مجلة كلية الإسراء
الجامعة للعلوم الهندسية

مجلة علمية محكمة تصدر عن جامعة الإسراء

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بسم الله الرحمن الرحيم

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
دائرة البحث والتطوير

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كلية الاسراء الجامعة / السيد العميد المحترم

م/ مجلة كلية الاسراء الجامعة للعلوم والهندسة

السلام عليكم ورحمة الله وبركاته ...

أشارة الى كتابكم المرقم م.ع/٢٣٩٨ في ٣١ / ١٢/ ٢٠٢٠ بشأن اعتماد مجلتكم واعتمادها لأغراض النشر والترقيات العلمية وتسجيلها ضمن موقع المجلات الاكاديمية العلمية العراقية ، حصلت موافقة السيد وكيل الوزارة لشؤون البحث العلمي بتاريخ ٢٠٢١/٨/٢٤ على أعتماد المجلة المذكورة في الترقيات العلمية والنشاطات العلمية المختلفة الأخرى ، واعتباراً من المجلد الثالث – العدد الثالث – لسنة ٢٠٢١ وتسجيل المجلة في موقع المجلات الاكاديمية العلمية العراقية.

للتفضل بالاطلاع وابلاغ مخول المجلة لمراجعة دائرتنا لتزويده بإسم المستخدم وكلمة المرور ليتسنى له تسجيل المجلة ضمن موقع المجلات العلمية العراقية وفهرسة اعدادها ... مع التقدير.

أ.م.د يوسف خلف يوسف
ء/ المدير العام لدائرة البحث والتطوير
٢٠٢١/٩/ ٦

نسخة منه الى:
- مكتب السيد وكيل الوزارة لشؤون البحث العلمي / أشارة الى موافقة سيادته المذكورة أعلاه والمثبتة على اصل مذكرتنا المرقم ب ت م٤/ ٤٥٧٦ في ٢٠٢١/٨/٢٣ / للتفضل بالاطلاع ... مع التقدير.
- قسم المشاريع الريادية / شعبة المشاريع الالكترونية / للتفضل بالعلم واتخاذ مايلزم ... مع التقدير
- قسم الشؤون العلمية / شعبة التاليف والنشر والترجمة / مع الاوليات .
- الصادرة .

مهند ابراهيم
٦ / أيلول

وزارة التعليم العالي والبحث العلمي – دائرة البحث والتطوير – القصر الأبيض – المجمع التربوي – الطابق السادس
قسم الشؤون العلمية sedep@rdd.edu.iq

تعليمات النشر

في مجلة كلية الاسراء الجامعة للعلوم الهندسية

- تصدر جامعة الاسراء (مجلة كلية الاسراء الجامعة للعلوم الهندسية) في مجلد سنوي يضم عددين.
- تقوم المجلة بنشر البحوث العلمية للباحثين في تخصصات العلوم الهندسية التالية:
  - هندسة العمارة
  - هندسة مدني
  - هندسة كيمياوية
  - هندسة الحاسوب
  - هندسة كهربائية
  - هندسة المواد
  - هندسة ميكانيكية

شروط النشر

1 - يطبع البحث بواسطة الحاسوب بمسافات مفردة بين الاسطر وبحجم خط 12 ونوع (Simplified Arabic)، اما العنوان باللغتين العربية والانكليزية فيكون بحجم خط 14 شريطة الا يزيد عدد صفحاته عن 15 صفحة بما في ذلك الجداول والاشكال والمراجع وعلى وجه واحد على ورق قياس A4 مع ترك هامش في حدود 2 سم من الاعلى والاسفل وهامش بحدود 3 سم من الجانبين الايمن والايسر.

2 - لا يفضل نشر البحوث من قبل رئيس واعضاء هيئة التحرير في المجلة سواء كان البحث منفرداً أو مشتركاً.

3 - يقدم البحث بثلاث نسخ ورقية ونسخة الكترونية بعد قبول البحث للنشر، يسلم البحث بشكله النهائي مطبوعا بالنظام الاعتيادي بمسافة منتظمة لكافة الصفحات عدا الصفحة الاولى التي تتضمن عنوان البحث و اسماء الباحثين وعناوينهم باللغتين العربية والإنكليزية متبوعا بالبريد الالكتروني للباحث الاول وعلى قرص مرن CD ببرنامج Microsoft Word / 2010.

4 - تقبل البحوث باللغتين العربية والانكليزية ويفضل كتابة البحث باللغة الانكليزية.

دليل المؤلف Author Guidelines

ادناه الشروط والمتطلبات الواجب مراعاتها من قبل الباحث للنشر في هذه المجلة بشرط أن لا يكون البحث قد نشر أو سينشر في أية مجلة هندسية أخرى ولم يمضِ على انجازه اكثر من أربع سنوات.

1 - يجب ان يكون عنوان البحث موجزاً قدر الامكان ومعبر عن البحث.

2 - اسماء الباحثين: تكتب اسماء الباحثين وعناوين عملهم بصورة واضحة مع البريد الالكتروني للباحث الاول.

3 - يجب ان يتضمن المستخلص موجزا واضحا عن البحث مكون من 250-300 كلمة متبوعا بكلمات مفتاحية 4-6. أذا كان البحث باللغة العربية فيكون المستخلص متبوعا بالكلمات المفتاحية اولا ثم المستخلص متبوعا بالكلمات المفتاحية باللغة الانكليزية ثانيا و العكس صحيح.

4 - المقدمة: تتضمن مراجعة المعلومات وثيقة الصلة بموضوع البحث الموجودة في المصادر العلمية وتنتهي المقدمة باهداف الدراسة وأساسها المنطقي.

5 - المواد وطرائق العمل: تذكر طرائق العمل بشكل مفصل ان كانت جديدة اما اذا كانت منشورة فتذكر بشكل مختصر مع الاشارة للمصدر وتستعمل وحدات النظام العالميSystem International of Units (S.I.Us)

6 - النتائج والمناقشة: تعرض بشكل موجز وهادف وبنظام متوالي وتعرض النتائج بافضل صورة معبرة وتوضع الجداول والاشكال في أماكنها المخصصة بعد الاشارة إليها في النتائج.

7 - يستعمل نظام الارقام العربية وهكذا في البحوث المرسلة للنشر وتمثل مناقشة النتائج تعبيراً موجزاً عن النتائج وتفسيراتها.

8 - تكون كتابة المصدر في القائمة المصادر متضمنة الآتي: اسم او أسماء الباحثين، سنة النشر وعنوان البحث كاملاً واسم المجلة ورقم المجلد والعدد وعدد الصفحات، مثال:

الخفاجي، جاسم محمود و حميد، محمد حسوني و كريم، حيدر حاتم، (2018) " دراسة تجريبية على الخرسانة مع استبدال جزئي للركام الخشن بواسطة المطاط غير المرغوب فيه".

مجلة كلية الاسراء الجامعة، المجلد 1 العدد 1، 217-243. و ممكن ان تكتب كالاتي: مجلة كلية الاسراء الجامعة، 1(1)،217-243.

9 - المستخلص الانكليزي يجب أن يكون وافياً ومعبراً عن البحث بصورة دقيقة وليس بالضرورة ان يكون ترجمة حرفية للمستخلص العربي و متبوعا بكلمات مفتاحية 4-6.

دليل المقيّم Reviewer Guidelines

أدناه الشروط والمتطلبات الواجب مراعاتها من قبل المقيم للبحوث المرسلة للنشر في هذه المجلة

1 - ملأ استمارة التقويم المرسلة رفقة البحث المطلوب تقييمه بشكل دقيق وعدم ترك أي فقرة بدون اجابة.

2 - على المقيّم التاكد من تطابق وتوافق عنوان البحث باللغتين العربية والانكليزية وفي حالة عدم تطابقهما اقتراح العنوان البديل.

3 - أن يبين المقيّم هل ان الجداول والاشكال التخطيطية الموجودة في البحث وافية ومعبرة.

4 - أن يبين المقيّم هل ان الباحث اتبع الاسلوب الإحصائي الصحيح.
5 - أن يوضح المقيّم هل ان مناقشة النتائج كانت كافية ومنطقية.
6 - على المقيّم تحديد مدى استخدام الباحث للمراجع العلمية الرصينة وحداثتها.
7 - أن يؤشر المقيّم بشكل واضح على واحد من ثلاث اختيارات وهي:
البحث صالح للنشر بدون تعديلات.
البحث صالح للنشر بعد اجراء التعديلات.
البحث غير صالح للنشر.
8 - يجب أن يوضح المقيّم بورقة منفصلة ما هي التعديلات الأساسية التي يقترحها لغرض قبول البحث.
9 - للمقيّم حق طلب إعادة البحث إليه بعد إجراء التعديلات المطلوبة للتأكد من التزام الباحث بها.
10 -على المقيّم تسجيل اسمه ودرجته العلمية وعنوانه وتاريخ اجراء التقييم مع التوقيع على استمارة التقييم المرسلة له رفقه البحث المرسل له للتقييم.

المصادر

1 - يشار الى المصادر في متن البحث كما يلي:
اللقب او الاسم الثالث للمؤلف والسنة اذا كان البحث بإسم باحث واحد، واذا كان مؤلفين فيذكران والسنة واذا كانوا ثلاثة فاكثر فيذكر اسم الاول واخرون والسنة.
2 - ترتب المصادر حسب الصيغة العالمية (APA) وكما بالامثلة المذكورة:
أ- بحث في مجلة.
اسم الباحث أو الباحثون، (السنة)، عنوان البحث، اسم المجلة، المجلد، العدد و صفحتي البدء والانتهاء للبحث.
ب- كتب.
اسم المؤلف أو المؤلفون، (السنة) عنوان الكتاب، الطبعة، دار النشر وعدد الصفحات.

ج- الرسائل والاطاريح الجامعية.

اسم الباحث، (السنة)، عنوان الرسالة او الاطروحة، العنوان (الكلية والجامعة) وعدد الصفحات.

د- بحث في وقائع مؤتمر او ندوة علمية.

اسم الباحث أو الباحثون، (السنة)، عنوان البحث، اسم المؤتمر او الندوة العلمية، مكان الانعقاد، صفحتي البدء والانتهاء للبحث.

ترسل البحوث الى مجلة كلية الاسراء الجامعة للعلوم الهندسية على العنوان الاتي:

جامعة الاسراء– قسم التوثيق والنشر

بغداد / العراق

البريد الالكتروني:

al-esraajournal@esraa.edu.iq

(تعهد الملكية الفكرية)

إني الباحث..... صاحب البحث الموسوم (.....
.....)

أتعهد بأن البحث قد أنجز من قبلي ولم ينشر في مجلة أخرى في داخل وخارج العراق وأرغب بنشره في مجلة (**مجلة كلية الإسراء الجامعة للعلوم الهندسية**) التي تصدرها جامعة الإسراء.

التوقيع:

التاريخ:

(تعهد نقل حقوق الطبع والتوزيع)

إني الباحث..... صاحب البحث الموسوم (.....
.....)

أتعهد بنقل حقوق الطبع والتوزيع والنشر إلى مجلة (**مجلة كلية الإسراء الجامعة للعلوم الهندسية**) التي تصدرها جامعة الإسراء.

التوقيع:

التاريخ:

المحتويات

الظاهراتية وأدارة البيئة الحضرية في المدينة

(شارع الرشيد حالة دراسية)

م.د. هديل موفق محمود

الجامعة التكنلوجية – قسم الهندسة المدنية، بغداد \ العراق

Phenomenology and Urban Environment Management in the City (Al- Rasheed Street Field Study)

Lect. Dr. Hadeel Mowaffaq Mahmood

Department of Construction Engineering-University of Technology, Baghdad / Iraq
Alabdaa.tanmea@yahoo.com

المستخلص

إن مايميز دول العالم النامي ومنها العراق إنها تمتلك إدارة ضعيفة للبيئة الحضرية، وهذا واضح من خلال الواقع الفعلي لهذه المدن ونوعية المشاكل المصاحبة لها ونوعية الدور الذي تؤديه المؤسسات المعنية بهذه الإدارة، وذلك لأسباب عدة لعل من أهمها عدم التنسيق وعدم التنظيم للجهود المبذولة بين كافة الجهات المعنية بإدارة البيئة الحضرية، وهذا يرجع بدوره الى أسباب أخرى منها المؤسسات وعدم الترابط بمهامها وعدم تمكنها من مواكبة التطورات الجديدة في المدن فيتطلب أساليب ادارية تقلل من ضعفها،كما إن ضعف التمويل والتمتع بالصلاحيات لها أبلغ الأثر في تحجيم الدور الذي من الممكن تؤديه هذه الجهات في عملية تنشيط وتطوير إدارة البيئة الحضرية والاهتمام بالمكان وروحة التي عرفت بها الظاهراتية،. وفي الواقع ان الانسان والتقدم الحديث قد امن بـأن العلم والتكنولوجيا قد حررته من الاعتماد المباشر على الاماكن،وهذا المعتقد قد اثبت انه لم يتحقق و من متطلبات الحياة يجب ان لاتفقد روح المكان وخصوصيتة وهذا ما عرف في شارع الرشيد، فالتلوث والفوضى البيئية قد ظهرتا بشكل مفاجئ على انهما نقمة رهيبة ونتيجة لذلك فأن مشكلة المكان فقد مكانته الحقيقية التي يتمتع بمكانتها التاريخية،. فيتطلب تحديد اسس وطرق لحماية هذا المكان للحفاظ على خصائصة بالاعتماد على اساليب ادارية وتنفيذية تحقق الرفاهية والحفاظ على خصوصية المكان.

الكلمات المفتاحية: الظاهراتية، المكان، البيئة الحضرية و شارع الرشيد

Abstract

What distinguishes the developing world countries, including Iraq, is that it has weak management of the urban environment, and this is clear through the actual reality of these cities and the quality of the problems associated with them and the quality of the role played by the institutions concerned with this management, for several reasons, perhaps the most important of which is the lack of coordination and lack of organization for the efforts made between all sides Concerning the management of the urban environment, and this in turn is due to other reasons, including institutions, lack of coherence in their tasks, and their inability to keep abreast of new developments in cities, so it requires administrative methods that reduce their vulnerability, and that weak financing and enjoying powers have the most impact in limiting the role that these entities can play in The process of revitalizing and developing the urban environment administration, taking care of the place and the spirit in which phenomena were known In fact, man and modern progress have believed that science and technology have freed him from direct dependence on places, and this belief has proven that it has not been achieved and from the requirements of life must not lose the spirit of the place and its specificity and this is what was known in Al-Rashid Street, so pollution and environmental chaos have appeared suddenly However, they are a terrible curse, and as a result, the problem of the place has lost its true position, which enjoys its historical position.

Keywords:Phenomenology, Location, Urban environment and Al-Rasheed street.

المقدمة

المدينة ومكوناتها من الامور المهمة التي يتطلب الاهتمام بها وخاصتا الموافع التي تمتاز بمانة تاريخية والبحث تطرق لموقع شارع الرشيد واخذ جزء منه لتحديد اهمية المكان وابراز خصائصة واعطاء انطباع لاهمية المكان والاحساس بخصوصية المكان ومميزاته وتحديد جهات تساعد على تنميته من الادارة المحلية وتفعيل الخدمات في هذا الموقع لاهميته التاريخية. وترابط بين شاغلي المكان ومرتادية مع محتويات المكان وابراز روح المكان وشعور الترابط بين المكان ومرتادية او من يشغلة وما متطلباته لاحياء المكان وادامته وجعل تنميتة بشكل مستدام وخاصتا ان كان موقع ذات خصائص تاريخية ومكانة كما في شارع الرشيد في حالة دراسية لهذا البحث. ومعرفة اهم المعوقات والمشاكل التي يتطلب الحد منها وايجاد طرق تحافظ وتديم المكان وتحافظ عليه.

مشكلة البحث: تلاشي الشعور بالمكان والانتمائية والحفاظ عليه وضعف بالادارة المحلية وتقديم الخدمات في المدينة يتسبب بظهور عدد من مشاكل المدينة.

أهمية البحث: ابراز روح المكان وتنامي الشعور بالانتمائية له والحفاظ على المواقع ذات خصائص عمرانية مميزة.

هدف البحث: الاهتمام بالمكان ومحتواه الذي يكون المدن يتميز بمتطلبات لجعلة مثالي اعتمادا" على اساليب وطرق أدارية تحقق هذا الهدف.

فرضية البحث: أن وجود أدارةحضرية مفعلة والاهتمام بالمكان يحقق مدن مثالية وملبية لمتطلبات مجتمعها.

1 – الظاهراتية

هي مدرسة فلسفية قائمة على مبدأ القصدية هدفها الاساسي هو دراسة الظاهرة او المظاهر لخبرة الانسان، من خلال محاولته تعليق كل الاعتبارات لحقيقتها الموضوعية او الارتباطات الذاتية ان دراسات الظاهرة،هي تلك التي تختبر في الفعاليات المختلفة من الوعي والتي تتعلق بشكل اساسي بفعاليات الادراك المعرفي والحسي بالاضافة الى فعاليات التقييم والتقدير او الاستيعاب الجمالي، وتعرف البيئة بشكل واقعي او حقيقي وبترابطها على انها المكان والاشياء التي تحدث فيه تحل مكانا"، وهي الموقع الذي يتألف من اشياء واقعية والتي لها وجود مادي، هيئة، ملمس، ولون والتي تندمج مع بعضها لتشكل هوية المحيط البيئي و يسمح بفضاءات محددة التي لها نفس الوظائف ليستوعب خواص مختلفة جدا بما يتفق مع الثقافة الفردية والحالات البيئية للمكان الذي توجد فيه،(عبد الرحمن،2017). تعد الظاهراتية على انها العودة الى الاشياء كنقيض او بالمقارنة مع الاشياء المجردة والتراكيب الفكرية،وبهذا قادت الى تجدد الاهتمام للخواص الحسية للمواد للضوء واللون والاهمية الرمزية للمفاصل.وعلى انها مؤثرة بشكل كبير في افكار مجموعة من المصممين المعاصرين امثال (Tado Ando– Steven Holl) والمخطط الحضري "Paul Virilio"، في ظاهرة المكان " يتفق Schulze مع تأثير كتاب Kevin Lynch image of the cityوالذي يصف فيه العناصر التي تصنع المدينة "legibile" ان العناصر التي حددها Kevin Lynch هي الملامح الموجهة للمدينة والتي تعمل كمكان الاساسي له (غيث،2018).

1-1 الظاهراتية والعمران.

أن الظاهراتية والعمران وتاثرة بها يكون بالاهتمام والتحسس بالمحيط وما يتضمنه حيث تعرف بكونها الاحساس بالمكان او الاندماج في الموقع (ان يحتل محلا في الموقع) للتشديد على والتركيز على دقة هيكل او بنية الطبيعة وفهم الانسان لها، وايضا" تعرف عمرانيا بأنها Tectonics(بناء متعلق بشكل الارض) التي بينها Schulze في

طروحاته التي تعتبر استجابة للموقع وربط مع الطبيعه بتأطير المشاهد، وتمثل الاشياء التي تحيط الجسم تعكس فعلها الممكن عليها (حسين , 2016) فعرفها Schulze هي امكانية او قدرة الظاهراتية في العمارة على انها قادرة على جعل البيئة ذات معنى من خلال خلق اماكن معينة، فأن الظاهراتية تمثل الترابط وتبعد الفصل بين المثالية والواقعية، وتبطل الفصل بين الفرد والعالم بمعتقد الذي فيه يكون الاثنان لايمكن فصلهما، و ان العمارة لم تكن فقط حول التفكير اذ انها كانت حول الشعور وان ذلك الشعور يعتمد على الوقت والمكان والموضوع وان العمران و الاشياء المبنية تخلق مكانا لاحداث وجودية تترابط فيما بينها (عبدالعزيز، 2017).

2 - الظاهراتية والمكان

أن من اساسيات تكوين العمران في المدينة هو شعور الترابط مع المكان وابراز اهميته ووجوده في المدينة بتحقيق اساسيات التي تتضمنها الظاهراتية وهي الاهتمام بالمكان وتكوينة وبنيتة التي يتم التعرف عليها فيمايلي:

2-1 ظاهرة المكان

ان الطبيعة تشكل بشكل ممتد للمكان والذي يمتلك هوية معينة وهي "الروح" يمكن وصفها بواسطة نوع من الخصائص النوعية الحقيقية التي يستخدمها Heidegger ليميز الارض والسماء، وعليه ان يتخذ من هذا التمييز الاساسي نقطة للشروع، وبهذه الحالة نصل الى فهم وجودي للـ landscape والذي يجب الحفاظ عليه ويتركز المعنى الطبيعي للبيئة (النجار , 2009)، ان اجزاء البيئة التي هي من صنع الانسان هي اولا تكون عبارة عن "مستقرات" لمقاييس مختلفة ابتداءا من البيوت والمزارع صعودا الى القرى والمدن وبالدرجة الثانية هي "ممرات "تربط هذه المستقرات بالاضافة الى العناصر المختلفة والتي تحول الطبيعة الى" cultural landscape". فاذا كانت هذه المستقرات ذات علاقة عضوية مع الطبيعة فأنها تتضمن كونها تخدم المكان، الميزةالاساسية للاماكن التي هي من صنع الانسان هي enclosure – concentration. انها "insides" بالمعنى الكامل

والتي تعني بأنها "تجمع gathering" ماهو معروف وبمجال ابعد من ذلك فان المباني ترتبط مع البيئة من خلال استقرارها على الارض وارتفاعها باتجاه السماء واخيرا فان المحيطات البيئية المصنوعة من الانسان comprise artifacts والتي تخدم كمكان داخلي foci يركز على وظيفة التجميع للمستقر، وأن روح المكان "genius loci والتي عرفها القدماء على انها "opposite man" والتي يجب ان يتعايش معها الانسان لكي يتمكن من السكن وهي الاساس للمكان وتعد من خلال وصفه لهيكل المكان على انه يتألف من فضاء له ميزة (رزوقي، 2007).

2-2 بنية المكان (Garriga, 2010)

يتميز المكان ببنية تتمثل بوجود مفهوم الفضاء والميزة وترابط المفهومين لتوليد المكان الواقعي فبينما كلمة الفضاء تعني التنظيم ثلاثي الابعاد للعناصر التي تصنع المكان فأن الميزة تعني الجو العام "atmosphere" والذي يعتبر الملكية الشاملة لاي مكان، وتعد الظاهراتية هو بناء فضاء واقعي او حقيقي وقد تعمق Kevin Lynch في بناء الفضاء الواقعي او الحقيقي مقدما مفاهيم بشأن (العقدة و العلامات الدالة والممرات والقطاعات والحافات) ليعرف هذه العناصر والتي تكون الاساس لتوجيه الانسان في الفضاء لتكوين المكان، الذي يتضمن الفضاءات التي تمتلك درجة مختلفة من التمدد والاحتواء، وأن للمكان حدود هي ليست النقطة التي يقف عندها الشيء ولكن هي التي من عندها يبدأ الشيء وجوده كما عرفها الاغريقيون، وتعرف بنية المكان الميزة التي تحددها المادة والبناء الشكلي للمكان، وعليه فأن ظاهرية المكان هي ان تجمع modes الاشكال او الصيغ الاساسية للبناء وعلاقتها بالتوجيه الشكلي.

3 – الظاهراتية والتخطيط الحضري وتصميم المدن (Salingaros, 1999)

أن العمارة وعمران المدن من اولويات تكوين المدينة فبالتطور والتكنلوجيا وتطبيق الاسس الحديثة و الحداثة المبني، ولدت عدد من المتطلبات للاحتواء والترابط المكاني، فعرفت كتابات Heidegger بأنه اوضح ان الحداثة ادت الى مشاكل في المعنى من خلال خلق بيئة تخطيطية وظيفية التي لاتسمح للشخص بالسكن dwell وفي مقال كتب من قبل معماريين المان ونشر في Berlin journal بأن "العمارة هي تعمق penterationحيوي وتداخل لواقعية هيكلية ومتعددة الطبقات وغامضة. وهي تتطلب دائما التعرف او التمييز لروح المكان التي تنشأ عنها"وأن العلاقة بين الذات والموضوع قد حسمت فالعمارة هي المحيط والملجأ للفرد وعليه اعادة تقديم البعد الظاهراتي في تفسيرنا للبيئة المبنية اصبح مهما للمباني و بان البناية هي تداخل بين الارض والسماء وترابط المكاني وظهر هذا خاصتا للمباني الحديثة.

4 – الظاهراتية والبيئة الحضرية للمدينة(بوخش، 2004)

أن المدينة ومكوناتها تتطلب الحفاظ على بيئتها وخاصتا" البيئة الحضرية، حيث تتمثل بنسيج ذو هيكل غني في تركيبة معقد، يتكون من خليط متجانس من الابعاد الطبيعية المشيدة الاقتصادية الثقافية والاجتماعية، ويتم التعرف على المحيط الذي يعيش فيه الانسان عن طريق تعريف البيئة الحضرية كونها تعبر عن نظره شمولية للمكونات المختلفة للنسيج الحضري الذي يعيش فيه الانسان، وأيضا هي النسيج المادي المعبر عن ناتج تفاعل الإنسان مع بيئته بهدف إشباع متطلبات الإنسان المادية والروحية في إطار محددات خلفياته الثقافية والإجتماعية والفكرية، وأن الطبيعة والمدينة علاقة متبادلة يتطلب الاهتمام بها حيث الطبيعة تكون فيها علاقة مباشرة بين الانسان ببيئته وأهتمامه بالمكان، أذ يتعامل معها بتلقائية وبدون وسيط لسد متطلبات الحياه التي

يتطلب توفرها له، أما في البيئة الحضرية المخططة فتنقطع تلك العلاقة المباشرة بين البيئة والانسان الذي يعيش فيها وعدم ترابط بسبب تدخل أطراف عديدة وهي المؤسسات والتشريعات والتنظيمات وغيرها.

4-1 مكونات البيئة الحضرية

تتكون البيئة الحضرية كل ما عليها من صنع الانسان من مباني ومابينها من فراغات، معناه كل شيئ من صنع الانسان ويمكن أعتبار أن البيئة الحضرية تتشكل بوجود عنصرين أساسيين لتشكيلها هما الكتل والفراغات والعلاقة بينهما هما الاساس الذي تتشكل البيئة الحضرية من خلاله، والكتل هو المباني والفراغات هي المسارات والفراغات بين الابنية التي تنتشر وتتخلل بين الكتل العمرانية، ويمكن تعريف الفراغ العمراني الذي يعرف من عدة جوانب من حيث التكوين والشكل، بأعتباره أن جميع أنواع الفراغات بين المباني هي فراغات حضرية، حيث ترتبط واجهات المباني المحيطة بالفراغ بشكل هندسي وجمالي وتكون علاقة ترابطية تساعد على أدراك الفراغ الخارجي كفراغ حضري بسبب العلاقة بين الناحية الهندسية والجمالية تساعد على أدراك الفراغ الخارجي (جعفر 2006).

4-2 إدارة البيئة الحضرية

أن أغلب المدن تمتلك إدارة ضعيفة للبيئة الحضرية وهذا واضح من خلال الواقع الفعلي لهذه المدن ونوعية المشكلات المصاحبة لها ونوعية الدور الذي تؤديه المؤسسات المعنية بهذه الإدارة،وذلك لأسباب عدة لعل من أهمها عدم التنسيق وعدم التنظيم للجهود المبذولة بين كافة الجهات المعنية بإدارة البيئة الحضرية وهذا يرجع بدوره الى أسباب أخرى منها المؤسسات الموروثة وعدم تمكنها من مواكبة التطورات الجديدة في أساليب الإدارة، مما يؤدي الى ضعفها كما إن ضعف التمويل والتمتع بالصلاحيات الكافية لها أبلغ الأثر في تحجيم الدور الذي من الممكن تؤديه هذه الجهات في عملية تنشيط وتطوير إدارة البيئة الحضرية وتطبيق القوانين والتشريعات العمرانية , ومن الواضح إن هناك تداخل في المفاهيم والقضايا التي ترتبط بالإدارة لذلك كان لابد من التطرق الى هذه المفاهيم وتحديد معالمها الواضحة لمنع اللبس الذي ممكن أن يحصل (الشربيني، 2004).

الإدارة بشكل عام (تحقيق الأهداف المنشودة بإسلوب كفوء وفعال عن طريق التخطيط والتنظيم والقيادة والتحكم في الموارد). وفي مجال الإدارة للبيئة الحضرية للمدن يجب ان يتم التفريق بين مصطلحي الإدارة التقليدية (Administration) والتي تعني (إدارة المؤسسات) وبين مصطلح الإدارة العلمية (Management) والتي تعني الإدارة المرتبطة بالتخطيط وتطبيق القوانين والتشرعات العمرانية (رزان،2018).

وكان من بين المفاهيم المنتشرة بالوقت الحاضر مايعرف الإدارة الحضرية (Urban Management) إذ يتضمن المفهوم الفكري للإدارة الحضرية ثلاثة عناصر رئيسة وهي (أمين،2004):

أ- الاهتمام بالمناطق الحضرية وتقديم الخدمات.

ب- إعادة تقويم الأهمية الإقتصادية للمدن.

ج- إعادة التأكيد على أهمية بناء المؤسسات المحلية من أجل التنمية.

المنظومة التي تهتم بكيفية تحديد وإختيار المسؤوليات اللازمة من أجل تنفيذ إجراءات محددة لتحقيق تحسن في نوعية البيئة الحضرية في المدينة).

وهناك من عرفها على إنها (منظمة مركبة من المفاهيم والقيم والقوانين والسلوكيات والمنظمات لتقوم بترجمة أهداف وأولويات الى مخططات عمل من أجل التأثير في نوعية البيئة الحضرية). اما في البعد العملي لإدارة البيئة الحضرية فإنها تتضمن بعدين مترابطين(Muskegon Homeowners،2006):

أ- أن توفر أدارة البيئة الحضرية معناه توفير مستوى معيشي جيد ينتج خلق بيئة حضرية متوازنة وصحية وذات بيئة أمنه، يتم كل هذا بتواجد أدارة بيئية حضرية متوازنه للمدينة.

ب- أدارة البيئة الحضرية.هي الادارة التي تهتم ببيئة المدينة ومكوناتها حيث تعمل على تفعيل مبادئ الاستدامة وتنميتها في المدينة والاهتمام بالموارد الطبيعية بطرق مستدامة وأستخدام طرق وأساليب تقلل الى أقصى حد ممكن من تلوث البيئة الحضرية في المدينة والحد من الاسباب التي تساعد على تلوث البيئة الحضرية لحماية المدينة ومجتمعها.

4-2-1 المشكلات الرئيسية التي تعالجها إدارة البيئة الحضرية

أن البيئة الحضرية تتعرض لعدد من المشاكل وعدد من التغيرات في المدينة وتتغير من مدينة الى أخرى ومن أقليم الى أخر ومن دولة الى أخرى، حيث تتأثر بعدد من التغيرات مثل حجم المدينة ومكوناتها ومدى الحضرية فيها ومعدل النمو السكاني والنمو العمراني، ومستوى المجتمع الساكن للمدينة ومستوى الدخل له، والشكل والبيئة الطبيعية للمدينة ومنها التضاريس وغيرها، ومدى تأثر المدينة بالمناخ ومدى تأثر المدينة بالنظام المؤسساتي وقدرات المؤسسية والترابط والتعاون بينهم ومدى توفير الخدمات للمجتمع المدينة ومجاوراتها وغيرها، وتشير الكثير من الدراسات والبحوث الى تصنيفات مختلفة لهذه المشاكل يمكن أن ندرجها كمايلي (زاهر 2023):

1 - مشكلات تتعلق بتلوث الوسط الطبيعي مثل تلوث المياه , الهواء , الصوت...
2 - مشكلات تتعلق بإدارة الموارد مثل الطاقة , الموارد المائية , الموارد الغذائية , الأراضي الزراعية , مواد البناء ,....
3 - مشكلات تتعلق بالنواحي الحضرية مثل إدارة الأرض , الفقر الحضري , التجاوزات , والحفاظ , والأثر البيئي , والمناطق المفتوحة , وتوفير الخدمات العامة ,.... إلخ.

4-2-2 مشاكل ومعوقات إدارة البيئة الحضرية(بلال , 2019)

1 - أتخاذ القرار مختلف بسبب تعدد مستويات القرار وخاصتا" على المستوى المحلي وهي ومن المشاكل أيضا" تعدد القرار بشأن التمويل وتوفير المبالغ التي تزود للمراكز الحضرية التي تساعد على توفير الخدمات.
2 - عدم وجود ترابط متناسق بين الجهات التي تدرس وتخطط لحل المشاكل والجانب الثاني الاساسي المراكز الحضرية وأيضا مع الجانب الاساسي الثالث والمهم الجهة الممولة التي تساعد في تزويد المبالغ لحل المشاكل القائمة وتنفيذ المشاريع المحددة لحل المشاكل القائمة، وهذا عدم التنسيق يولد عدد من التبعات وهي

أ- التأخر في اتخاذ القرار بسبب التضارب في الآراء بين التنظيم الإداري الراسي (قومي، إقليمي، محلي) وبين التنظيم الإداري الأفقي (الدوائر والقطاعات المحلية).

ب- بالإضافة إلى الازدواجية في العمل وفي بعض الأحيان تضارب بين الجهات المنفذة في الأداء، وبالتالي التأخر في التنفيذ.

3 - أن عملية التخطيطية وتوفير متطلبات المراكز الحضرية، يتطلب توفير قاعدة بيانات ومعلومات كافية لتحديد المشكلة وحلها بالاعتماد على الكوادر فنية متخصصة وهذا يفتقر اليه، مما يولد قصور في العملية التخطيطية والادارية التي تقلل من كفاءتها في متابعة الامور وتقييم الواقع ومتطلباته.

4 - أن الحكومة المركزية واجهزتها المحلية هي التي تمول وتنفق وفق تخصيصات محددة من ميزانية الدولة، تعمل على توفير الخدمات والبنى التحتية وتوفير الخدمات لسكان المدينة ومتطلباتهم، وهي التي تتحمل أعباء التمويل والانفاق لاداء هذه الوظائف وأتمام متطلبات المدينة ومجتمعها.

ويمكن إدراج المعالجات التالية (Shabbir, 1993).

1 - تفعيل مبدأ المركزية في عملية التخطيط واللامركزية في التنفيذ كأ سلوبين متكاملين ومترابطبين في التطبيق، وأعطاء المرونة وأستخدام اللامركزية في مراحل معينة، ودعم للعمل المركزي خاصتا" لمراحل العمل الاداري في أتخاذ القرار حيث يتطلب تطبيق دعم للسلطات المحلية في مجالات عديدة ومنها.

أ- تخصيص موارد مالية كافية لسد حاجة تطبيق المشاريع المخططة وحاجة مجتمع المدينة وتعزيز الموارد المحلية.

ب- تحسين مستويات القيادة ودعم نظم التدريب، وإعطاء الأولوية على بناء قدرات الإشراف والمتابعة والتخطيط والبحث والتحليل.

ج- إعادة تنظيم الهياكل الإدارية للتنفيذ، بما يحقق التنسيق والمتابعة وبالتالي تحقيق الأهداف المتمثلة بتوفير بيئة حضريه مستدامة.

د- إجراء إصلاحات لآليات العمل الإداري وتغير التشريعات بما يوفر البيئة المطلوبة.

هـ- توفير المرونة الكافية والسرعة في معالجة المشاكل وتقدير المستلزمات وتحديد التكاليف وإقرار النفقات.

1 - المشاركة المحلية أساسية وخاصتا" مشاركة ممثلي السكان من وجهاء ومن يمثل المجتمع في الاحياء والمحلات السكنية، وأيضا" مشاركة أصحاب الاموال وممن يعمل كمستثمرين في تلك الاحياء كأعضاء أساسسين في مناقشة وصياغة ووضع حلول لخطط البيئية الحضرية، كونهم ممن يعيش وأقرب شخص متعايش و يحدد حاجة المجتمع، وأعطاء دور ومهام لهم في توفير بيئة حضرية مستدامة.

2 - أن التعاون بين القطاع الخاص والحكومي يولد حشد للموارد والطاقات في المجتمع بالاعتماد على أطر ومحددات قانونية وتنظيمية ومالية للاستفادة العالية بأقل جهد ومورد ممكن.

3 - وضع برامج وأليات لتقييم ومتابعة نسب الانجاز مايتم تحقيقه من الاهداف المخططة، ومتابعتها من قبل جهات حكومية ومحلية وخاصتا" من ممثلي الاحياء والمناطق الحضرية التي وضعت الخطط لها. وأشراك جهات مختصة ومنظمات مجتمع مدني تهتم بهذه المجالات لسد حاجة المجتمع وتوفير متطلباتهم.

4 - أن دراسة النمو الحضري المستقبلي عند توفير الخدمات وأستخدام الاراضي في الاحياء بمبادئ تفعل الاستدامة وأستخدام الارض الامثل خاصتا" عند دراسة دمج القرى المتقاربة في المجالس البلدية له اهمية كبيرة عند المدينة، وايضا" من المتطلبات التاكيد على أهمية الحفاظ على التنوع في أنماط النشاط الاقتصادي كجزء أساسي في متطلبات النمو حضري المستقبلي.

5 - الاهتمام في توفير مؤشرات للبيئة الحضرية تكون تخدم وقت تدوينها وأزمنة مختلفة وقابلة للمقارنة والتحليل بين المناطق المختلفة حسب الحاجة وتوفيرها لرصد التغيرات الحضرية في تلك المناطق الحضرية، ويعمل على توفيرها جهات تابعة للقطاع الخاص او العام كالشركات او دوائر البلدية او النقابات، منظمات المجتمع المدني، الاكادميون والاساتذة

المختصين بتخطيط المدن او منظمات المجتمع المدني التي تهتم بالمدينة ومتطلباتها او ذات العلاقة.

- من هذه الدراسة يتم التعرف على الاهتمام بالمكان وبالبيئة الحضرية للمدينة ومكوناتها، ومن المسؤول عن حمايتها والحفاظ عليها ودور الادارة الحضرية للمدن، ومن المواقع المهمة في مدينة بغداد يتطلب دراسة شارع الرشيد للموقع المحصور بين ساحة الميدان وساحة الرصافي لاهميته هذا الموقع ومعرفة خصوصيتة اعتبارة نموذجا" لمكانته التاريخية والاثرية بتكوين زيارة ميدانية واستبيان للمكان والتعرف على دور الظاهراتية والادارة الحضرية فيه واعتماد دور المجتمع ومتخذي القرار في تحديد اهمية المكان والحفاظ عليه باعتماد على نتائج الاستبانة في ابراز أأهمية الموقع المحدد.

صورة بنورامية تبين بداية شارع الرشيد (موقع الميدان) وانتشار العشواءيات وتهرء للمباني التاريخية في بداية شارع الرشيد /المصدر الباحثة من خلال الزيارة الميدانية

صورة بنورامية تبين اختلاف خط السماء وخصوصية المكان واستخدام مواد بناء وتصاميم مختلفة لخصائص المكان واهميته التاريخية والحضارية / المصدر الباحثة من خلال الزيارة الميدانية

صورة بنورامية تبين التشوة البصري والضجيجي والانتشار النشاط التجاري وتلاشي خصوصية المكان واهميته التاريخية والحضارية / المصدر الباحثة من خلال الزيارة الميدانية

- تم أستبانة عدد من افراد المجتمع خلال الزيارة الميدانية ومتخذي القرار والمهتمين بهذا الموقع، وأستنتج عدد من المشاكل وعجز كبير في الرقابة و تطبيق القوانين والتشريعات العمرانية وتجاوز على المباني وعدم الاستخدام الامثل للمباني واستثمار الوظيفة الاساسية بنشاط تجاري وهذا برز في عدد من مباني المطلة على شارع الرشيد وانتشار التشوة البصري بسبب اعادة بناء لمباني بمواد وتصاميم واختلاف الارتفاعات مما ولد فقدان الخاصائص التاريخية و أنتشار الباعة المتجولين وتجاوز على مواقع عديدة بتغيير الوظائف الاساسية للمباني واحلالها باخرى وتلاشي أهمية المباني تاريخية وتراثية وأستعمالها كمحلات تجارية او مخازن وتغير في وظيفتها الاساسية وفقدان خصوصية المكان وايضا" انعدام الصيانة وفقدان المتابعة وتنامي مشاكل في الهيكل الانشائي لعدد من المباني التاريخية والتراثية وتسبب تهرء لعدم الصيانة وعدم الاهتمام بالمباني وواجهاتها وأبرازالتشوة البصري واغلبها وقف وليست املاك خاصة وعرف الموقع في ألاغلب موقع تجاري ونسبة السكن قليلة أغلب المباني مستغلة لاغراض تجارية،وايضا" انتشار عدد من المباني المتهرءة بسبب مرورها بتغير بالنظام الهيكلي ولتعرضها لضروف جوية اواهمال وعدم الصيانة او يتم صيانتها بجوانب محددة من قبل القوانين والضوابط للمواقع التاريخية فشكلت مباني مهدمة وغير صالحة للاستعمال وعدم وجود ترابط بالسياق الحضري للمنطقة وعدم تطبيق

القوانين والتشريعات العمرانية والحفاظ للمناطق التاريخية تسبب فقدان خط السماء وبأرتفاعات مختلفة وتلاشي اهمية المكان وبسبب تزايد عدم الشعور بروح المكان وعلى الرغم بتزايد انتشار الطبقة المتوسطة والضعيفة من المجتمع في هذا الموقع تتميز بالدخل المحدود،وتحديد انواع وطرق الحفاظ واعادة التاهيل او الصيانة وعدم المرونة بتنفيذ القوانين ولا مساعدة متخذي القرار،مما ولد تهرء وتهديم عدد من المباني على الرغم من تطلب مساهمة الجهات المختصة واعادة تشغيل للمباني للحفاظ عليها واستغلالها لوظائف تعمل على ادامتها وحمايتها من التلف،وتفعيل دور الرقابة والتقييم وتفعيل دور الادارة الحضرية والقوانين والتشريعات العمرانية واعطاء دور للمجتمع وسكان الموقع للمساعدة وحماية المباني والمحافظة على الارث التاريخي لهذا الموقع.

استنتاجات

1 - عرفت إدارة البيئة الحضرية، بأنها عملية توفيق بين الأنشطة والخدمات من جانب والإدارة من جانب آخر و نوعية البيئة من جانب ثالث، أي تنظيم و تنسيق العلاقات المترابطة بين الجوانب الثلاثة وبما يحقق الأهداف الموضوعة تحقق تنمية واستدامة المكان ومحتواه.

2 - المدينة ومكوناتها اساس لحياة مثالية ولكن عدم الاهتمام بالمكان ومحتوياته يولد مشاكل بسبب عجز الجهات المتخذة القرار والمنفذة او المجتمع الشاغل لحمايته.

3 - ان التجاور المكاني ياخذ البعدين معا الموقع location والموضع site

4 - أن علاقة الانسان بالبيئة المحيطة بهه تعرف بالظاهراتية وعلى تكامل الانسان مع مايحيطة وانها تهدف الى خلق بيئة تختبر على انها ذات معنى من خلال تحقيق الانتماء المكاني.

5 - عرفت التجربة الحسية يعقبها اندماج وتحول للشعور الانفعالي الى شعور واع وعقلي لاهمية المكان وتلاشي دورة ومكانته فتتداخل معطيات الحس مع الذاكرة والتجارب الماضية والخيال الذي يقوم بالمزج بينهم عند معرفة الموقع واهميته وابراز روح المكان لدى مجتمع هذا الموقع.

التوصيات

1 - تفعيل مبدأ الظاهراتية كونها تهتم بالتحول من الفضاء بابعاده المجردة الى مكان يمتلك وجود وخصائص او سمات ورمزية بالنسبة للمتلقي وتبرز خاصتا" في التصميم الحضري بكونه ايجاد بيئة حضرية ذات معنى من خلال تحقيق الاحساس بالمكان.

2 - الاهتمام بالمنطقة التراثية المتمثلة بالمباني أو الشواخص التاريخية واعتبارها كنقاط جذب بسبب دورهـا الكبير من الناحية الاقتصادية والاجتماعية، لاسيما وأن المجتمع الانساني ينحى نحو اقامة شبكة من العلاقـات الانسـانية المتكافئـة والهادفـة الـى التعـرف المتبـادل بيـن حضارات الأمـم والشـعوب، وبذلك فـان الموروث منها يعكس هويتها ويبرز انجازاتها ولتكون بذلك عنصر الجذب السكان لها وفي ضوء هـذه الحقيقة عدت المواقع التراثية ركيزة اقتصاديـة في البلد لأنهـا تحقق مردودات مادية ومعنوية.

3 - الاهتمام بالمناطق التاريخية وابراز مكانتها وزيادة الوعي بكونها هوية المدينة وتاريخها المزدهر وتسخير اغلب الطرق والاساليب التي تعمل على الحفاظ على هذه المناطق وأدامتها.

4 - التركيز على قيمة واهمية التراث والمكان والهوية الثقافية لهذه المنطقة من خلال زيادة الوعي للمجتمع وللدوائر الخدمية وتقديم الخدمات والمتابعة وتفعيل دور القوانين والتشريعات الخاصة بهذه المواقع بصورة مرنة لتسهيل الحفاظ عليها وابراز أهمية المناطق التراثية والتاريخية للمدينة.

5 - تشجيع العمل المؤسساتي المتمثل بالمنظمات وشركات القطاع الخاص في إدارة هذه المواقع من خلال التوظيف المثالي الاستثمار للمباني التاريخية وموارد التراث الثقافي وتفعيل دور المجتمع بسبب الازمات المالية التي تعاني منها خزينة الدولة وضعف في تطبيق القوانين والمتابعة وتفعيل دور الادارة الحضرة لهذا الموقع، بشرط الحفاظ على القيمة والتراثية بالمقام الأول وتفعيل دور المتابعة من قبل الجهات الرسمية او مكاتب استشارية متخصصه.

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أستمارة الاستبيان

عزيزي المواطن الكريم... المعلومات المطلوبة في هذه الاستمارة لاغراض علمية فقط ويرجى وضع علامة أمام ماتراه مناسبا للاسئلة المقدمة ادناه.

- **الحالة التعليمية أبتدائية أو أقل ☐ شهادة ثانوية ☐ معهد او كلية ☐ شهادةعليا ☐**

- **هل انت من سكان موقع الدراسة** **نعم ☐ لا ☐**
- **هل انت من المهتمين او المتخصصين في الحفاظ على المناطق التاريخية** **نعم ☐ لا ☐**
- **وجود متابعة وأهتمام لموقع الدراسة من قبل الجهات المختصة** **نعم ☐ لا ☐**
- **وجود دور للمجتمع وسكان منطقة الدراسة في حماية والحفاظ على المباني المشيدة** **نعم ☐ لا ☐**
- **وجود توفير للخدمات المقدمة والمتطلب توفيرها ومتابعة من قبل الجهات الحكومية والمختصة بحماية المناطق التاريخية** **نعم ☐ لا ☐**
- **تنامي مشاكل موقع الدراسة بسبب المرتادين والمجتمع المار بموقع الدراسة** **نعم ☐ لا ☐**
- **وجود اهمال بمتابعة الجهات المختصة للمباني لموقع الدراسة** **نعم ☐ لا ☐**
- **الانتماء للمكان من قبل شاغلي المباني المنتشرة في موقع الدراسة** **نعم ☐ لا ☐**
- **ترميم وصيانة المباني تتحدد بقوانين وضوابط المناطق التاريخية** **نعم ☐ لا ☐**
- **دور المجتمع وسكان موقع الدراسة في الحفاظ على الموقع اكثر من الجهات المختصة** **نعم ☐ لا ☐**
- **تنامي التشوة البصري لموقع الدراسة بسبب الاستعمال الغير متوافق للمباني مع وظيفتها الاساسية فيتسبب بمشاكل وتلوث بيئي** **نعم ☐ لا ☐**
- **تنامي دور المؤسسات الخدمية بتفعيل دور الادارة الحضرية للموقع بشكل ظاهر** **نعم ☐ لا ☐**
- **هل يوجد دور للخلفياته الثقافية والإجتماعية والفكرية للمجتمع المرتاد او الشاغل في حماية الموقع واعطاء مكانتة التاريخية** **نعم ☐ لا ☐**
- **هل أن زيادة الوعي باهمية موقع الدراسة يعطي مكانتها والحفاظ عليها** **نعم ☐ لا ☐**
- **تطبيق القوانين والتشريعات ومحدداتها ساعد على اهمال موقع الدراسة** **نعم ☐ لا ☐**
- **هل وجود أستثمار او تشغيل للمباني وتوظيفها لخدمة الحفاظ وحماية مكانتها التاريخية والاثرية التي تعطي هوية وأنطباع تكوينة المدينة** **نعم ☐ لا ☐**

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6. Conclusion

This research presents a novel method for distinguishing brain cancers using a precise and effective model. To achieve a satisfactory model, it is important to employ advanced processing stages such as the median filter, data magnification, and configuration. The presented methods encompass a wide range of techniques, ranging from dry waveform manipulation to the extraction of brain features from MRI scans. A portion of the photographs in the collection have been resized to optimize efficiency and cost-effectiveness. The Bat Algorithm has been augmented with Convolutional Neural Network (CNN) functionalities. Compared to all other similar functions, the recommended approach demonstrated exceptional accuracy in categorization. The study utilized data from the complete brain imaging in addition to the Brain Tumor dataset. The Bat Algorithm achieved an accuracy of 95.3%, the Convolutional Neural Network Algorithm achieved an accuracy of 92.4%, and the bat algorithm and CNN achieved an accuracy of 99.7%. In the future, another type of artificial intelligence could be utilized to enhance precision and speed of performance. Several photographs in the collection have been resized to be more efficient in terms of time and cost.

images from 55 patients with meningioma, and 998 MRI brain images from 88 patients with glioma. Every image was offered MATLAB files and measured 512 by 512 pixels. The second batch of data consists of 430 typical pictures of the brain. There are 142 brain MRI pictures in the third data set.

5.1. Performance evaluation

In this paragraph, explain of Performance evaluation of cancer brain

5.1.1. Accuracy

The accuracy of separation models is typically assessed, and this is seen to be one of the most crucial factors. It is described as an accurate approximation of the whole value of the forecast. If a set of uneven data is skewed toward a class with a significant sample size, there is a possibility of high accuracy. Every test case is unique. A significant condition separator that upholds the accuracy of half of the most prevalent labels in the test set is given the primary category. From now on, a scale is used to measure precision (4)

$$\text{Accuracy}=\sum i=11(TPi+TNi)TPi+TNi+FPi+FNi \quad (4)$$

5.1.2. Precision

Equation displays the precision of the macro-intermediate (5)

$$\text{Precision}=\sum i=11(TPi)/(TPi+FPi) \quad (5)$$

5.1.3. Recall

The technique of determining each class recall, which is also necessary to determine overall recall, is known as the macro-average. The average value is then stated as (6)

$$\text{Recall}=\sum i=11(TPi)/(TPi+FNi) \quad (6)$$

- Fine-tune the CNN model by adjusting the hyperparameters and architecture based on the validation performance

Step 6: Evaluation and Performance Comparison

- Evaluate the performance of the BA-CNN approach on a held-out test set:
  - Calculate metrics like accuracy, precision, recall, and F1-score
- Compare the performance of the BA-CNN to other feature selection and classification techniques, such as:
  - CNN without feature selection
  - Other feature selection methods (e.g., PCA, LDA, IG) combined with CNN
  - Alternative hybrid approaches (e.g., GA-CNN, PSO-CNN)

Step 7: Deployment and Real-world Application

- Once the BA-CNN model has been thoroughly evaluated and its superior performance is confirmed, it can be deployed for real-world brain cancer detection tasks.
- The trained model can be integrated into a clinical decision support system or used for automated screening of brain cancer images.

5. Results & discussion

Three different kinds of data are used to classify brain tumors. The accessible website was the first Open Source site. The whole brain atlas's image collection is available in the second database. The Brain tumor website is where the images from the third set of data were gathered. In the first database of 2057 T1-weighted MRI brain scans, 150 cases were treated for pituitary, glioma, and meningioma brain tumors. In this instance, it had 630 MRI brain tumors of the pituitary gland from 42 patients, 504 MRI brain

Step 3: Bat Algorithm for Feature Selection

- Initialize the Bat Algorithm parameters:
  - Population size (number of bats)
  - Frequency range
  - Pulse rate
  - Loudness
- For each iteration of the BA:
  - Generate new bat positions (candidate feature subsets) based on the current position, frequency, and velocity
  - Evaluate the fitness of each bat's feature subset using a suitable metric (e.g., classification accuracy)
  - Update the global best feature subset found so far
  - Adjust the pulse rate and loudness based on the BA rules
  - The final output of the BA is the optimal feature subset that maximizes the classification performance.

Step 4: CNN Architecture Design

- Construct the Convolutional Neural Network architecture:
  - Define the number and types of convolutional, pooling, and fully connected layers
  - Specify the hyperparameters, such as filter sizes, strides, and activation functions

Step 5: CNN Training and Fine-tuning

- Train the CNN model using the brain cancer image dataset:
  - Use the optimal feature subset selected by the Bat Algorithm as the input to the CNN
  - Apply techniques like data augmentation, regularization, and early stopping to prevent overfitting

Step 11:if ((rand < Ai) and (F (Xi) < F(Gbest)): If Loudness A is less than the randomly assigned number, and if the objective function of the new solution remains lower than the objective function of the best global solution.

Step 12:Accept the new solutions, Increase ri and reduce Ai: These new solutions are accepted r, increasing the pulse rate and decreasing the loudness A, .

Step 13:Find the current Gbest: The current solution is compared with the current global best, solution if the current solution is better it becomes the new Gbest.

Step 14:The last simple loop which is similar to the previous one but has different names of the input parameters END OF THE MAIN LOOP.

4.5. CNN Classification

Training and fine-tuning of the CNN architecture is accomplished by making use of the optimum feature subset that was chosen by the BA.The CNN is able to learn the hierarchical characteristics and patterns from the images of brain cancer, which are subsequently utilized for the ultimate categorization of cancer instances as opposed to cases that do not involve cancer.

Step 1: Data Preprocessing

- Collect the brain cancer image dataset
- Preprocess the images, e.g., resize, normalize, and apply data augmentation techniques

Step 2: Feature Extraction

- Extract the initial set of features from the preprocessed brain cancer images
- This can be done using techniques like Gabor filters, color histograms, or pre-trained CNN features

Step 2:Define frequency Fi and velocity Vi: The frequency F and velocity V are then set to zero with a frequency at which any of the links that shall connect at: & an initial velocity at a at which the link shall move at.

Step 3:Initialize pulse rates ri and the loudness Ai: Here it is presupposed that the pulse rates r and the loudness A are equal to some random integer values.

Step 4:while t < Maximum iterations do: This is the final stage of preparation, the central section of the gene expression programming algorithm, in which all calculations are mad

Step 5:Update frequency and velocity: The frequency and speed is as follows The following equations are used to model whether or not these requirements have been met: For the 'business as usual', scenario GHG emissions are forecast to rise at a growing rate over the next three decades.

Step 6:It can be quite possible to approximate the transfer function values of a specific clinical trial using the following equation. 2: As for the computation of the transfer function f_i, this can be done with the aid of the equation The characteristics of the H(f) function are discussed in the next section.

Step 7: update Vi, Xi as well as Fi as given in the following equitation 3 to 4

Step 8:if (rand > ri): This predicate is used to check if a randomly generated number m is greater than all the other values in the clinical data set including the pulse rate r.

Step 9:Select the global best solution (Gbest): Therefore, from all the individual global best solutions identified in the sites, the Gbest is selected and the dimensions of the X are shuffled randomly with the help of the global best.

Step 10: Generate new solution randomly Eq (5): The new solutions are entered following the predetermined equation from randomly generated numbers.

4.4. Feature Selection Using Bat Algorithm

Enhancing some brain cancer images can facilitate the development of bat algorithms or algorithms that draw inspiration from bats. To enhance simplicity, we currently employ the subsequent approximate or standard regulations:

a) All bats utilize echolocation to perceive distance, and they possess an innate ability to distinguish between food/prey and obstacles;

b) Bats have random flight patterns, moving at a velocity vi from point xi. They maintain a constant frequency fmin, but their wavelength λ and loudness A0 change as they look for prey. These entities have the ability to autonomously modify the wavelength (or frequency) of the pulses they emit and vary the rate at which they emit pulses, denoted as r ∈ [0,1], based on the closeness of their target.

c) While the loudness can exhibit various fluctuations, make the assumption that the range of loudness spans from a positive value A 0 to a significant constant value Amin.

Furthermore, it is important to note that the estimation of time delay and three-dimensional topography does not include the use of ray tracing. While this feature may have potential benefits for the application in computational geometry, we have decided not to implement it due to its increased processing complexity in multidimensional scenarios. Furthermore, we employ the subsequent approximations for the sake of simplicity, in addition to the aforementioned simplified assumptions. Typically, the frequency f within a range [fmin,fmax] corresponds to a range of wavelengths [λmin,λmax].

Step1 :Initialize Bat population: The seeds of the random number generators for X zero are set initially to a random value between the specified lower and upper limits.

c) Create multiple key points:
   - If multiple dominant orientations are detected, create multiple key points with those orientations

Step 4. Key point descriptor calculation:

a) Define a local neighborhood:
   - Consider a 16x16 pixel area around the key point

b) Compute gradient magnitude and orientation:
   - Calculate the gradient magnitude and orientation within the local neighborhood

c) Create a histogram of orientations:
   - Divide the local neighborhood into 16 4x4 subregions
   - Create a histogram of gradient orientations for each subregion

d) Generate descriptor vector:
   - Concatenate the histogram values from all subregions to form a 128-dimensional descriptor vector

e) Normalize the descriptor vector:
   - Normalize the descriptor vector to ensure robustness to illumination and contrast changes

Step 5. Key point matching and verification:

a) Compare descriptors:
   - Calculate the distance between key point descriptors from different images

b) Apply a matching criterion:
   - Set a distance threshold to identify potential matches

c) Perform additional verification:
   - Apply techniques like outlier rejection or geometric verification to enhance the accuracy of the matches

Step1. Scale-space extrema detection:

a) Construct a Gaussian scale-space pyramid:
   - Convolve the input image with Gaussian kernels of varying standard deviations
   - Store the resulting blurred images in the scale-space pyramid

b) Compute the Difference-of-Gaussian (DoG) pyramid:
   - Subtract adjacent Gaussian-blurred images to create the DoG pyramid

c) Identify local extrema in the DoG pyramid:
   - Compare each pixel in the DoG pyramid to its 26 neighbors
   - Mark pixels that are local maxima or minima as potential key points

Step 2. Keypoint localization:

a) Eliminate unstable keypoints:
   - Discard keypoints with low contrast or poor localization

b) Compute keypoint location and scale:
   - Refine the location and scale of each remaining keypoint

Step 3. Orientation assignment:

a) Compute gradient magnitude and orientation:
   - Calculate the gradient magnitude and orientation at each keypoint location

b) Assign dominant orientation:
   - Create a histogram of gradient orientations in a neighborhood around the key point
   - Assign the dominant orientation as the peak in the histogram

standardizing the image via the Min-Max Normalization Technique, and employing SIFT to extract distinctive attributes. The choice of the bat algorithm and classification procedure is determined by the Convolutional Neural Network (CNN).

Output Pixel Value = (1/(k * k)) * Σ(Input Pixel Value)

where:

Output Pixel Value is the filtered value of the pixel.

Input Pixel Value is the value of the pixel within the kernel window.

k is the size of the kernel, and k * k represents the total number of pixels within the kernel window.

The sum Σ is taken over all the pixels within the kernel window.

4.3. SIFT Feature Extraction

SIFT (Scale-Invariant Feature Transform) feature extraction can be applied to an image of a brain tumor to identify distinctive local features. The algorithm works by detecting key point locations at multiple scales, refining them through localization, assigning orientations to capture rotational invariance, and calculating descriptors that encode the appearance and structure of the regions around the key points. These descriptors can then be used for tasks such as feature matching or object recognition. By performing SIFT feature extraction on the brain tumor image, we can extract meaningful and scale-invariant features that enable robust analysis and comparison of tumor characteristics across different images. In the below algorithm steps to step SIFT:

4.1.Stander Dataset

This dataset is an amalgamation of three distinct datasets: figshare, SARTAJ dataset, and Br35H.This dataset has 7023 human brain MRI scans that have been categorized into four classes: glioma, meningioma, no tumor, and pituitary.The brain tumor MRI dataset can be found at the following link: https://www.kaggle.com/datasets/masoudnickparvar/brain-tumor

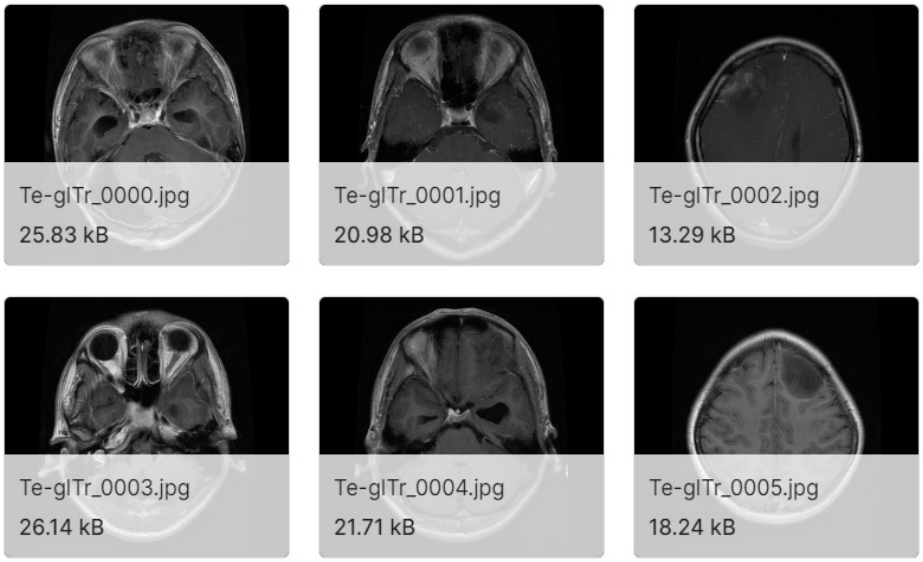

Figure 3. Sample of stander dataset.

4.2. Pre-Processing Using Mean Filter

The pre-processing procedure aims to enhance the efficiency and characteristics of Magnetic Resonance Imaging (MRI) images. This stage enhances the process of classification and is employed by autonomous professionals for subsequent analysis. The procedure entails generating a cerebral image by the utilization of a mean filter, incorporating a dataset,

microbat in the jth iteration, A stands for loudness and r_ij is a random number of between 0 and 1 and lastly, X^ * represents the OPTI, or best solution found to date in the search space.

$$y(j) = y(j-1)v_i \quad (3)$$

There are two main mathematical equations used in the Bat Algorithm; the first updates the position, speed, and frequency of each microbat in each iteration, in a bid to converge on the optimal solution in the search space.

4. Proposed Methods

The implementation of the proposed Bat Algorithm and Convolutional Neural Network (CNN) function improves segment effectiveness in the identification of brain tumors. MATLAB is less in time and more in speed and processing power as compared to C language. The function involves three stages: Pre-processing, Feature extraction, Feature Selection, and Classification of B-CNN. The computer assists in diagnosing brain tumors.

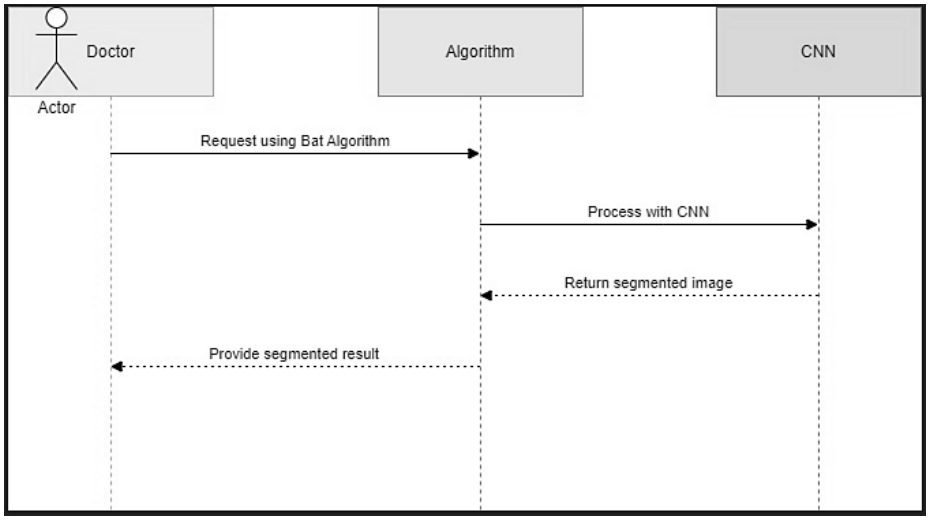

Figure 2 .Sequence Diagram of Proposal Method

performance rather than existing traditional methodologies. While this work by [18] does not employ the Bat Algorithm or utilize deep learning for the diagnosis of brain cancer, it contains valuable information on other aspects of adversarial learning which may be useful in medical image processing in the future.

For feature selection, the authors [19] employ a Bat Algorithm technique and for the detection of brain tumors, they use a deep learning model and found improved efficiency in the integrated process as compared to the individual application of both the techniques.

This review by [20] is on the employment of emerging algorithms, specifically, the Bat algorithm, and utilization of various optimization features that may be useful while choosing features.

3. Bat Algorithm

The Bat Algorithm utilizes the behaviors and characteristics of microbats for optimization purposes. It operates in a multidimensional search space, where each microbat represents a potential solution. The position and speed of each microbat are updated iteratively. Equation (1) describes the frequency of each microbat. Within the range of [f_min, f_max], f_i represents the frequency of the ith microbat.

$$f_i = f_{min} + \mu(f_{max} - f_{min})\beta\beta \ \epsilon[0,1] \quad (1)$$

Equation (2) shows the speed update equation of the every microbat during the jth iteration. Here, for i equal to 1:m, v_ij represents the speed of the ith microbat in the jth iteration, v_0 is the initial speed, and n_iter is the total number of iterations. $f_i = f_{min} + \mu(f_{max} - f_{min})\beta\beta \ \epsilon[0,1]$.

$$v_i(j) = v_i(j-1) + \mu\left(fx_{(j)} - x^{OPTI}(j)\right) \quad (2)$$

Equation (6) shows how each of the microbats' positions in the jth iterations are computed. In this case, x_ij is equal to the position of the ith

networks. In the following study [10], a new model that combines both the CNN and the Bat Algorithm for selecting the relevant features to improve the results of the classification of brain tumors will be proposed.

The authors [11] conclude the overall procedure of using the Bat Algorithm for feature selection in combination with a deep learning model for the classification of brain tumors and, identify why this synergistic approach works.

in [12] the application of the Bat Algorithm in feature selection and prognosis of brain tumors is proposed and the results will be tested with a deep neural network to determine a better result of the test.

The authors [13] introduced an optimal feature selection using the Bat Algorithm and used deep learning to enhance the efficiency of detection of brain tumors as evidenced by the findings of the study.

Although this work [14] does not outline specific methods for diagnosing any form of brain cancer, it gives details of different EOAs about feature selection and recommends the Bat Algorithm for similar tasks.

Therefore, this research [15] will focus on the idea of integrating the Bat Algorithm to perform feature selection task on the brain MR images and the deep learning model to classify brain tumors in order to demonstrate the modification and improvement of the new hybrid model.

It is crucial to observe that the authors present a new approach in this study [16], which incorporates the Bat Algorithm into a deep neural network for diagnosing brain tumors, explaining the performance enhancement observed in this research work.

The primary objective of this [17] is to analyze the capability of utilizing the Bat Algorithm for feature selection and integrate it with the Deep learning models for Brain Tumor Classification to determine its effectiveness in terms of

2. Related Work

In this paragraph, we talk about a group of previous research that deals with the bat algorithm and deep learning to detect brain cancer.

In their study [7] aimed at the identification of the early signs of dementia using the improved BAT optimization algorithm to segment the different subregions of the brain as well as utilizing deep learning to classify the identified subregions. For segmentation in this study, the technique utilizes histogram equalization and Otsu's thresholding as pre-processing methods and the BAT optimization algorithm and, the improved BAT algorithm. Here the authors used the convolutional neural network for classification which leads to enhanced segmentation and adequate classification.

In this regard, for new automatic CMB diagnosis method [8] suggested the utilization of deep learning and optimization algorithm. The input of the method is brain MRIs, and the outputs are CMB and non CMB findings. It employs sliding windows for the formation of the dataset, the VGG pre-trained for image features, and the ELM trained via GBA. The method is shown to be more accurate and has higher generalization performance compared to several other existing methods.

This study [9] presents a performance-optimized CNN classifier through a novel BFOA-LA hybridization method. The performance analysis of the developed classifier clearly indicates that the proposed BFOA LN-CNN produced higher accuracy than the existing DCNNs with reference to the G-HHO and IIB-based Deep Residual network models. The method attains an accuracy of 99 percent in classifying the personalized data. 41% outperforms the DCNN G, HH & O architectures as well as IIB deep residual neural

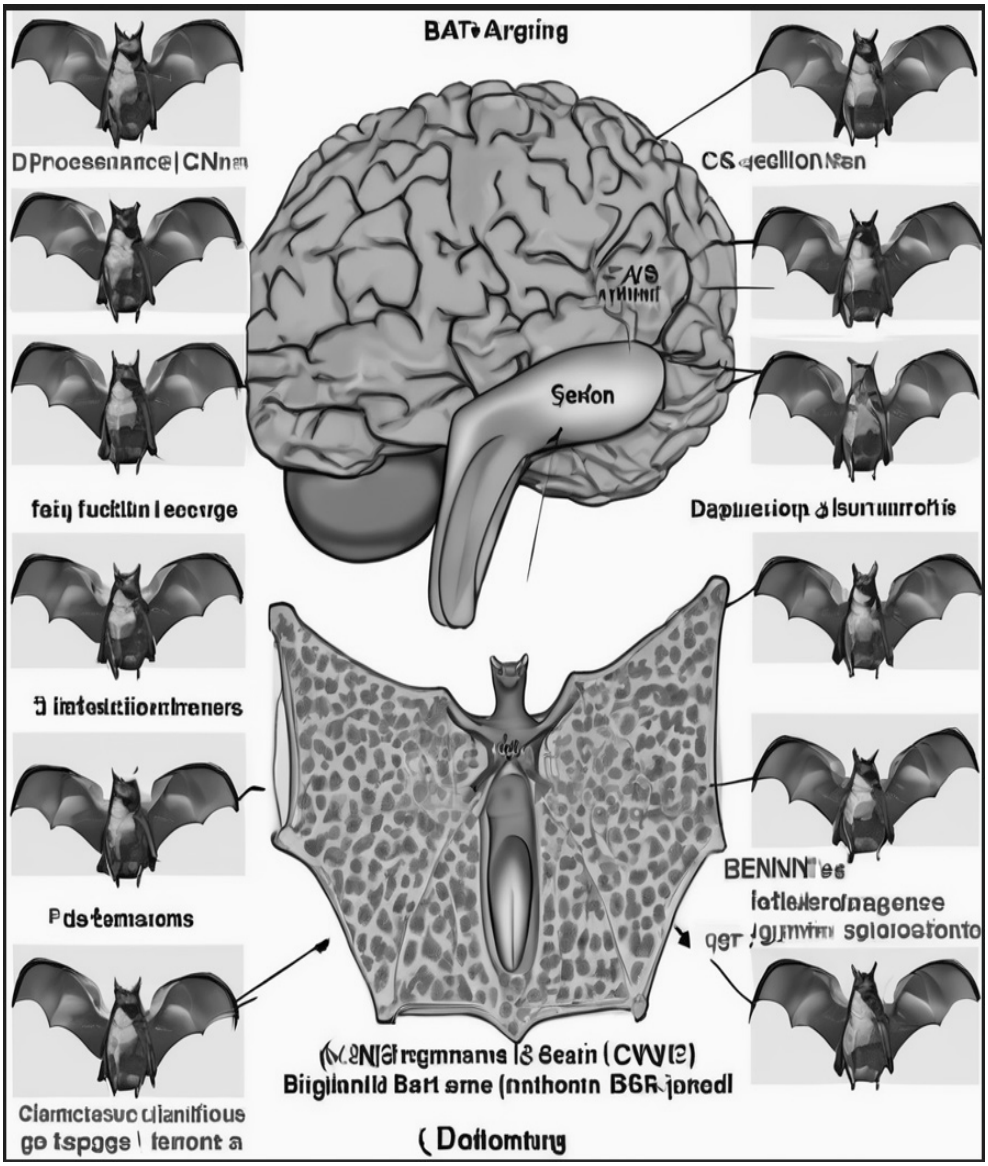

Figure 1. Bat Algorithm With CNN [6].

optimization of the feature selection, this means that the algorithm aims at selecting the most disciplined features from the input MRI brain images. These selected features are then used to train a deep learning model, for instance, Convolutional Neural Network, for the classification between brain cancer and the normal one.

The contributions of this study can be summarized as follows: In the light of the above facts, the following are the contributions of this study:

1. Suggest an improved method of using the Bat algorithm and deep learning in selecting relevant features and diagnosing brain cancer and neutralize the blind spots of the two methodologies.
2. An investigation of the proposed approach based on the MRI and CT brain image datasets accessible to the public will provide a reliable judgment of how effective the proposed solution is to feature extraction and classification in contrast to conventional methods.
3. Satisfying the most critical question in this study of how the Bat Algorithm for feature selection plays significant role in the final performance and usability of Deep Learning model.
4. Delineate how incorporating of Bat Algorithm and the deep learning for the detection of brain cancer can be advantageous with respect to clinical practice and potential future enhancements of this study.

Many state-of-the-art issues in the medical image analysis enhance in the recent past fourty years owing to the contribution of deep learning techniques [3]. Doctors have also noted that using CNNs and other architectures from the deep learning family, they are able to identify relevant features from Medical images for classification tasks [4]. However, such deep learning models show decent performance but they are more sensitive to the input features chosen and the quality of data they are fed on.

Feature selection being one of the first steps in the preprocessing process of data for the learning pipeline in designing deep learning, models occupies a very important place to not only improve the performance of the feature selection process, but also the interpretability of the models. Here, feature selection is an integral part of learning significant representations because it enhances learning methods by identifying only the most relevant features out of the available input to enhance the accuracy, generalization, and computational proficiency of a specific model [5].

Another relevant approach to performing the feature selection is the methods within the bio-inspired optimization algorithms, specifically Bat Algorithm (BA) [6]. Bat Algorithm is a meta-optimization technique that has its root in echolocating nature of bats and particularly in the search of feature set for a particular problem. Integrating the Bat Algorithm with deep learning models is advantageous to brain cancer diagnosis systems because of the integration of elements of the two ways.

Here in this paper, a meta heuristic algorithm known as Bat Algorithm and deep learning technique is presented to select the best features and categorize an image in to having brain cancer or not. The above method is then used as follows: The Bat Algorithm is initially employed to compute the

1. Introduction

Brain tumors present a formidable challenge as they exhibit a high mortality rate and involve the aberrant growth of brain cells. The categorization of tumor cells is contingent upon their level of aggressiveness, with those exhibiting a heightened risk factor being classified as either at risk or as having cancer. In order to detect and treat the tumor, patients are required to undergo a number of tests, with the most frequently used imaging techniques being computed tomography (CT) and magnetic resonance imaging (MRI). MRI is regarded as an excellent brain imaging technique because of its ability to provide clear differentiation between soft tissues and its non-invasive nature [1][2].

Brain tumors are divided into two types: harmful and harmful. The World Health Organization (WHO) has issued a widely used grading system, which divides brain tumors into grades I to IV under a microscope. Grade I and grade II are benign brain tumors, while grade III and grade IV are high-grade brain tumors. Undiagnosed brain tumors may degenerate into high-grade tumors if not treated properly. The correct and timely identification of Brain Cancer is one of the most critical problems in today's world of medicine and determines the further outcomes of diseases and the efficacy of the treatment process in most cases. The conventional methods that entail detection of anomalies through the interpretation of medical images by qualified radiologists have drawbacks such as lacking well-defined objective and often subjective outcomes, requiring a lot of time and entailing high inter and intra observer variabilities. Particularly, there is more attention paid to the approaches for creating complicated systems that would improve the possibility of determining and classifying the signs of a brain cancer at the initial stage.

المستخلص

يعتبر سرطان الدماغ من أخطر الأنواع التي يجب علاجها في أسرع وقت ممكن. ولذلك فمن الضروري الكشف عن سرطان الدماغ في مراحله المبكرة لتعزيز تشخيص الحالة. تقترح هذه الدراسة الجمع بين خوارزمية الخفافيش (BA) وطرق التعلم العميق لتحديد وتصنيف أورام المخ في الصور الطبية بدقة.

في هذا البحث، تم استخدام خوارزمية الخفافيش لاختيار السمات المميزة من صور الدماغ المدخلة. خوارزمية الخفافيش (BA) هي خوارزمية تحسين ميتايورستية تحاكي سلوك تحديد الموقع بالصدى للخفافيش. يستكشف مساحة الميزات بكفاءة لاكتشاف الميزات الأكثر ملاءمة للتحليل، وهو أمر مفيد ويوظف هذه الميزات لتدريب شبكة عصبية اصطناعية متقدمة بشكل استثنائي (ANN)، الشبكة العصبية التلافيفية (CNN)، التي تعمل على تحسين تصنيف أنسجة المخ السرطانية من الأنسجة الطبيعية. علاوة على ذلك، يمكن لنموذج التعلم العميق أن يصور بدقة الأنماط غير الخطية المعقدة داخل البيانات، مما يعزز القدرات التشخيصية.

تم إجراء سلسلة من الاختبارات باستخدام التصوير بالرنين المغناطيسي والأشعة المقطعية المتاحة بسهولة والتي تم الحصول عليها من المجال العام. إن الجمع بين خوارزمية الخفافيش ونموذج التعلم العميق يتفوق على التقنيات المستخدمة سابقًا لاستخراج ميزات أورام المخ وتصنيفها، مما يؤدي إلى اكتشاف أكثر دقة. وقد لاحظنا تحسناً من حيث الدقة والحساسية والانتقائية مع وصول الدقة

كلمات مفتاحية: مرشح الوسط، خوارزمية الخفافيش، الشبكة العصبية الاصطناعية (ANN)، الشبكة العصبية التلافيفية (CNN)

Abstract

Brain cancer is considered one of the most dangerous types that must be treated as soon as possible. Therefore, it is necessary to detect brain cancer in its early stages to enhance the diagnosis of the condition. This study proposes to combine the bat algorithm (BA) with deep learning methods to identify and classify brain tumors in medical images accurately.

In this paper, the bat algorithm was used to select distinctive features from the input brain images. The Bat Algorithm (BA) is a metaheuristic optimization algorithm that mimics the echolocation behavior of bats. It efficiently explores the feature space to discover the most suitable features for analysis, which is useful and employs these features to train an exceptionally advanced artificial neural network (ANN), the Convolutional Neural Network (CNN), that improves the classification of cancerous brain tissue from normal tissue. Furthermore, a deep learning model can accurately depict complex nonlinear patterns within data, enhancing diagnostic capabilities.

A series of tests were performed using readily available MRI and CT scans obtained from the public domain. Combining the bat algorithm with a deep learning model outperforms previously used techniques for feature extraction and classification of brain tumors, leading to more accurate detection. We have noticed an improvement in terms of accuracy, sensitivity, and selectivity, with accuracy reaching

Keywords: Mean Filter, Bat Algorithm, Artificial Neural Network (ANN), Convolutional Neural Network (CNN)

Exploring the Benefits of Feature Selection based on bat algorithm and deep learning in Brain Cancer Diagnosis

Assist. Lect. Noor Fawzi Shafiq

Department of Medical Physics, College of Applied Sciences,
University of Fallujah, Al-Anbar / Iraq.
noor.fawzi@uofallujah.edu.iq

استكشاف فوائد اختيار الميزات بناءً على خوارزمية الخفافيش والتعلم العميق في تشخيص سرطان الدماغ

م. م. نور فوزي شفيق

قسم الفيزياء الطبية، كلية العلوم التطبيقية – جامعة الفلوجة، الانبار \ العراق
noor.fawzi@uofallujah.edu.iq

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6.. Conclusion

The paper presents a methodology for calculating similarity between text files using Google Colab. Next, cleaning and pre-processing operations are performed, including removing punctuation marks and unnecessary tet. The proposed model then calculates similarity using cosine, Euclidean similarity, and Jaccard similarity coefficients between training and test texts, providing a variety of metrics for comparison and analysis. These sequential steps combine automated analysis with human interpretation, enhancing the effectiveness and accuracy of the plagiarism checker and making it easier to use in many different fields and applications. The results showed that it is possible to determine similarity between texts using different similarity metrics. When looking at calculating similarity ratios on different scales, we see a difference in the ratios, because the methods for calculating similarity differ from one method to another. On the other hand, we note the ability of metrics to do this.

	test_id	description_x	description_y	same_security	jaccard_sim
0	0	semtech corp	semtech corporation	NaN	0.333333
1	1	vanguard mid cap index	vanguard midcap index - a	NaN	0.285714
2	2	spdr gold trust gold shares	spdr gold trust spdr gold shares	NaN	1.000000

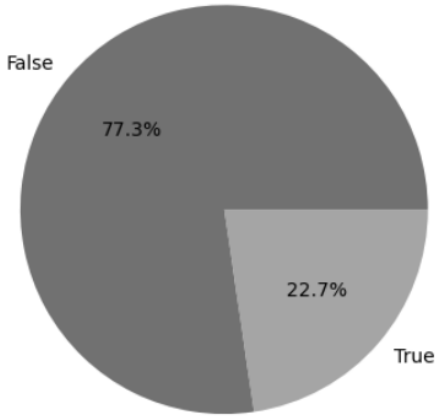

Fig.14. Jaccard similarity.

Finally, Figure (14) shows the Jaccard similarity measure, which measures the relative affiliation between groups of words in texts. A threshold (threshold) was determined to determine whether the texts refer to the same security or not. When the similarity value exceeds the specified threshold, the pair of texts is considered to refer to the same security. Next, it is determined whether the results are correct or not by comparison with the test data.

Figure (12) shows a way to measure similarity between texts using the cosine similarity measure, which calculates the angle between vector spaces representing texts.

	test_id	description_x	description_y	same_security	euclidean_sim
0	0	semtech corp	semtech corporation	NaN	1.152305
1	1	vanguard mid cap index	vanguard midcap index - a	NaN	1.085166
2	2	spdr gold trust gold shares	spdr gold trust spdr gold shares	NaN	0.296031

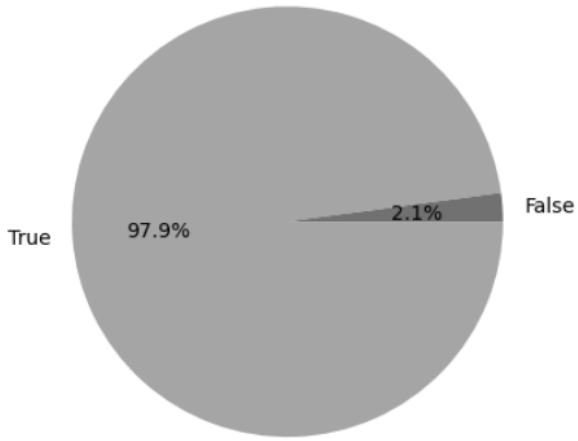

Fig. 13, Euclidean similarity

It uses the Euclidean similarity measure, which calculates the shortest distance between two points in the space defined by its perception of texts, as demonstrated in Figure 13.

The proposed approach was also tested on the text similarity dataset, available on Kaggle and accessible at: https://www.kaggle.com/datasets/rishsankineni/text-similarity. This set consists of the data described in the next section.

In each row of the included datasets (train.csv and test.csv), the product is not exactly identical. You can make use of these recipes to predict whether each pair in the test set also refers to the same security.

Dataset information:

- Train data: includes descriptions (description_x, description_y), indicators (ticker_x, ticker_y), and rating (same_security).
- Test data: includes descriptions (description_x, description_y), and the rating will be predicted (Same_security).

The generated forecasts are compared with actual values using similarity metrics Jaccard similarity , cosine similarity and euclidean similarity to determine whether the forecasts are correct or incorrect, as described in the next section:

	test_id	description_x	description_y	same_security	jaccard_sim	cos_sim
0	0	semtech corp	semtech corporation	False	0.333333	0.336097
1	1	vanguard mid cap index	vanguard midcap index - a	False	0.285714	0.411207
2	2	spdr gold trust gold shares	spdr gold trust spdr gold shares	True	1.000000	0.956183

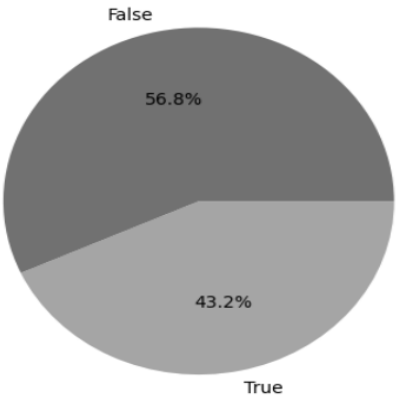

Fig. 12, Cosine similarity

5.2 Euclidean similarity

Figure (10), represents the calculation of the similarity percentage for two text files in real time, where the similarity percentage was 0.7%.

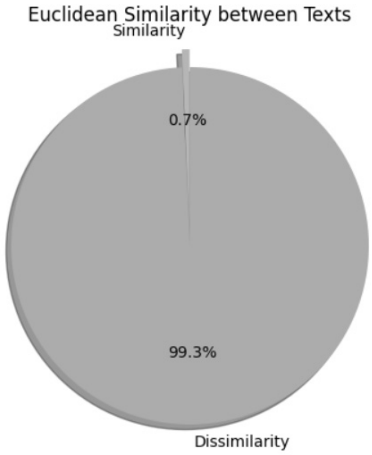

Fig. 10. Euclidean similarity.

5.3 Jaccard similarity

The method of calculating and representing similarity percentages varies from one measure to another, as the Jaccard similarity measure recorded a rate of 3.9%, as demonstrated in Figure (11).

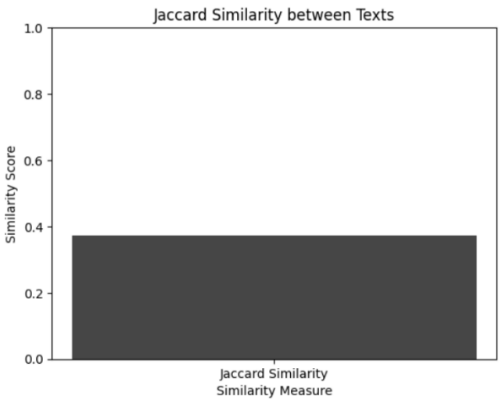

Fig. 11. Jaccard similarity.

Based on the results shown, we notice the ability to determine similarity between texts using different similarity measures. When looking at calculating similarity percentages in different measures, we see a difference in percentages, and this is due to the difference in methods for calculating similarity from one method to another. On the other hand, we note the ability of the metrics to accurately calculate the similarity between text files.

The proposed model calculates similarity using cosine, Euclidean similarity, and Jaccard similarity coefficients between training and test texts, providing a variety of metrics for comparison and analysis. . These sequential steps combine automated analysis with human interpretation, enhancing the effectiveness and accuracy of the plagiarism checker and making it easier to use in many different fields and applications. Fig. (8) shows the schematic diagram of the proposed model methodology.

5.. Experimental results

This section describes the use of similarity metrics on text files uploaded via the Google Colab platform. Various similarity metrics, such as Jaccard, cosine, and Euclidean distance, were applied after implementing the necessary steps to process texts using natural language processing techniques.-

5.1 Cosine similarity

Figure (9) shows the application of the cosine similarity measure to two text files uploaded through the Google Colab platform. NLP techniques were performed to remove impurities from the two files, and then the similarity percentage was calculated in real time. The cosine similarity measure recorded a similarity rate of 5.4%.

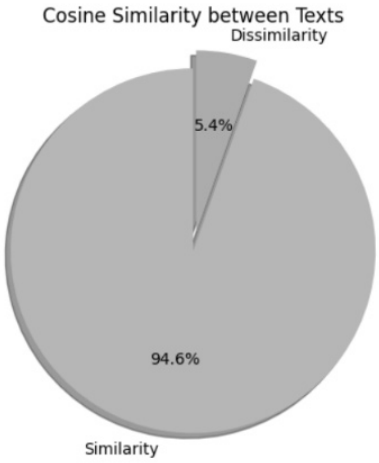

Fig. 9, Cosine similarity

4.. Methodology

The methodology used in this research starts with loading the training and testing data as a .txt file. The decision was made to rely on Google's calculator rental service to conduct the research, as this service includes renting cloud processors and storage space. The proposed system uses Google Colab to increase the processing speed using TensorFlow and the TensorFlow Processing Unit (TPU). Taking advantage of the Jupyter user interface to create a drop-down menu containing files uploaded to Google Colab, making it easier to upload and select text files (training and testing). The steps also include text cleaning and pre-processing, such as removing unnecessary punctuation and text. After formatting the files. The similarity calculation phase begins.

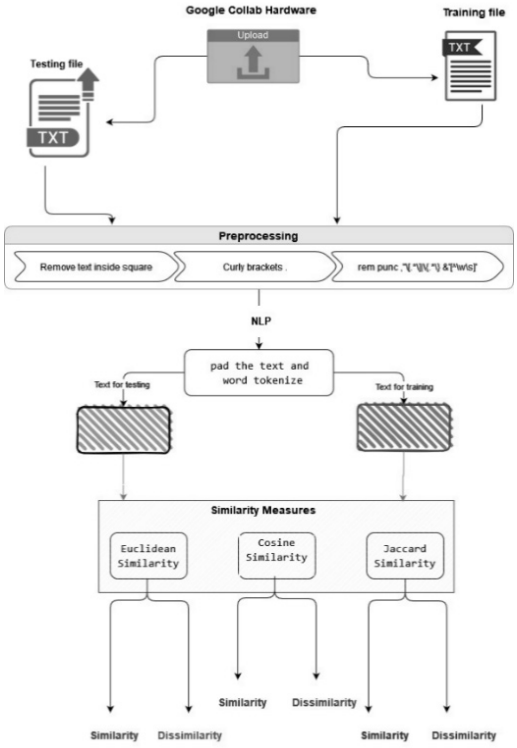

Fig. 8 Block diagram of proposed system.

The Jaccard similarity ratio between the two groups is 0.42, where the size of the intersection between them is 3, and the size of the union is 7 (1 + 3 + 3).

$$S(S_a, S_b) = \frac{S_a \cap S_b}{S_a \cup S_b}$$

3.6 Google Collab Hardware Specifications

Google Colaboratory, commonly referred to as Google Colab, is an open source service offered by Google to individuals with Gmail accounts. It provides access to GPU resources for research purposes, especially for those who may lack sufficient resources or cannot afford dedicated hardware. With Google Colab, users benefit from 12.72GB of RAM and 358.27GB of hard disk space during a single runtime. Each playback session lasts for 12 hours, after which it resets, requiring users to reconnect. This measure is implemented to prevent misuse of GPU resources for activities such as cryptocurrency mining or other illegal purposes. When opening a Google Colab file, users are asked to select the runtime type, offering three options: None (using the computer's CPU), GPU, and TPU (specifically for tensor processing). This selection can be made under the Runtime menu under Change Runtime Type[19]. Fig. (7) demonstrates the Google Colab Notebook Setting.

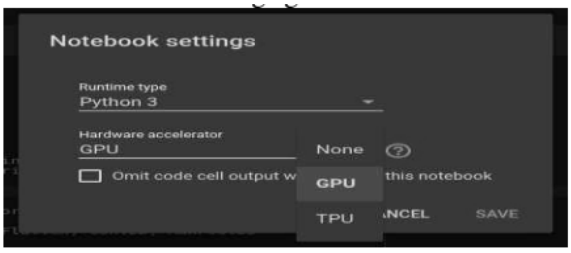

Fig. 7 . Google Colab Notebook Setting.

phrase-based methods according to their basic units. The most popular methods for each type will be displayed for a limited time.

3.5.1.1 Character-Based

Jaccard similarity is defined as the size of the intersection divided by the size of the union of two sets. The Jaccard index, also known as the Jaccard similarity coefficient, is used to treat data as groups. Calculates the intersection size of two sets and divides it by the union size. When using Jaccard similarity to calculate similarity between texts, texts are usually normalized initially to reduce words to their roots, which facilitates the comparison process.

Mostly, words are displayed with their roots in English, and their figurative meanings in other languages such as Chinese. For example, let us take two sentences as a model for calculating Jacquard similarity: “The bottle is empty” and “There is nothing in the bottle.” After normalization is applied, a Venn diagram is drawn for the remaining words in the two sentences to determine how similar they are [18]. Fig. (6) illustrates Jaccard similarity.

Fig. 6. Jaccard similarity [18].

3.5. Text Representation

In this section of the paper, we will focus on how texts can be represented in the form of numerical features that can be directly computed, so as to enable effective comparison and analysis processes. Texts can be similar in different ways, both in terms of vocabulary (lexicon) and in terms of meaning.

For example, lexical similarity is a common way to represent text, where the literal sequences of words in texts are compared. Semantic similarity can also be represented using methods such as the context-based method, where words, phrases and sentences are compared in context to determine the extent of similarity between texts.

Other methods for representing semantic similarity include the meaning-based method, where meanings and concepts in texts are compared. The texts are represented by graphical models to analyze the similarity between them.

Using these methods, we can accurately and comprehensively understand and analyze the similarity between texts, enabling us to reliably extract information and verify relationships between texts. [17].

3.5.1 String-Based

The benefits of string-based methods are that they are easy to compute. String similarity metrics analyze and group characters, which measures the similarity or difference (distance) between two text strings to achieve a match or comparison. These metrics represent one of the most common similarity metrics, which are included in specialized packages. As shown in Fig. 1, different approaches have been proposed to classify character- and

$$\mathrm{Sim}\,(S_a, S_b) = \cos\Theta = \frac{\overrightarrow{S_a} \cdot \overrightarrow{S_b}}{\|S_a\| \cdot \|S_b\|}$$

3.4.1.2 Euclidean Distance

Euclidean distance, also known as the L2 rule, is one of the most widely used forms of Minkowski distance. When distance is referred to without specifying a specific type, the reference is usually to Euclidean distance. The Pythagorean principle is used to calculate the distance between two points, where the difference between the values of the two dimensions at the two points represents the opposite sides of the right-angled triangle as shown in Fig. (5) and the equation below:

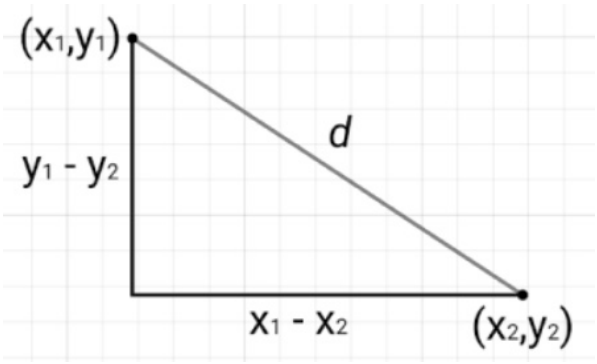

Fig. 5. The Euclidean distance [16].

The greater the distance (d) between the two vectors, the lower the degree of similarity between them, and vice versa[16].

$$d(S_a, S_b) = \sqrt{\sum_{l=1}^{n} (S_a^{(l)} - S_b^{(l)})^2}$$

3.4.1. Length Distance

The percentage of similarity is measured by converting texts into digital matrices that express the presence or absence of different words and their frequency in each text.

In this paper, the most popular methods for evaluating text similarity will be presented in more detail, including Gaussian distance and Euclidean distance. Each of these methods will be briefly explained and their advantages and disadvantages in text similarity estimation analyzed [14].

3.4.1.1 Cosine Distance

Cosine similarity measures the degree of similarity between two vectors by taking the cosine of the vector angle as a measure. If two vectors point in a similar direction, it can be determined by similarity that they both have vectors pointing to two vectors.

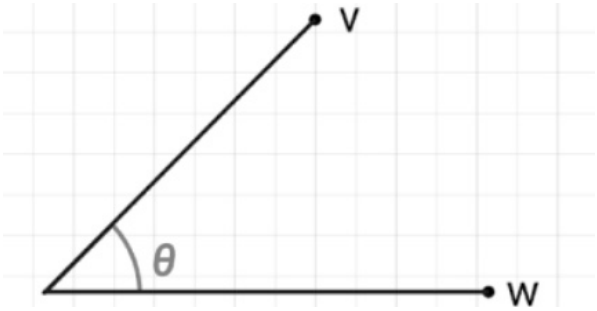

Fig. 4. The cosine distance [15].

The cosine distance is measured using the vector space of vector space and is converted to the angle problem in vector space. The similarity measure is determined by calculating Eq. Determine the cosine to measure the angle between the two vectors as shown in Fig. (4). Although the angle between the two vectors is 0°, the cosine similarity of the two vectors is equal to 1 [15]. As shown in the equation below:

"man" may be semantically similar, but in fact, the terms are not semantically similar. Semantic similarity is an essential part of semantic relatedness, and the semantic distance of this relationship is measured to be inversely related to the distance between the compared concepts [13].

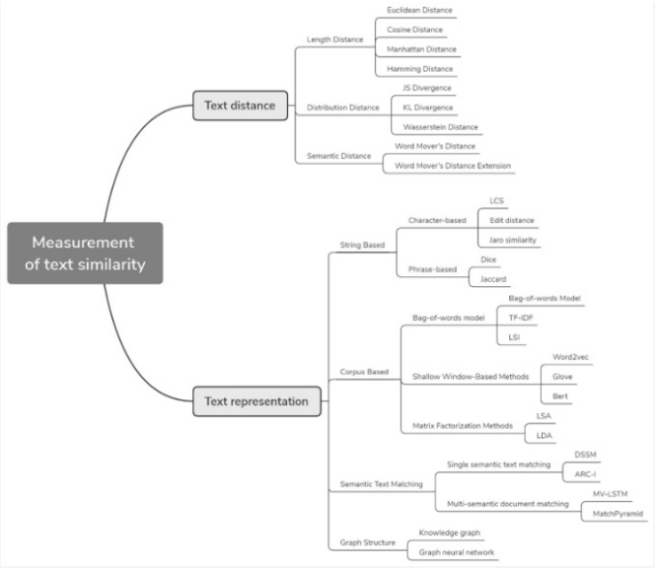

Fig. 3. Flowchart for the measurement of text similarity[13].

3.4 Text Distance

The first part of this research will address the concept of "text distance," an evaluation technique that describes the semantic relationship between two words or texts from the perspective of dimension metrics. Three main methods are used to measure text distance based on different aspects of the text object, its distribution, and semantics.

The use of similarity metrics is particularly prominent in the field of natural language processing. Everything from information retrieval systems, search engines, paraphrase detection, text classification, document linking, and spell checking rely on similarity metrics [10].

3.3 Similarity Measures

The similarity between two excerpts of the same text is determined by the amount of cognates, which increases with the number of similarities, and vice versa. Almost all NLP-based tasks, such as information retrieval, automatic question answering, machine translation, dialog systems, and document matching, now leverage text similarity as a key factor in the operation of text systems [11].

In the past 30 years, new methods for semantic similarity using metrics have been introduced, the latest of which is divided into semantic similarity techniques, where most scholars have divided their methods. Statistical measurements of text similarity, or comparisons with databases and knowledge databases such as Wikipedia, using statistical methods. Spacing between text is not taken into account in these classifications, it only takes into account the representation of the text. The importance of neural network representation learning has been highlighted in recent years due to the development of computational models for neural network representation learning. Semantic matching, semantic matching methods and techniques, semantic matching methods, and systematic matching methods. Chart [12].

Fig. (3) shows that similarity between texts is not limited only to their semantic similarity, but also includes a comprehensive examination of the semantic features of two common words. For example, the words “king” and

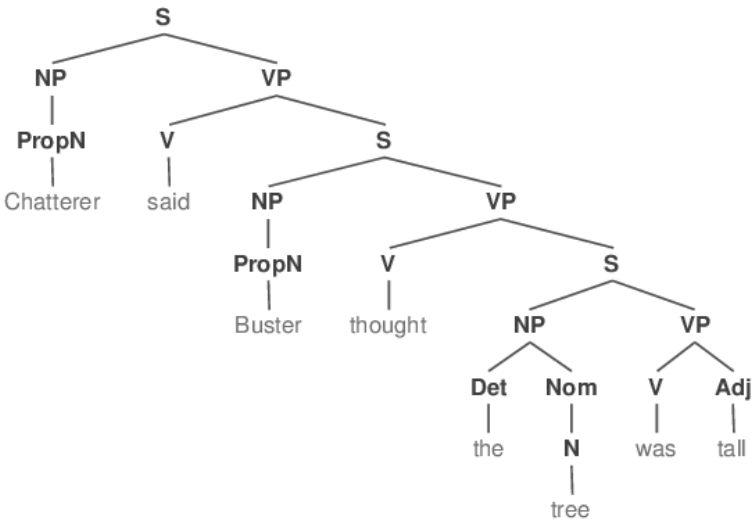

Fig. 2. Analyzing texts and sentences using NLP.

3.2 Text Similarity

Text similarity is the distance between two vectors, where the dimensions of the vectors represent the features of the objects. In simple terms, similarity is a measure of difference or similarity between two data objects. If the distance is small, the objects are said to have a high degree of similarity, and vice versa. In general, it is measured on a scale from 0 to 1. This score within the range (0, 1)is referred to as the similarity score. Despite its simplicity, similarity forms the basis of many machine learning techniques.

For example, the K-Nearest-Neighbors classifier uses similarity to classify new data objects, and similarly, K-means clustering uses similarity metrics to assign data points to appropriate clusters. Even recommendation engines use similarity-based collaborative filtering methods to identify users' neighbors.

comparison techniques, which include text search and analysis, as it works to identify similarities very effectively. The TF-IDF and Cross Comparison algorithms are among the most effective. Techniques used to determine similarity between texts.

Finally, using deep neural networks to analyze texts more deeply and accurately, such as convolutional networks such as (CNNs) and neural networks capable of calculating temporal consequences such as (RNNs), as their nature allows for precise analysis of texts and understanding similarities.

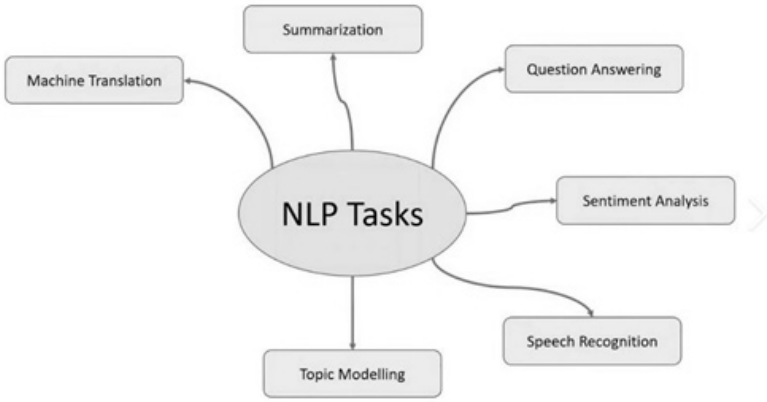

Fig. 1. NLP Tasks.

There are many real world applications such as search engines using Neuro-Linguistic Programming (NLP) techniques to improve search results by understanding queries and text similarity.

Also, it can Forensic analysis uses NLP techniques to analyze testimonies and texts related to criminal cases to identify links and similarities between them. Figs. (1 and 2) shows the process of analyzing texts using NLP techniques. [9].

3. Background

The proposed model presented in this research focuses on analyzing uploaded texts through the use of the Google Collab repository, using natural language programming techniques that process these files and eliminate the impurities in them, such as removing symbols or correcting spelling errors, and then calculating the similarity percentage using... A set of similarity metrics. Like the cosine scale. Measuring similarity using calculating the Euclidean distance between data points in space and finally measuring Jaccard similarity. It is worth noting that each similarity measure has a unique way of analyzing and calculating the similarity between texts. As described in Section 3.3 of this paper.

3.1 Neuro-Linguistic Programming (NLP)

Neuro-Linguistic Programming (NLP) is an important technology in the modern digital age and is one of the branches of artificial intelligence that is concerned with analyzing and understanding human languages. Neuro-Linguistic Programming (NLP) appeared in the 1950s and has a wide range of applications in text analysis and similarity detection, such as text understanding and generation, machine translation, information extraction, semantic analysis and others, and there are many techniques provided by this technology, for example Work on converting clips. Converting text to digital representation (numeric arrays) such as Word Embedding's and deep conversion techniques such as BERT and GPT.

These representations also include the analysis of textual sentences, which contributes to a precise understanding of the sentence structure and linguistic structure of texts. NLP technology also provides many search and

manually identifying plagiarized data. On the other hand, the second study highlighted the possibility of obscuring the scientific content of publications by replacing words, removing or adding material, or rewriting, arranging, or rewriting the original articles. This paper also made a comparison between different plagiarism detection techniques, as well as carefully detailing the literature on plagiarism detection types, strategies, and tools.

In considering the studies presented in this section, we notice different methods for detecting similarities in text files and identifying plagiarism. This is not limited to the English language, but is intended for many languages such as Arabic and Persian, as well as providing methods that support similarity in musical texts. All studies emphasized the role and importance of natural language processing techniques to detect similarities and prevent plagiarism. Table 1 shows a summary of the above studies.

No.	Reference	Year	Method	Result
1.	Hadi Vaisi, et al.. (4)	2022	Word vector representation, cosine similarity	High success rates in detecting similarity in Persian text documents
2.	Delfina Malandrino, *et al.*, (5)	2022	Hybrid approach integrating text similarity and clustering methods	Outperformed existing methods in music plagiarism detection, high user acceptance in web application
3.	Jirapond Muangprathope, *et al.*, (6)	2021	Formal Concept Analysis, concept similarity metrics	High accuracy in detecting stolen text files and documents through case studies
4.	Fani, *et al.*, (7)	2018	Advanced natural language processing techniques	Emphasized the importance of NLP techniques in plagiarism detection

relevant source documents. The proposed similarity metrics use concept approximation using formal concept networks and have been mathematically proven to be formal similarity metrics. Source document processing and retrieval are performed using the proposed algorithm to demonstrate the performance of the proposed similarity measure in detecting document plagiarism through the implemented web applications. This work proposes three plagiarism prevention formats: (1) detection between documents within a document set, (2) detection between the suspicious document and source documents, and (3) detection between the suspicious document and other documents from the Internet. The three proposed formats were implemented in a system using PHP with a MySQL database. In addition, in the latter format, the presented system implements Google services. The efficiency and effectiveness of the proposed system was demonstrated through a case study of news and academic documents. The model was able to detect stolen text files and documents with an accuracy of up to 94.01%.

4. Both the study [7] (2018) conducted by Vani and colleagues and the research paper [8] (2021) point out the importance of using advanced natural language processing techniques to detect and treat plagiarism, given the increasing cases of plagiarism in electronic research and articles. The first study focused on analyzing linguistic features to detect plagiarized passages and plagiarism with varying degrees of complexity and their impact on the extracted features. In addition to using measures of syntactic-semantic similarity. The plagiarism suite from the PAN competition was used between 2009 and 2014 for pilot testing, which showed significant improvement in

results on the PAN2015 dataset show a success rate of 96.94% with a running time of 00:01:21, outperforming graph-based methods by 9.94% in detecting plagiarism in Persian text documents, highlighting the effectiveness and efficiency of the proposed method.

2. In this work [5](2022) by Delfina Malandrino, *et al.*, we propose two new methods: text similarity-based method and clustering-based method, and demonstrate their integration into an enhanced (hybrid) approach to improve music plagiarism detection. To evaluate the effectiveness of the proposed methods, individually and in combined inference, tests were conducted on a large set of confirmed plagiarism and non-plagiarism cases. Results show that the combined inference outperforms current methods. Additionally, we deployed the combined inference into a web application and evaluated its effectiveness, utility, and overall user acceptance through a study involving 20 participants divided into two groups, one with access to the tool. The study involved participants deciding which pair of songs, from a predefined set of pairs, should be considered plagiarism and which should not. The study demonstrates that the group using our tool succeeded in identifying all plagiarism cases and performed all tasks without errors. The entire sample agreed on the benefit of having an automated tool providing a degree of similarity between two songs, highlighting the importance and efficacy of the proposed approach in addressing the issue of music plagiarism detection.
3. This paper [6] (2021) by Jirapond Muangprathope, *et al.*, An algorithm is proposed for document plagiarism detection using formal concept analysis (FCA) with a concept similarity filter introduced to retrieve

the cosine of the angle between word frequency vectors, in addition to calculating Euclidean similarity by representing texts as frequency vectors and calculating Euclidean distance. The content of the paper is organized as follows: Section 2 provides a review of the literature related to the proposed work and previous research in this area. Then Section 3 provides an overview of the proposed system. Section 4 includes a presentation of the different stages of the working methodology, including a description of the dataset used. Section 5 presents the experimental results, while Section 6 discusses observations and results. Finally, the work is concluded in Section 7.

2. Literature review

Many studies have been conducted using various methodologies to diagnose and detect plagiarism in text files, as well as to predict it. Below, we will discuss a number of such studies that have been explored and implemented using a variety of algorithmic techniques.

Related work:

1. representation for similarity detection in Persian text documents. It uses word embedding's to represent words in an N-dimensional space, and calculates the similarity between the source and suspicious documents based on the cosine similarity between these vectors. The model converts text data into word embedding's, calculates similarity using cosine similarity, and classifies documents as plagiarized or not. Results from the PAN2016 dataset indicate a success rate of 94.37% with a running time of 00:01:27 per document pair, outperforming SVM and deep learning methods. In addition,

1. Introduction

Plagiarism is the use of ideas, words, and expressions without proper reference to them, and is a common problem in various fields such as academia, scientific research, publishing, inventions, etc. The methods of plagiarism vary. It may be self-plagiarism, as in publishing an article in several magazines, or using other authors' texts without their permission, and this is considered a form of plagiarism. The occurrence of plagiarism can be observed in both academic and non-academic fields [1].

Plagiarism is among the most serious forms of research violations, as it negatively affects the reputation of the researcher and the university and harms the public. Research articles that include plagiarism hinder the scientific research process. Incorrect results can spread and negatively affect future research or scientific applications. For example, in the field of medicine or pharmacy, descriptive studies are vital tools for evaluating the effectiveness and safety of drugs and medical treatments. Plagiarized research articles can distort meta-studies and jeopardize patient safety.

In addition, plagiarism drains scholarly resources. Even in cases where plagiarism is discovered, reviewing plagiarized articles, requesting an apology, and holding them accountable poses a challenge o affected institutions, sponsors, and referees. If plagiarism goes undetected, its negative effects can be more serious, as plagiarists can obtain rewards and promotions in unfair ways, such as sponsoring agents giving allowance for stolen ideas or accepting plagiarized research as the results of research projects [3].

This research deals with integrating natural language processing techniques from NLP with a variety of methods for detecting plagiarism and calculating similarity scores, including using cosine similarity and measuring

المستخلص

أحدث التوسع السريع للإنترنت ثورة في الوصول إلى المعلومات، خاصة في مجال البيانات غير المنظمة، والتي يتكون معظمها من محتوى نصي. في حين أن الوصول الفوري إلى المعلومات يجلب العديد من المزايا، فإنه أدى أيضًا إلى ظهور مشكلة سائدة - الانتحال. يشكل نسخ المواد وإعادة استخدامها دون الحصول على إذن مناسب تهديدًا كبيرًا للنزاهة الأكاديمية والنزاهة. ارتفعت معدلات السرقة الأدبية، خاصة في المنشورات الأكاديمية والعلمية، مع ظهور الإنترنت، حيث وصلت إلى مستويات مثيرة للقلق، مثل 60% في مشاريع الطلاب. تتناول هذه الدراسة النموذج المقترح الذي يتضمن حساب التشابه باستخدام معاملات جيب التمام، والتشابه الإقليدي، وتشابه جاكارد بين نصوص التدريب والاختبار، مما يوفر مجموعة متنوعة من المقاييس للمقارنة والتحليل. تجمع هذه الخطوات المتسلسلة بين التحليل الآلي والتفسير البشري، مما يعزز فعالية ودقة مدقق الانتحال ويجعل استخدامه أسهل في العديد من المجالات والتطبيقات المختلفة. وأظهرت النتائج أنه من الممكن تحديد التشابه بين النصوص بدقة.

الكلمات المفتاحية: البرمجة اللغوية العصبية، جيب التمام، التشابه الإقليدي، الجاكار، تشابه النص.

Abstract

The rapid expansion of the Internet has revolutionized access to information, especially in the area of unstructured data, most of which consists of textual content. While instant access to information brings many advantages, it has also given rise to a prevalent problem – plagiarism. Copying and reusing materials without proper permission poses a significant threat to academic integrity and integrity. Rates of plagiarism, especially in academic and scientific publications, have risen with the advent of the Internet, reaching alarming levels, such as 60% in student projects. This study examines the proposed model that includes computation of similarity using cosine coefficients, Euclidean similarity, and Jaccard similarity between training and test texts, providing a variety of metrics for comparison and analysis. These sequential steps combine automated analysis with human interpretation, enhancing the effectiveness and accuracy of the plagiarism checker and making it easier to use in many different fields and applications. The results showed that it is possible to accurately determine the similarity between texts.

Keywords: NLP, Cosine, Euclidean similarity, Jaccard , Text similarity.

A Study on Improving the Accuracy and Effectiveness of Similarity Detection Processes in Text Files Using NLP Techniques

Assist. Lect. Noor Abdulmuttaleb Jaafar

Administration & Finance Department, College of Admin. and Economics - University of Diyala, Diyala / Iraq

noor84abd84@uodiyala.edu.iq

دراسة حول تحسين دقة وفعالية عمليات اكتشاف التشابه في الملفات النصية باستخدام تقنيات البرمجة اللغوية العصبية

مدرس مساعد نور عبد المطلب جعفر

قسم الإدارة والمالية، كلية الادارة و الاقتصاد – جامعة ديالى، ديالى \ العراق

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6. Conclusion

In this paper, the system proposed encrypts and compresses the voice signal simultaneously. The suggested system consists of two phases: encoding and decoding phases. The proposed method has experimented on the Librispeech dataset. Two chaos maps are utilized to generate a key for permutation, as well as DCT, Dynamic quantization and a Hybrid of Huffman and Run-length encoding is performed to the speech signal. The simulation results achieved a good result and the best result was achieved with a compression ratio of about 14%. The results get MSE=0.008, SNR =34.025db, and PSNR=80.1db.These results reflect the high quality and intelligibility of constructed voice signals.

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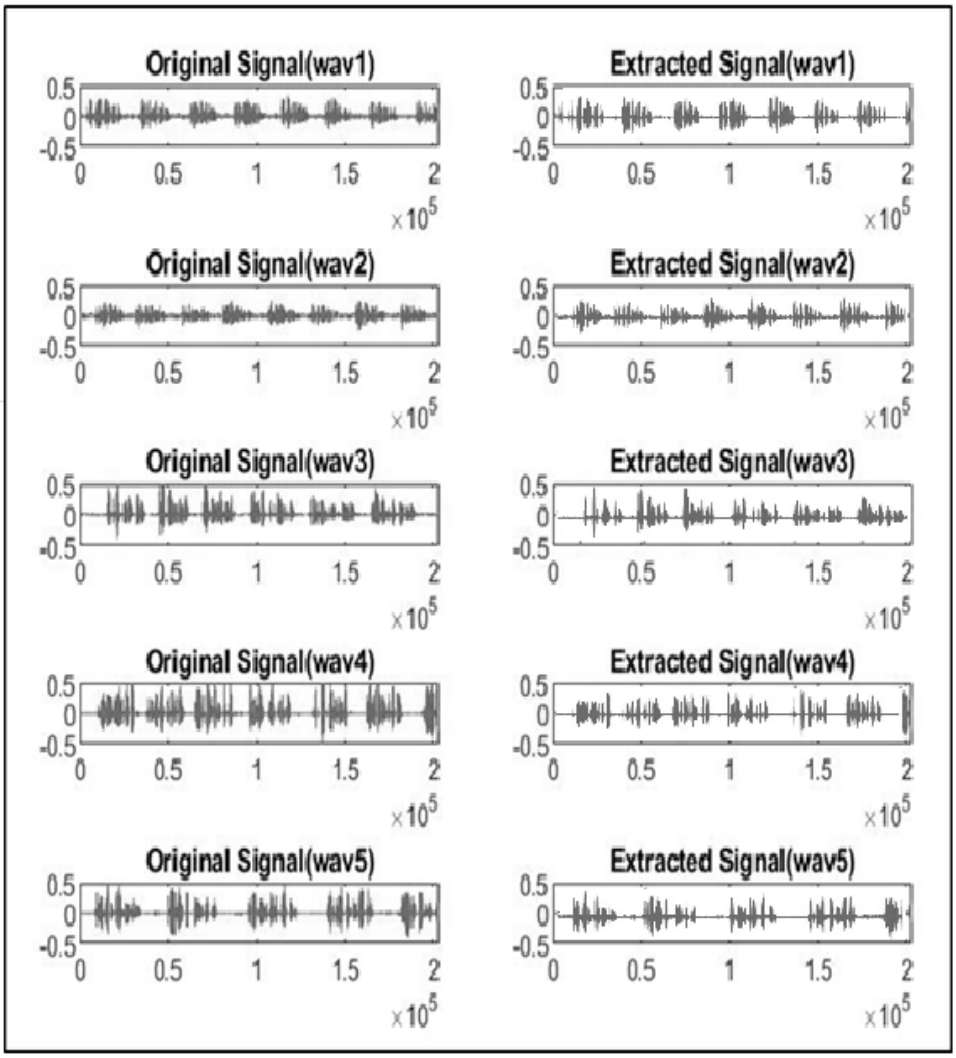

Figure 5: Results of the Second Method tested on Libri-speech samples

5. Experimental Result and Analysis

The suggested system consists of two phases: encoding and decoding phases. The proposed method has experimented on the Librispeech dataset. Two chaos maps are utilized to generate a key for permutation, as well as DCT, Dynamic quantization, and a Hybrid of Huffman and Run-length encoding is applied to the speech signal.

In this method, the signal is segmented into affixed length frames, each of (5 sec), and determines the quality of the reconstructed signal. The DCT process is implemented on each frame, then calculates the total norm, takes the absolute of DCT coefficients, and sorts DCT coefficients in descending order. The next step is to find the norm for each sample to specify the important part of DCT coefficients. Figure 5 illustrates the Original and constructed signal of the second proposed system.

The hybrid of Huffman and RLE coding is used at the coding step. Dynamic quantization and hybrid Huffman and RLE coding enhanced the system performance. The compression ratio of the samples obtained from the Libri-speech dataset is illustrated in Table 1.

Table 1: Results of the second method for the Libri-speech dataset

the size of wave files in bits =203200*16=3251200					
size in bit	573759	952654	1168730	449601	1397241
compression ratio%	17.64763	29.3	35.95	13.8288	24.97619
MAP	0.001	0.00006	0.00054	0.0008	0.00003
PSNR	46.492	80.52	61.83	80.1	46.15
SNR	5.358	30.2	12.45	34.025	5.45

The encoding steps of the proposed system algorithm are illustrated in algorithm1.

Algorithm (1): Proposed system method

Input: Speech file

Output: Encoded speech file

Steps:

1: Input speech file

2: set segment as seg ←5*fs

3: cut the segment

4: q←apply DCT using eq(1,2).

5: apply dynamic quantization on q

6: k←apply Huffman algorithm on the quantized speech signal frame

7: apply RLE on the index

8: key1←generate key using logistic map using eq.(3)

9: key2←generate using gauss map using eq.(4)

10: permute the quantized speech signal using key1

11: Convert key2 to hexadecimal.

12: Convert the signal k to hexadecimal.

13: apply Excusive-OR bits of the signal k with the key2.

14: Return Encoded speech

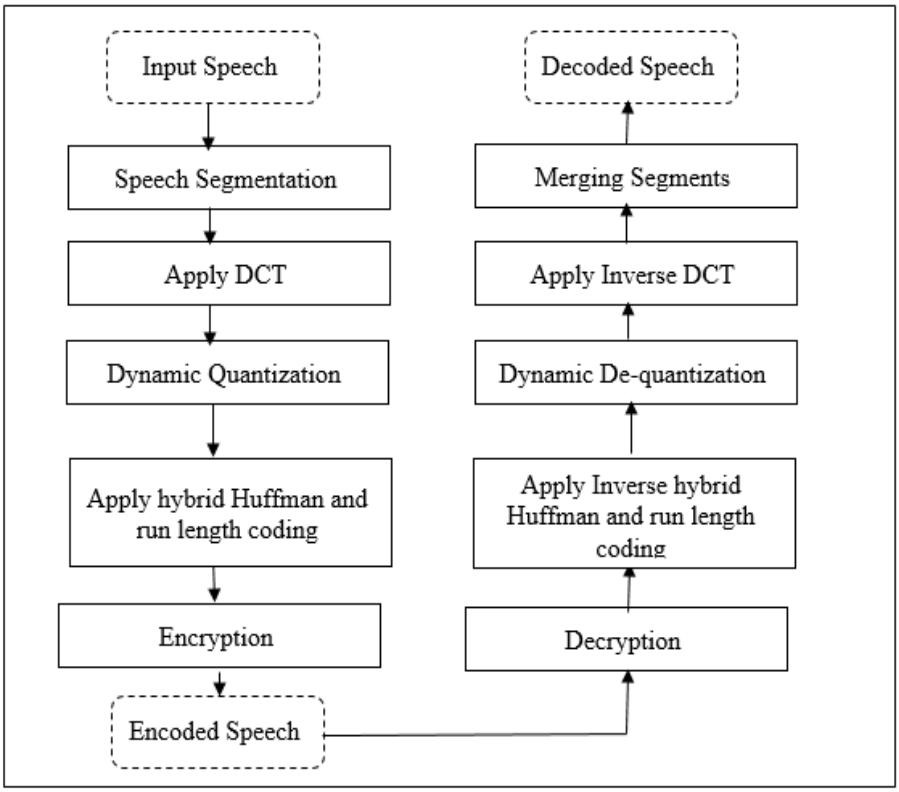

Figure 3: Block diagram of the proposed method

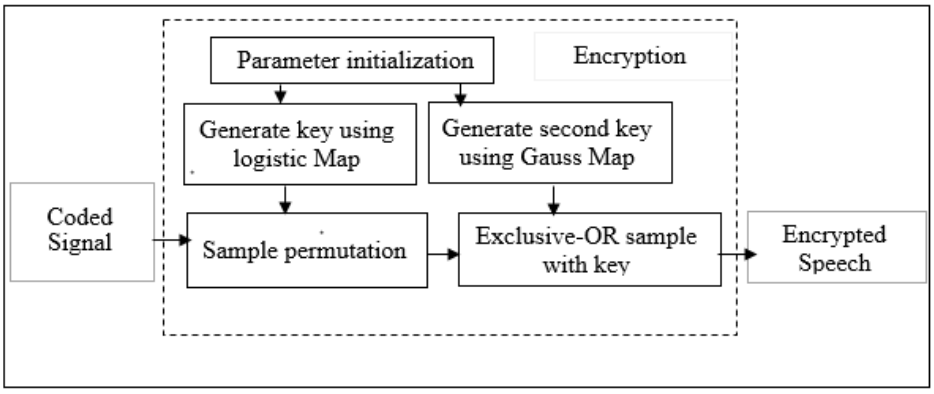

Figure 4: Encryption Stage

Where σx2 is the speech signal mean square and σe2 is the mean square difference between the reconstructed and original voice signal.

MSE is a useful metric to note that it correlates perfectly with perceived audio quality:

$$MSE = \frac{1}{y}\sum_{n=1}^{y}(I(n) - R(n))^2 \quad \ldots (7)$$

The PSNR, is depend on MSE and it calculated in equation 8:

$$PSNR = 10log_{10}\frac{255^2}{MSE} \quad \ldots (8)$$

4. Proposed Speech Coding Method

The proposed method explains in Figure 3 that The system uses DCT, a Hybrid of Huffman, run length coding, and logistic and Gauss map to encrypt and compress speech signals. The Block diagram of suggested speech encoding and decoding is illustrated in Figure 3. At the first segmentation step, the speech signal is padded and segmented into a fixed-length frame of 5 sec. Then on each frame, DCT and finding the total norm is applied. An absolute for the output of the DCT process is performed to eliminate the negative values and prepare it for the proposed dynamic quantization step.

A Hybrid of Huffman and RLE is proposed for an effective coding process. Then encryption process is implemented on the output of the Hybrid Huffman and RLE algorithm. The encryption stage that is explained in Figure 4 consists of several steps: key generation using the logistic map, permutation, key generation using the Gaussian map, and XOR permuted signal with a key generated from the Gaussian map (Substitution). Fig shows the steps of an encryption stage.

Where β and α are indicate the input parameters that will enormously affect the results of the Gaussian map. A Gaussian map will produce some random values. This sequence will be utilized to randomize other sequences with the exact length. By taking □= 4.9 and ß= [-1, +1] values, the graph has been drawn for the Gauss iterated map as illustrated in Figure 2.

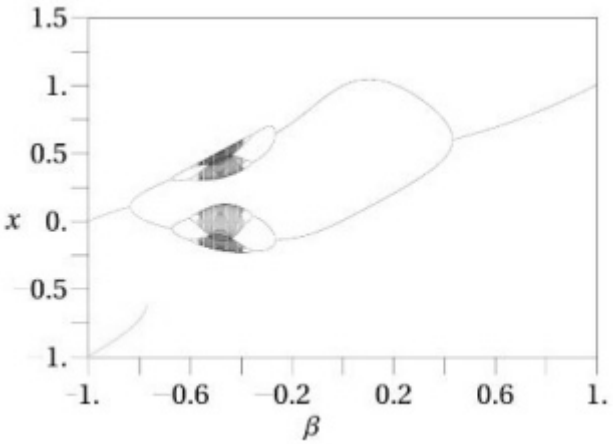

Figure 2. Gaussian map

3.5 Performance evaluation

Several objective tests were performed to assess the overall effectiveness of the suggested speech compression strategy [11][21]. Several criteria are taken into account while evaluating the performance of the reconstructed signal including the compression factor as explain in equation 5.

$$compression\ factor = \frac{length\ of\ orginal\ signal}{length\ of\ compressed\ signal} \quad \ldots(5)$$

Signal-to-noise ratio that explain in equation 6.

$$SNR = 10log_{10}\left[\frac{{\sigma_x}^2}{{\sigma_e}^2}\right]^2 \quad \ldots(6)$$

based on certain beginning conditions and parameter settings. Other parameter values result in oscillations at the system's output with varying periods. A chaotic function or map is what mathematicians refer to as a function that exhibits some chaotic behavior.[17] The logistic map is one of the most straightforward chaotic functions that has lately been researched for cryptography applications. The function of a logistic map is written as [18]

$$X_{n+1} = rX_n(1 - X_n) \qquad (3)$$

The parameter r is a positive constant that accepts values up to 4 in the case when xn takes a value between (0, 1). Its value establishes and investigates the logistic map's behavior. The iterations start to get utterly chaotic at r=3.57 and lend themselves to the goal of encryption.

3.5 Gauss Chaotic Map

A chaotic map is a method that is frequently utilized in encryption because, despite its simplicity, it is challenging to guess. Pseudorandom numbers will be generated via a chaotic map and utilized in the encryption procedure. Chaotic maps provide pseudorandom outputs that rely on the inputted parameters. The Circle map, Tent map, and Gaussian map, among other chaotic maps, may all be employed. Equation (4) can be utilized to produce pseudorandom from a Gaussian map[19][20].

$$X_{N+1} = \exp(-aX_2^N) + \beta \qquad (4)$$

of a symbol, that symbol is more likely to occur next to others. If this is not the case, using coding runs (rather than symbols) to compress data will not work. Other coding techniques can achieve the same result in a broader sense, but run-length coding consumes extremely minimal cost when the runs are large[15].

3.4 Huffman Coding

David Huffman created this approach as part of a class assignment; in the field of information theory, the class was the first ever, and Robert Fano taught it at MIT. Huffman codes are codes formed utilizing this approach or procedure. These are prefix codes that are optimal for a certain model (set of probabilities). The Huffman technique is based on two considerations about optimal prefix codes.[16].

1. In an optimum code, more often occurring symbols (those with a greater likelihood of recurrence) will have shorter code words than less frequently occurring symbols.
2. In an optimum code the exact length is given to the least frequently occurring symbol.

The first observation can be seen to be true. The average number of bits per symbol would be higher if the code words for symbols that occur more frequently were longer than those that occur less frequently. As a result, an ideal code cannot use longer code words for symbols that appear more frequently.

3.4 Logistic Chaotic Map

Chaos is the pseudorandom behavior that a deterministic, nonlinear dynamical system displays. Chaotic systems have different output values

3. Methodology

the proposed method consists of several steps as follows:

3.1 Discrete cosine transforms (DCT)

The Discrete Cosine Transform (DCT), like other transforms, aims to de-correlate the data. Each transform coefficient may be encoded individually after de-correlation without sacrificing compression performance. This section introduces the DCT and some of its key qualities[13]. The following are the most popular DCT definition of a 1-D sequence of length

N: $$C(u) = a(u)\sum_{i=0}^{N} s(i)\cos(\frac{u\pi(2i+1)}{2N}) \quad (1)$$

$$a(u) = \begin{cases} \sqrt{1/N} & if\ u = 0 \\ \sqrt{2/N} & if\ u \neq 0 \end{cases} \quad (2)$$

Where 0…., N-1, s presents a set of N speech input data values, and C (u) is the uth DCT coefficient.

3.2 Quantization

The process of converting a collection of continuous-valued data to a set of discrete valued data is known as quantization. The goal of quantization is to minimize the amount of information in threshold coefficients. This procedure ensures that errors are kept to a minimum. [14].

3.3 Run Length Coding

Run-length encoding is utilized when symbols do not occur independently but are impacted by their predecessors. Given the occurrence

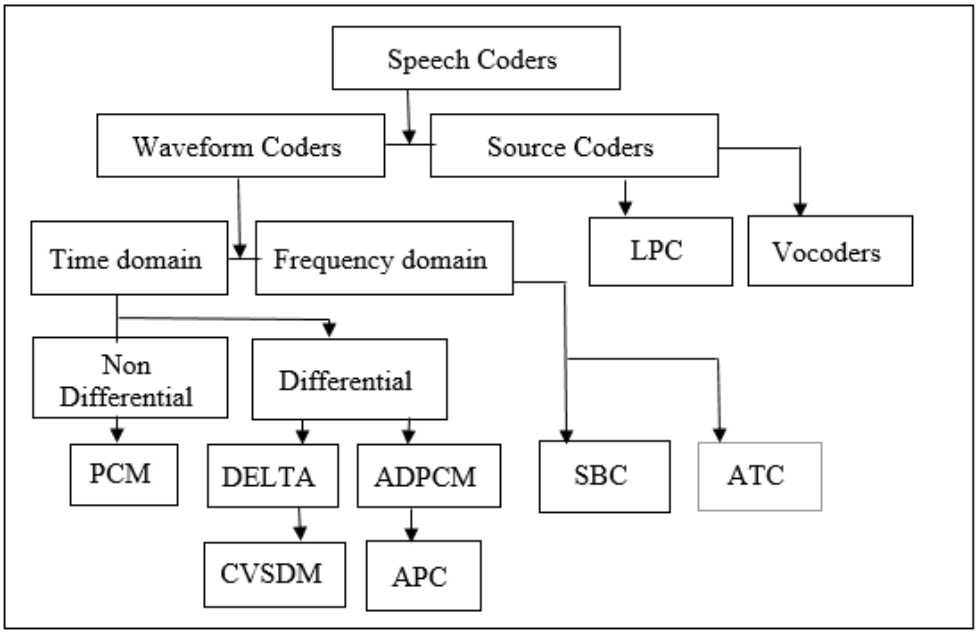

Figure 1: Classification of Speech Coding Methods[11]

The basic objective of parametric and hybrid coding approaches is to improve the quality of a voice signal while reducing the bit rate. The velocity of transmission or storage, voice quality, and computational complexity affect how well a speech signal is delivered. The following characteristics apply to low-bit-rate coding schemes[12]:

- Robustness to various languages and speakers.
- Minimized coding delay. and channel error.
- It must have high speech quality and a low bit rate.
- Less computational complexity and low memory needs.

The speech coders' objective is to attain bit rate and bandwidth reduction. The memory demanded for speech coders should be reduced, which reduces the bit rate proportionately. Because compressed data may be transferred with fewer bits, the signal's transmission power must be reduced. The coding algorithms offer noise resilience since some saved bits may be employed to protect error-control bits for the speech parameters.[10].

The paper is organized as follows; The basics of speech coding are described in Section 2, the theoretical background is presented in Section 3, the proposed method is illustrated in Section 4, Section 5 shows the experimental results, and Section 6 discusses the conclusion.

2. Speech Coding Basics

Voice coding methods can process massive amounts of data and increase the volume of information transmitted from one point to another. The coding algorithms preserve the original voice quality while representing the data with the least number of bits. The encoder transforms digital data into codes, then broadcasts as frames. After receiving the coded frames, the decoder or receiver conducts synthesis to reconstruct the original signal. The speech coders mainly vary in bit rate, perceptual quality, complexity, and delay of the reproduced speech[10]. Figure 1 illustrates the chart of speech coding methods classification [11].

1. Introduction

The most effective communication method utilized in telephone, mobile communications, and transmissions is speech. One method that aims to use all the communication systems' capabilities and resources is speech compression. By reducing the transmitted voice signal's bit rate or size, compression is achieved.[1][2]. The communication channel's bandwidth is conserved through this technique. Additionally, it reduces the memory needed to store speech files. Because speech signals include a significant amount of redundant information, speech is compressed. A compressed signal is generated by removing non-essential voice information and coding just the important voice information. To reconstruct the original speech with excellent intelligibility, the degree of information to be eliminated must be appropriate. Video teleconferencing systems, voice mail, cellular, and satellite communications are just a few of the current applications for speech compression.[3][4].

Speech coding has been studied extensively for years, leading to various standardized codecs that may be divided into two groups: vocoders and waveform codecs. The decoder synthesizes speech from a set of physiologically essential features that a vocoder, also known as parametric speech coding, distils, such as the spectral envelope (comparable to responses of the vocal tract, including the contribution from tongue position, nasal cavity, and mouth shape), gain (speech-level), and fundamental frequencies. A vocoder often runs with excellent computational efficiency at three kbps or lower, but the quality of the synthesized speech is typically constrained and does not scale to higher bitrates [5][6]. A waveform codec, on the other hand, seeks to precisely recreate the input voice signal and offers up to transparent quality in a high bitrate range. [7][8][9].

المستخلص

يتطلب التوسع الهائل للبيانات في العالم الرقمي تطوير طرق فعالة لنقل البيانات وتخزينها. تُقترح استراتيجيات ضغط البيانات (DC) لتقليل كمية البيانات المخزنة أو المنقولة بسبب الموارد المحدودة. ونتيجة لقدرة أفكار DC على استخدام مساحة التخزين الحالية وقدرة النقل بكفاءة، فقد تم تطوير أساليب مختلفة في مجالات مختلفة. يعد ترميز الكلام طريقة ترميزية ضائعة؛ ولذلك، تختلف إشارة الخرج قليلاً عن إشارة الإدخال. يعد تشفير الكلام مفيدًا لتشفير الرسائل والتواصل عبر المسافات الطويلة وجودة الكلام. في مجالات معالجة الصوت الرقمي والاتصالات السلكية واللاسلكية، كان تشفير الكلام يمثل مشكلة كبيرة. في هذا العمل، نوضح أنه يمكن استخدام DCT مع نظام فوضوي مدمج مع Hybrid of Huffman وترميز Run-length لتنفيذ تشفير الكلام بمعدل بت منخفض للغاية مع جودة إعادة بناء عالية. تم إجراء النظام المقترح على مجموعة بيانات Lbri-speech ويتم تقييم الطريقة بناءً على SNR وMSE وPSNR. أظهرت نتائج المحاكاة نتائج جيدة وتم تحقيق أفضل نتيجة بنسبة ضغط تبلغ حوالي 14%. النتائج تحصل على SNR=34.025db، MSE=0.008، وPSNR=80.1db.

الكلمات المفتاحية تشفير الكلام، ضغط البيانات، تشفير التحويل، تشفير الكلام العصبي، إشارة الكلام.

Abstract

The exponential expansion of data in the digital world necessitates the development of effective methods for data transmission and storage. Data compression (DC) strategies are suggested to reduce the quantity of data stored or conveyed due to constrained resources. As a result of DC ideas' ability to efficiently use existing storage space and transmission capacity, different methods have been developed in various areas. Speech coding is a lossy method of coding; therefore, the output signal differs slightly from the input signal. Speech coding is useful for message encryption, communication over long distances and speech quality. In the fields of digital voice processing and telecommunications, speech coding has been a significant problem. In this work, we demonstrate that a DCT with a chaotic system combined with a Hybrid of Huffman and Run-length coding can be utilized to implement very low bit-rate speech coding with high reconstruction quality. The proposed system was conducted on the Lbri-speech dataset and the method is evaluated based on SNR, MSE, and PSNR. The simulation results show good results and the best result was achieved with a compression ratio of about 14%. The results get MSE=0.008, SNR =34.025db, and PSNR=80.1db.

Keywords speech coding, Data compression, transform coding, neural speech coding, speech signal.

Speech Coding based on a Hybrid Approach: DCT, Huffman and Run-length Coding

Assist Lect. Sundos Abdulameer Alazawi
ss.aa.cs@uomustansiriyah.edu.iq
Department of Computer Science - College of Science, Mustansiriyah University, Baghdad / Iraq

Assist. Lect. Esraa Jaffar Baker
es-alshaibany@uomustansiriyah.edu.iq
Department of Computer Science - College of Science, Mustansiriyah University, Baghdad / Iraq

Assist. Lect. Shahbaa Mohammed Abdulmaged
Al-Iraqia University - Law Dept., Baghdad / Iraq
Shahbaa.abdulmaged@aliraqia.edu.iq

ترميز الكلام على أساس نهج هجين: DCT، وهوفمان، والترميز على طول المدى

م. م. سندس عبد الأمير العزاوي
قسم علوم الحاسوب – كلية العلوم، الجامعة المستنصرية، بغداد \ العراق

م. م. اسراء جعفر بكر
قسم علوم الحاسوب – كلية العلوم، الجامعة المستنصرية، بغداد \ العراق

م. م. شهباء محمد عبد المجيد
الجامعة العراقية – قسم الحقوق، بغداد \ العراق

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4.Conclusion

Extracting meaningful information from unprocessed IoT data is a highly intricate undertaking that surpasses the capabilities of conventional data analysis methods. This paper presents a thorough examination of Deep Learning, a sophisticated machine learning technology that has proven to be particularly effective in evaluating complicated data produced by IoT applications. Deep Learning models surpass conventional machine learning paradigms in the following aspects. Firstly, they eliminate the need for supervised feature sets to be used for training. As a result, Deep Learning models may effectively extract features that may not be easily identifiable by a human. Furthermore, Deep Learning models produce more precise prediction outcomes. Moreover, Deep learning models are suitable for representing complex patterns in diverse datasets. This proposal offers an in-depth analysis of different Deep Learning architectures. This text presents a comprehensive overview of the research endeavors that have utilized Deep Learning models for data analysis in Internet of Things (IoT) scenarios. Finally, this paper discusses the problems and future research directions that need to be addressed in order to support continued study in this field. It is important to note that the use of deep learning for analyzing IoT data is still in its early stages. Further study is necessary to fully utilize the capabilities of deep learning models for IoT data analysis.

network architectures. This procedure facilitates the doctor's acquisition of information through the utilization of medical devices. The obtained data is then subjected to a classification stage in order to determine the presence of any infection or disease, such as the Corona virus or potential future epileptic episodes. This enables the doctor to prescribe the appropriate medication for the patient.

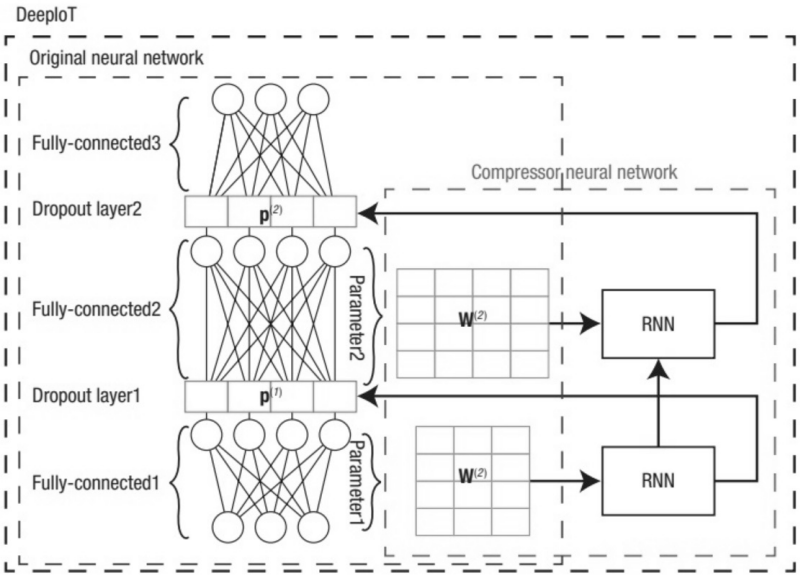

Figure (13) deep learning of IoT

body to constantly monitor a patient's essential health indications. These sensors have the capability to transmit data on physiological parameters obtained from the human body to other devices for the purpose of diagnostic procedures and prescribing treatments. WBAN offers healthcare services globally and facilitates unrestricted mobility by allowing medical professionals to monitor a patient's health using data transmitted through wireless networks. This study presents a healthcare monitoring system utilizing Wireless Body Area Network (WBAN) technology. The system is capable of collecting data on electrocardiogram (ECG), heart rate, and human body temperature. This is precisely what we require, particularly during the COVID-19 pandemic. It is feasible to enhance this by considering or presenting other instances in the event of a novel virus. This particular type of virus undergoes self-development approximately every twenty or ten years, as per the research conducted by the World Health Organization. During this period, a significant number of individuals are uncertain whether they are dealing with a virus or a common flu. The inability to access a hospital or a doctor has left patients feeling disheartened. Consequently, this type of network has experienced substantial advancements. The data obtained from the human body is wirelessly transmitted via the IEEE802.15.6 MAC protocol on NS-3. The physiological data will be transmitted to a distant medical server where it will be stored and evaluated. If a patient is diagnosed with any disease, the medical team is capable of promptly providing aid.

3.3 Deep Learning in IoT

An exceptionally efficient deep learning compression approach, known as DeepIoT, has the capability to compress frequently utilized deep neural

By adding more access points or other required components, the network's flexibility may be readily increased without interfering with the operation of the entire network.

B. Medical Records

In this instance, data is gathered from patients' medical records regarding the therapies they received. We gather patient medical records that encompass the patient's medical history, including details on therapies, laboratory testing, and drug administration. Analyzing these records can yield valuable information that can offer ideas for enhancing medical guidance. Nevertheless, medical records typically have a substantial volume, with each record containing data that has scattered variables and high dimensions. Additionally, those with diabetes and high blood pressure may experience several symptoms, including kidney and cardiovascular disease, neuropathy, and skin and eye problems. Their weakened immune systems make them more susceptible to contracting the Karuna virus and experiencing related diseases. It is crucial to have appropriate information regarding these matters. Hence, it is imperative to scrutinize medical records in order to identify individuals who have been impacted by the aforementioned issues and closely follow their condition through more specialized tests.

3.2. WBAN

Wireless Body Area Network (WBAN) is a subset of Wireless Sensor Network (WSN), a burgeoning technology used in healthcare applications. A Wireless Body Area Network (WBAN) is a network of small, low-power wireless nodes that are strategically positioned on or around the human

Multiple access ports are incorporated into the distinctive architecture to enable the body sensors' information to be sent more easily. As a result, the service coverage is greater than that of buildings based on infrastructure. During situations, like the coronavirus pandemic, when the Body Area Network (BAN)'s range is limited to around two meters, these devices enable users to migrate to any area or building in order to seek safety. The system's range may be increased to about 100 meters using an ad hoc linking architecture, allowing for both temporary and permanent deployments. There are two types of nodes that may be used in this architectural arrangement: sensor nodes that are located within or near the human body, and router nodes that are placed near the body area network (BAN). In Wireless Sensor Networks (WSNs), each node performs the dual roles of a router and a sensor. The ad hoc architectural configuration connects to the outside world through a traditional gateway that resembles a Wireless Sensor Network (WSN). Every infrastructure typically uses one radio, which means that bandwidth is shared. Therefore, when there is a high density of router nodes and sensor/actuator nodes in a certain location, there is a chance that a collision may occur. In order to resolve these conflicts, an asynchronous MAC technique might be used. The network architecture provides access to the system and has the following unique characteristics:

- Wide-ranging radio coverage made possible by data being sent across several hops. As a result, it is possible to provide improved support for patient mobility, especially for those infected with the coronavirus, because of the reduced bandwidth when data is sent over many hops.
- Rapid progress has been made in the timely and flexible wireless deployment of emergency response systems.

4. **Validation of the suggested model**: Researchers assess the efficacy, user-friendliness, and utility of the presented model by conducting interviews with Internet specialists. Figure 6 illustrates the proposed system.

3.1. Data collection

A. Wearable devices

We may use a variety of gadgets, such as wearable technology and smart sensors, to detect blood pressure, oxygen saturation, temperature, accelerometers, weight scales, and smartwatches. To track the patient's physiological indicators, including heart rate, blood pressure, blood sugar, stress level, oxygen saturation level, temperature, and weight, the body's signals will be recorded in real-time in each of these situations. In our system, portable gadgets are widely used to track physiological functions. The mobile device's sensors allow for the exact collecting of data on a number of human bodily features. Therefore, in addition to collecting personal data like age, gender, height, and other pertinent information, smartphones are used to collect data on food, exercise, and other types of physical activity. This information is very beneficial for healthcare and illness prevention, especially in light of the coronavirus epidemic. Nevertheless, smartphone data is very erratic and easily corruptible. Therefore, it is difficult to use smartphone data to obtain accurate health information and extract relevant data. To efficiently process sensor data and extract relevant information for healthcare applications, we have used ontology-based data extraction and semantic knowledge approaches.

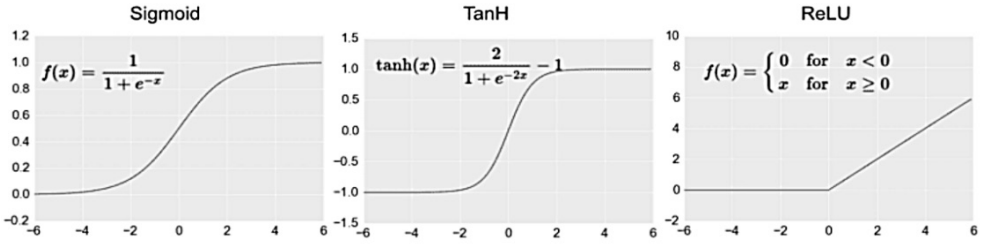

Figure (12) activation function

3 Research methodology

The proposed approach entails developing an intelligent system that leverages the Internet of Things (IoT) for healthcare in response to the COVID-19 pandemic. The system aims to address the challenges faced by a significant number of infected individuals who were unable to access medical facilities or healthcare professionals. Ensuring the implementation of this care system is highly crucial. The research technique comprises four fundamental stages:

1. **Data gathering stage**: The researcher gathers and examines data either by adhering to established medical guidelines or by utilizing intelligent technology like mobile phones.
2. **During the design and analysis stage**, servers are utilized to connect gadgets and utilize fundamental information to create an automated model that represents the healthcare process.
3. **The proposed development model**: The health care monitoring model can function independently of the Internet of Things that it was originally built upon.

To guarantee that the output values are maintained within a range that is convenient to deal with, activation functions are utilized to perform a mathematical action on the input data. It is not necessary to alter input layer data because they are usually centered around zero and have already been appropriately scaled. Nevertheless, these numbers frequently go beyond the bounds of their original scale when multiplied by weights and summed collectively. Activation functions are important in this situation since they are activated to bring the numbers back into an acceptable range.

Activation functions need to be continuous differentiable and non-linear in order to be successful. Because of its nonlinearity, the neural network may be used as a global approximation. Gradient-based optimization techniques need the existence of a continuously differentiable function in order to effectively backpropagate errors across the Connectivity infrastructure.

Within the neuron:

- The activation function is given to an individual neuron or to the whole layer of neurons.
- The input values are combined using a weighted sum.
- The resulting sum is then sent through an activation function, causing a transformation to occur.

The output to the subsequent layer is represented by the converted value [36].

$$\text{sigmoid:} \qquad f(x) = \frac{1}{1+e^{-x}},$$

$$\tanh: \qquad f(x) = \frac{e^{x} - e^{-x}}{e^{x} + e^{-x}},$$

$$\text{ReLU:} \qquad f(x) = \max(0, x),$$

to perform arithmetic function operations. This is the point where the classification process starts.

$$r^{(-1)} \sim Bernolli(p) \quad \text{.....(3)}$$

$$x_j^l = f[\sum_{i \in M_j} (r^{(l-1)} * x_i^{l-1}) * W_{ij}^l + b_j^l] \quad \text{.....(4)}$$

When every feature in the training dataset has a strong connection to the fully connected (FC) layer, overfitting can occasionally happen. After performing well on training data, the model suddenly exhibits poor performance on fresh data. According to equation (3), every value in vector (1) lr− has a probability of p and hence follows a Bernoulli distribution, producing values that are either 0 or 1. Starting from the first layer l and moving through the vector (1) lr−, each layer of the model blocks is a component of the 1lix− input vector. As a result, the model can roughly represent the subnetwork model that was taken out of the network model as a whole. Forward propagation is used to acquire the lth layer's output.

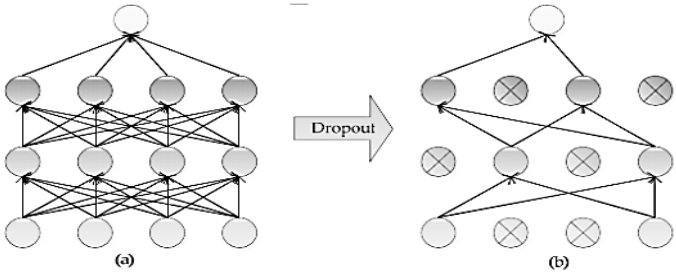

Figure (11) Neural network utilizing Dropout

e) Activation Function Layer

Even though neurons have activating activities, not all neurons have them, as Figure (12) illustrates. While the input layer lacks activation functions, the output layer has hidden neurons.

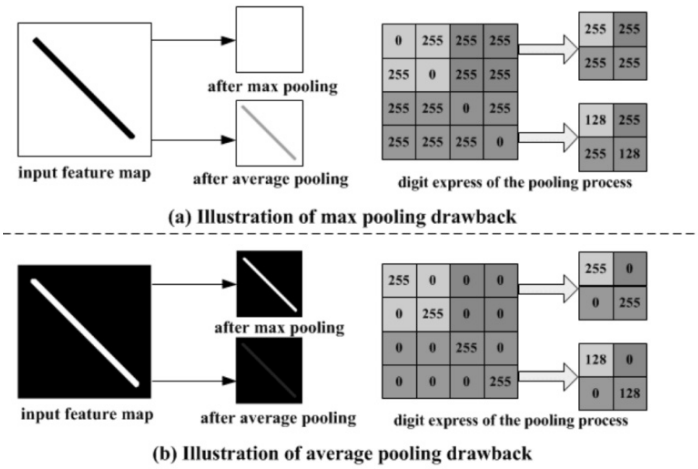

Figure (10) max or average pooling

c) Fully Connected Layer (FC)

In addition to neurons, the FC layer, which links neurons between layers, also contains weights and biases. These layers comprise the final few levels of the CNN architecture, before the output layer. By doing this, the input picture from the layers above is fed into the FC layer, flattening it. Arithmetic function operations are carried out by applying additional FC layers on top of the flat vector. At this moment, the categorization process starts.

d) Dropout

Weights, biases, and neurons make up the FC layer, also referred to as the fully connected layer, which creates connections between neurons in various layers. These layers make up the last few levels of the CNN architecture before the output layer. The fully connected (FC) layer is compressed throughout this process, and the input picture from the layers above is sent to it. The flattened vector is further extended with completely linked layers

b) Pooling Layers

Neural networks (NN) employ pooling as a way to reduce computational complexity and variance. A lot of times, inexperienced people use the assembly method without realizing why they should. Three basic assembly techniques that are often used are compared here.

Aggregating activities come in three different flavors:

Choosing the largest value inside a certain window is how max pooling, a deep learning approach, downsamples the input data. The value specified denotes the batch's maximum pixel value.

Min pooling: Identifies the batch's lowest pixel value.

In computer vision and image processing, average pooling is a technique that downsamples an input picture by splitting it into non-overlapping sections and replacing each region with the average value of the pixels inside that It computes the average value of each pixel in the batch.

The term "batch" here refers to a group of pixels the same size as the filter, which is based on the image's dimensions. Here, a 9x9 filter was selected. The aggregation approach's outcome varies according to the particular filter size setting. Consequently, the convolutional layers' spatial dimensions, which provide the feature maps. The accuracy of the features is reduced by the pooling layer. Maximum and average pooling ideas are shown in Figure 10. Not all of the info is removed when we aggregate a picture. Rather, we extract an overview of all the values that are there.

situation, a popular option is the ADAM Optimizer, which stands for Adaptive Moment Estimation Optimizer. ADAM is an optimization technique that iteratively adjusts the network weights based on the training data, in contrast to the traditional random gradient descent approach [24].

2.5.2 Layers of CNN

Layers of CNN There are many layers in a convolution neural network. The most important layers are explained in the subsections below:

a) **Convolution Layer**

Extracting features from an input picture while maintaining the spatial connection between pixels is the main objective of the convolution process. This is accomplished by teaching a filter (kernel) about the characteristics of the picture. An essential part of a convolutional neural network is the convolution layer, which wraps the input picture in order to extract its characteristics. While later layers extract higher-level characteristics, the initial convolution layer concentrates on extracting low-level features like lines, corners, and edges. The equation for these layers is given in equation (2) [25].

$$a^{1} = \sigma\left(b + w * a^{0}\right) \quad (2)$$

a1 indicates the collection of activations that are output from the feature map, while a0 denotes the input activations. σ stands for the activation function, w for weight, b for bias, and * for the convolution process. The height and breadth of the input picture are greater than those of the kernel. The kernel convolves with the picture by sliding across it to build a feature map. The product of the kernel element and its matching element in the original picture is the convolution.

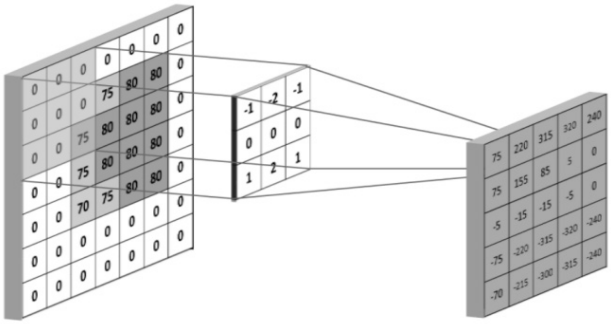

Figure (9) Zero Pegging.

V., Batch Size, Iterations and Epoch

In machine learning, large datasets are frequently handled, therefore batch sizes, iterations, and epochs are crucial. To solve this problem, the data must be divided into smaller chunks and entered into our model one after the other. At the end of each phase, the neural network weights must be adjusted to better match the data. An epoch is a predetermined window of time that a network uses to process data. When a network is trained, its whole data set is used for a single network iteration, a process known as an epoch. The batch size in each session determines how many I/O pairs are shown on the network. The total number of batches needed to finish a single period is referred to as the iterations. Square brackets [23] encompass the number 23.

VI. Cost Function

The network's performance is assessed using the cost function. It is the outcome of deep learning and reflects the goal that the network seeks to reduce. An optimizer is needed in order to minimize the cost function. In this

The kernel moves left to right again after shifting one object downward in the top-right corner of the picture. Until the kernel reaches the lower-right corner of the input picture, this procedure is repeated. The outcome of this process is the feature map [29].The stride value controls how the filter moves across the picture. For example, the filter will only move across the image by one pixel at a time when the stride is set to 1.

III. Image Features

Points of interest, edges, and lines in photographs offer diverse information about the content of an image. Localities in an image are described and utilized in several image analysis applications, including reconstruction, recognition, matching, and more [21].

IV. Zero Padding

No matter whatever convolution phase it goes through, the picture will get smaller. To keep the original input size, zero padding is the process of adding zeros to the input picture matrix. Cushioning comes in two different types. "Valid" is the first option; it signifies that no padding is used and that the convolutional layer is never padded. The input size is not maintained as a result. The term "same" denotes the second kind, which means that before to convolution, the input picture is padded. This means that the output's size is equal to the input's size. The zero padding notion is seen in Figure 9. In conclusion, padding is evident in our input volume as it's required to make sure our kernels can handle the input matrices. Sometimes we fill matrices with zeros with an extra row or column. This is known as zero padding. As an alternative, eliminate the unfitting area of the image using a method known as legitimate padding [22].

II. Convolution Operation and Filter

The convolutional layer is employed to extract the salient characteristics of the image. The convolutional layer at the lower level extracts rudimentary characteristics, such as edges, lines, and corners. The high-level convolutional layer acquires abstract characteristics by incorporating low-level features. The convolutional layer generates numerous feature activation maps by performing a correlation operation between a convolution kernel of a certain size and the previous layer, as depicted in equation (1).

$$X_j^l = f\left[\sum_{i \in M_j} (X_i^{l-1} * K_{ij}^l + b_j^l)\right], \quad (1)$$

The kernel consists of a limited number of actual values. The size of the photo is reduced compared to the original. The filter sizes typically range from 1 x 1 to 7 x 7 in neural networks, and these filters determine the weights of the network. They are established during the training phase. Convolution, mathematically speaking, refers to the act of merging two functions described by an integral that demonstrates how one function's shape is altered by the other. Figure 8 illustrates the Convolution process.

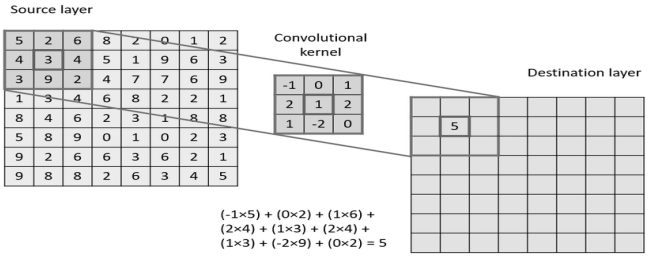

Figure (8) Convolution operation

From the top-left corner of the image, the convolutional process begins, and the kernel moves horizontally from the left side to the right side.

requiring specific knowledge or human involvement in feature creation [27]. The architecture of a convolutional neural network (CNN) is shown in Figure 6.

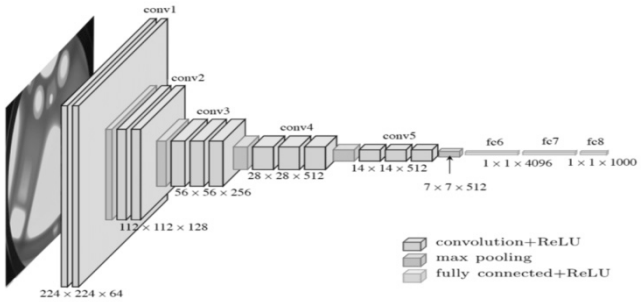

Figure (6) Architecture of CNN

The subsections below provide explanations for several of the terminology and terminologies related with CNN.

I. Input layer of CNN

The input layer serves as the first input for the whole Convolutional Neural Network (CNN). In an image processing neural network, the input typically consists of the pixel matrix of an image. The dimensions of the grayscale image can be utilized to determine the size of the input image[20]

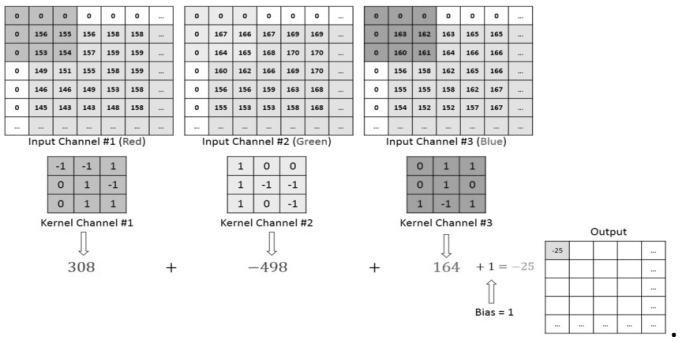

Figure (7) input layer RGB Image of CNN

2.3.1 Convolutional Neural Network (CNN)

One kind of deep learning technique that is particularly useful for handling the processing of picture and video data is the convolutional neural network. It does this by taking important features out of the data and building a neural network that gives these features weights. After that, the network filters the data in order to modify it before classifying and selecting an image.

When it comes to handling image or video processing data, data scientists choose CNN. Using our layers, you can easily modify the transfer learning model. Convolutional neural networks, or CNNs, are widely used in computer vision. CNN is a particular kind of neural network that successfully solves a number of AI and computer vision problems. Since the convolution process is a crucial component in at least one of its layers, the term "convolutional neural networks" is employed. The input and output layers of a convolutional neural network (CNN) are joined by a number of hidden layers. Examples of layers are pooling layers, convolutional layers, and fully connected layers. Depending on the particular use case, different CNN designs utilize different numbers and combinations of layers. Text from the user is "[19]." CNN layers can have several filters, from few to many, that evaluate each channel and examine the input in a methodical manner.

Convolutional neural networks (CNNs) may extract characteristics that are more and more complicated and abstract as they go through layers. Starting with the farthest corners and edges in the first layers and moving forward to full faces and objects in the levels that follow. In the course of training, the network determines on its own which particular characteristics must be retrieved in order to solve the given issue. CNN's versatility stems from its ability to tackle a wide range of computer vision problems without

known as deep learning to derive insights from vast quantities of data. The term used to describe the period in which robots are capable of doing tasks that have historically required human skills is referred to as artificial intelligence. Machine learning is a component of this system that enables computers to acquire knowledge from previous experiences and acquire new abilities without human involvement. Similar to its ability for experiential learning, a deep learning algorithm repetitively executes an activity, making small adjustments to the outcome each time in order to enhance it. The term "deep learning" is used due to the fact that neural networks include several layers, which enable the process of learning. Deep learning may be used to address any issue that requires cognitive processing. Deep learning utilizes a vast, disorganized, and interconnected dataset to enable computers to effectively tackle complex issues. According to Figure 5, there is a positive correlation between the complexity of learning algorithms and their performance [18].

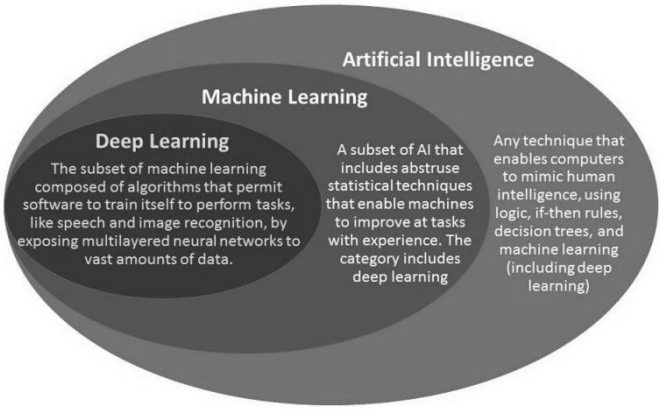

Figure (5) AI self-learning .

2.3 Deep Learning Classification

In recent decades, deep learning has achieved significant success mostly due to its capacity to efficiently process vast quantities of data. In addition to conventional methods, hidden layer approaches have attracted attention, especially in the field of pattern recognition. Convolutional neural networks are often used as one of the most common forms of deep neural networks.

Since the 1950s, when artificial intelligence first surfaced, scientists have faced challenges in developing a system capable of comprehending visual input. Subsequently, this discipline was designated as computer vision. In 2012, a team of academics from the University of Toronto created an artificial intelligence model that outperformed the leading picture identification algorithms, representing a significant breakthrough in computer vision.

The artificial intelligence system called AlexNet achieved a remarkable 85% accuracy rate and emerged as the winner of the 2012 ImageNet computer vision competition. The name Alex Krizhevsky is given to it as a tribute to the main designer. The runner-up test taker achieved a commendable score of 74 percent.AlexNet was built around convolutional neural networks, which are a specific kind of neural networks that closely mimic human vision. Convolutional Neural Networks (CNNs) have become an essential component of online computer vision training courses due to their growing significance in many computer vision applications. Now, let's examine the functioning of convolutional neural networks (CNNs).Artificial neural networks (ANN) are computational models that mimic the structure and functions of the human brain. They use a kind of machine learning

Ref.	Independent.	Dependent.	Method
Trivedi *et al.* [21]	to utilize a Bluetooth device that doesn't cover a big region and to avoid using other devices for the transmission procedure..	The analog values are translated into digital data based on the collected measurements. The physical characteristics were transferred to the constructed gadget via Bluetooth.	a mobile device regulated Arduino-based health parameter surveillance
Kumar *et al.* [22]	Not use other devices for many sensors cannot be treated properly.	In the control segment, a DS18B20 sensor was utilized for measuring the temperature of the body, furthermore, a pulse sensor was utilized for measuring the pulse. The Arduino was used to load data into the cloud via the module of the Ethernet shield and Wi-Fi on the transport layer.	Arduino, Ethernet, and Wi-Fi
Tamilselvi *et al.* [23]	No specific performance measures are described for any patient.	used Heartbeat, SpO2, Temperature, and Eyeblink sensors as capturing elements and "Arduino-UNO" as a device of processing.	ARDUINO-UNO board as a microcontroller and Cloud computing
Prajoona Valsalan *et al.*[24]	----	This system is worked on monitoring the pulse rate, the temperature of the body, and room temperature and humidity utilizing sensors. These sensor values are displayed on LCD as well. Then, these values are transmitted to a medical server utilizing wireless communication.	WLAN, LCD, wireless communication.
Acharya *et al.* [25]	The major drawback of the system is that no interfaces for data visualization are developed.	Pulse sensor, BP sensor, temperature sensor, ECG sensor, and the microcontroller "raspberry pi" were utilized. These sensors could collect data and transmit them to the raspberry pi for processing and again sent to the IoT network.	BP sensor, ECG sensor, and raspberry pi.

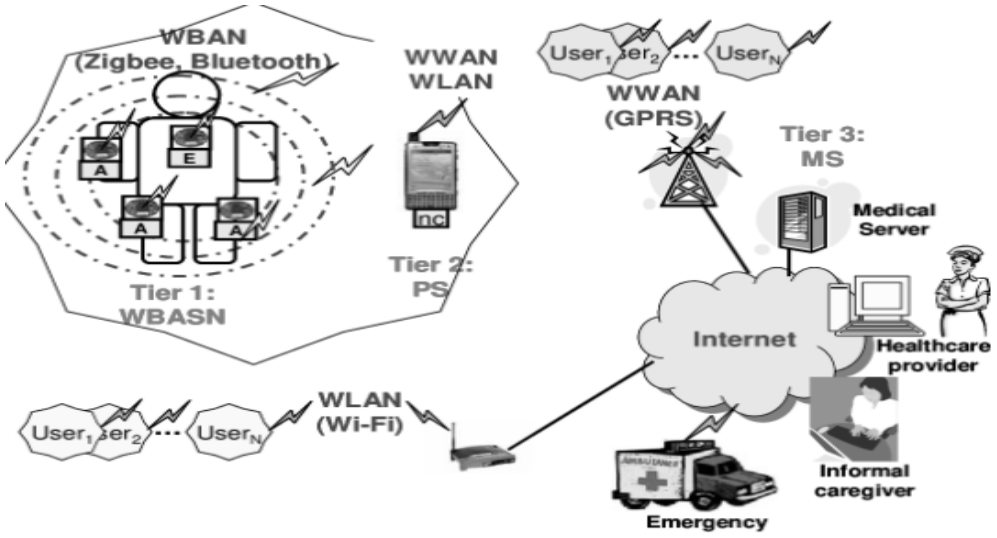

Figure (4) WBAN Architecture

Table 1: IoT-Based Healthcare Monitoring

Ref.	Independent.	Dependent.	Method
B. Thaduangta *et al.*[19]	Device sensor	The individual relied on routine health exams, which included frequently monitoring bodily parameters and sharing the collected data with medical professionals. The data is acquired using a web application.	Technology Acceptance Model
D. Kajaree *et al.*, [20]	Device sensor	used Body wireless sensor Network (BWSN) transmit the parameters of patients' health collected through the microcontroller "Raspberry Pi" to the caretaker and physicians wirelessly.	BWSN, caretaker wirelessly,

Additionally, the cost-effectiveness and special battery-powered features of the existing body sensor devices make it an attractive topic for energy-efficient MAC control.

- **Inter-BAN Communications**: The subsequent phase involves a single server that oversees the WBAN sensor hubs, offers the graphical user interface (GUI), and facilitates communication with the top-tier services. This includes information passing between the local server and one or more designated lanes. It might be excellent in foundation or spontaneous design. Wireless innovations for communication between BANs have matured, unlike communications within BANs; these include WLAN, Bluetooth, ZigBee, mobile, 3G, and more.
- **The clinical server, which is the third layer of Beyond-BAN Communications**, offers a range of services to clients and medical professionals in addition to storing electronic clinical information for registered users. Beyond-BAN's communication strategy is customized for each application and needs to adhere to customer-specific service standards. Through the Internet, the doctor may remotely access the patient's data and review it to make sure the patient's health parameters—such as heart rate, blood pressure, and physical activity—are within normal bounds. The doctor can also assess if the patient is following instructions or reacting to a particular treatment.

- **Mobility: Customers of BANs may travel. It is not appropriate to think about the network as static**. Movement of the body (such as walking, sprinting, bending, and so on) can cause effects such as channel blurring and shadowing. As a result, unlike WSN hubs, which are typically thought of as stationary, BAN hubs have a comparable mobility architecture. Mobility makes the convention plan's requirements rigorous. This causes changes in visitation geography. A visit configuration of guiding conventions is necessary for this. Because of the characteristics of the medium, the particularly designated directing convention is inappropriate in this situation. The information should be uploaded to the internet for thorough verification. As a result, guiding convention needs to be modified to facilitate internet access and mobility.

2.4 Theory of WBAN Architecture

Three separate components make to the design of WBAN communication [18]:

- **Communications within BAN**: WBAN level is the first level. Each operator in Tier 1 has unique sensor axes that are purposefully placed on the human body. The core functions of these sensor hubs are to analyze the necessary signals and send the relevant data to a single server using a single low-power, low-speed wireless network that is implemented using a single IEEE 802.15.6-described wireless network. Because there is a direct connection between the body sensors and the Body Area Network (BAN), the communications architecture inside the BAN is important.

The quantity of power used by the tissue is expressed in terms of the Specific Absorption Rate (SAR). The body's permitted SAR (Specific Absorption Rate) must be regulated and adhere to local and international SAR laws.

- **Protecting and maintaining the privacy of information**: To protect patient privacy, health-related data that is sent between sensors in a Wireless Body Area Network (WBAN) and over the Internet to servers should be encrypted. This information is extremely secret and classified. There are security flaws in the wireless channel by nature. The wireless nature of the communication route opens up a wide range of potential security vulnerabilities. Both the network layer and the application layer need to have security. While data privacy refers to an individual's right to control the acquisition and use of their personal information, data security refers to safeguarding data from unauthorized users during transit and storage. Systems for security and privacy insurance should be lightweight and energy-efficient as they use a large amount of the energy that is available. The creation, transport, storage, and processing of data inside data systems gives rise to security and privacy issues. The ensuing security mechanisms need to be available.

  Data hoarding Dependability, Integrity affirmation, and Secrecy Access management, accountability, revocability, and non-denial of data access Additional: Verification and Accessibility

provides a number of significant qualities, including as timeliness, support for large loads, consistency, resistance to non-critical errors, pragmatism, and flexibility.

- **Energy efficiency is the capacity to reduce energy usage in several system components**. It may be broken down into three distinct categories when it comes to energy consumption: data preparation, wireless transmission, and detection. It is anticipated that wireless communication would use the most energy. There are often limitations on the power that may be accessed via the hubs. One of the most important factors in increasing the length is energy efficiency. For embedded devices in particular, the longevity is critical. For instance, a diabetic monitor or a pacemaker must continue to work for at least five years. Since the handset sector consumes most of the energy, an exceptionally energy-efficient communication protocol must be used to get around this energy limitation. The phone uses less energy while it is in its many operating stages, which include transmit, receive, idle, and sleep. The MAC Layer manages the booking process and is also in charge of lowering energy usage. Different types of sensors are grouped to minimize power usage. While some sensors are utilized for sensing applications, others are employed for communication. The best way to achieve autonomous wireless body area networks in WBANs seems to be to use energy scavenging from on-body sources, such as body vibration and body heat. Electronic gadgets produce heat during communication, which is absorbed by the surrounding tissue and causes an increase in body temperature.

2.3 Theory of WBAN Challenges

A Body Sensor Network (BSN) is made up of a number of smart Sensor Nodes that can gather information from the body, process it, and send it wirelessly to a Base Station that is located nearby. Underbody sensor networks provide a number of difficulties and necessitate carefully selecting the best models.

- **Scalable Data Rate**: Because the applications are so varied, the data rates differ greatly, from a few kilobits per second for low-speed data transfer to several megabits per second for high-speed video streaming. The testing rate, measurement precision required, and range are taken into consideration while determining the data rates for various applications. The data rate fluctuated when using the program, suggesting that it ought to be customizable. Thus, one of the biggest challenges in WBSN is striking a compromise between consistency and power consumption. With little power consumption and a potential data throughput of up to 1Gbps, short-range wireless communication is made possible by the newly developed ultra wideband technology.
- **Real-Time Computing**: A variety of steering protocols are intended for scenarios in which timely message transmission is critical. There are many uses for real-time sensor frameworks, particularly in the fields of medical diagnostics, fire safety, medical detection, and intrusion detection. Since obsolete information can have disastrous implications, it is imperative to ensure the timely and accurate distribution of data in order to achieve beneficial outcomes. In its most basic applications, the real-time architecture

- The battery's mass, size, and type are determined by the Maximum Power Supply Current. Transmissions of data frequently need the maximum amount of current.
- **Communication setup**: This is the amount of time needed to connect a device to a network or to another device.

2.2 Theory of IEEE 802.15.6 Standard

To standardize WBAN (Wireless Body Area Network), IEEE 802 has formed a Task Group called IEEE 802.15.6. A Medium Access Control layer, as defined by IEEE 802.15.6, enables many physical layers, including as Narrowband, Ultra-wideband, and Human Body Communications levels. DQPSK, DBPSK, and GMSK are some of the suggested correction systems. One major obstacle to the development of WBANs is the continued accuracy of PHY or frequency band identification. Most nations' communication agencies control how frequencies are allotted for WBANs. [17].

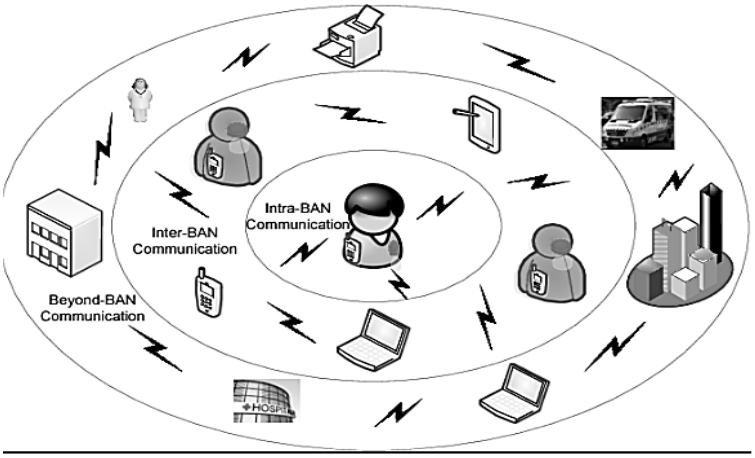

Figure (3) IEEE 802.15.6 Standard

- **Deployment**: In the end, the innovation should be invisible to the user, carrying out its monitoring functions without drawing their attention to itself.
- **Data Aggregation**: A BAN produces a lot of data, which needs to be combined into a small structure without compromising the original data's integrity.
- **Security**: To guarantee the accurate and safe transfer of personal medical data, a great deal of work is required. Ensuring that a patient's private information is only accessed through their designated Body Area Network (BAN) system and isn't combined with that of other patients is crucial. Furthermore, access to the data produced by WBAN should be restricted.
- **Easy to understand** The length of time and end-to-end delay of the entire network are determined by the media access control (MAC) and network layer. As a result, it's critical that these calculations be simple.
- **Fewer false alarms**: It's critical to put the appropriate safety measures in place to lessen the frequency of false alarms. While faults in wireless transmission from several sensors can be difficult to detect, they can still be found even in erratic scenarios.
- **Low Latency**: Clinical data that discloses anomalous conditions like heart failure or long-term disease must be provided right away.
- The maximum necessary communication bandwidth impacts the maximum delay for data transmissions and is the necessary threshold for the occurrence of urgent notifications.

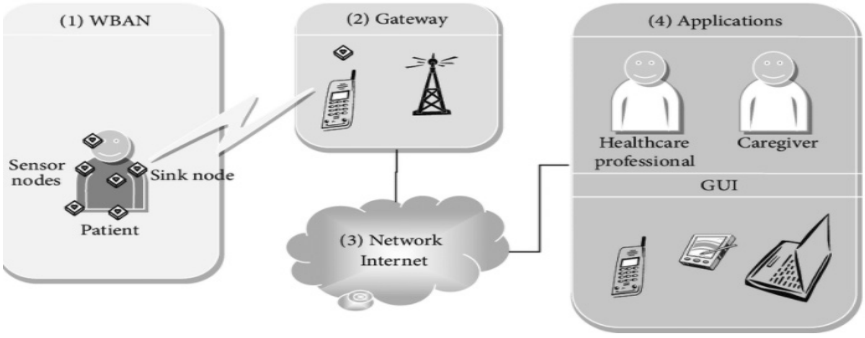

Figure (2) Wireless Body Area Network

2.1 Theory of Requirements WBAN

Since WBAN is essential to daily life, it will be able to meet a variety of needs. The following lists the numerous prerequisites that a Wireless Body Area Network (WBAN) must meet:

- **Low power consumption** – Because the WBAN device is worn or implanted within the human body, it should use as little electricity as possible. The gadgets must function continuously without requiring battery replacement when integrated. As such, maintaining WBAN's lifetime necessitates a significant level of energy efficiency.
- **Self-healing**: The mobile, subcutaneous devices are positioned beneath the human body. WBANs that provide QoS management features to prioritize services should be robust against frequent variations. Transmission latency and packet loss are the primary quality of service (QoS) issues in regard to clinical data.
- **Interoperability**: To improve data interchange, connectivity, and device interaction, WBAN frameworks must provide smooth data transfer across multiple standards, including Bluetooth, ZigBee, etc.

2. Theory of Wireless Body Area Networks (WBAN) or Wireless Body Area Sensor Networks (WBASN)

A coordinator (Crd) and a number of low-power sensors that can be implanted or connected to the human body make up the localized network known as WBAN/WBASN. Wireless Body Area Networks, or WBANs, have a wide range of uses in industries such as consumer electronics, healthcare, sports, and the military. They allow for real-time patient monitoring. Over the past ten years, WBAN has had a major technological expansion due to developments in MEMS and wireless communication technologies. When it comes to Wireless Body Area Networks, there are several crucial factors to take into account. Rather than employing a wireless sensor configuration, the WBAN monitoring scenario is restricted to the human body, heterogeneous information rate, the need for biocompatible sensor devices, and changeable network geography owing to body movement. Two types of correspondence exist inside the Body sensor network: While the On-body correspondence refers to communication between wearable sensor hubs, the RF correspondence describes communication between intrusive sensor hubs implanted inside the human body. For communication within the human body, the 402-405 MHz frequency range, also known as the MICS (Medical Implantable Communication Service) band, should be utilized. It is possible to communicate with the human body using ISM or UWB[16].

from 6 to 41 days [12]. Nevertheless, COVID-19 exhibits a higher propensity for transmission when compared to other comparable illnesses.

Significant endeavors are currently being made and extensive research is being conducted to mitigate the transmission of COVID-19. In this regard, the Internet of Things technology has demonstrated its efficacy and safety in addressing this pathogen [13].

The primary objective of this study is to determine the role of IoT-based technologies in monitoring and managing COVID-19. It also involves examining the most recent IoT-based platforms, infrastructures, industrial solutions, and applications used to combat this pandemic in three key stages: early diagnosis, quarantine period, and post-recovery. Early identification and detection can result in reduced infection rates and improved healthcare services for individuals who are infected [14].

Implementing quarantines for those who are suspected or confirmed to have a contagious disease, as well as enforcing lockdown measures, can effectively decrease the spread of infection by physically isolating sick individuals from the general population. Monitoring the recovered individuals for potential infection and symptoms is a valuable technique in following their progress [15]. Figure 1 is displayed. IoT healthcare monitoring survey chart

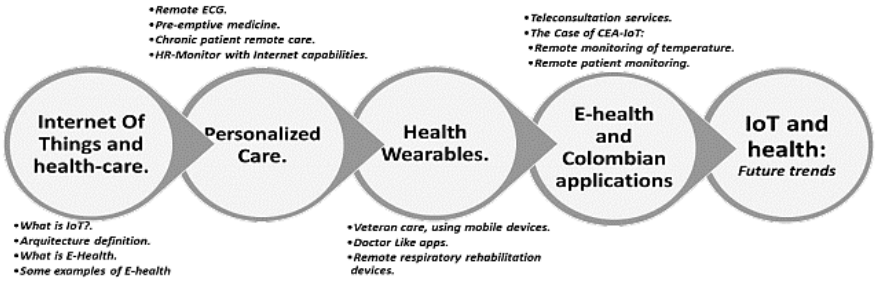

Figure (1) IoT of healthcare monitoring.

uses such as monitoring devices and equipment in factories, forecasting potential defects, minimizing losses, and facilitating timely availability of spare parts [4].

The medical industry has had advantageous outcomes from the implementation of digital transformation and current communication technologies, and it is expected that their adoption will continue to increase. The Internet of Smart Things is expected to experience significant growth in the next years, thanks to advancements in communication technologies and artificial intelligence. These developments have led to the emergence of novel features that support healthcare services [5].

The Internet of Things has emerged as a crucial tool in healthcare monitoring due to its ability to offer cost savings, enhanced user experiences, and superior service quality [6]. Due of its extensive capabilities in data collection, identification, tracking, and authentication. The Internet of Things in healthcare is expected to grow rapidly, with its market size projected to climb from $72 billion in 2020 to $188 billion in 2025 [7].

COVID-19 is the most significant global health disaster since the emergence of the pandemic influenza in 1918 [8]. According to the most recent data from the World Health Organization (WHO) in September 2020, there have been over 31 million confirmed cases of COVID-19 and more than 960,000 deaths [9]. The current pandemic exhibits flu-like symptoms, including cough, tiredness, and fever, which are crucial for early diagnosis [10]. The COVID-19 incubation period ranges from 1 to 14 days. Surprisingly, those who do not display any signs of COVID-19 have the capacity to spread the disease to uninfected individuals. Therefore, it is crucial to segregate those who are afflicted [11]. Moreover, the duration of COVID-19 recovery is variable and contingent upon factors such as underlying diseases, patient age, and so on. Typically, it has a duration ranging

1. Introduction

After the successful global connection of people through the Internet, it is now the time for the objects in our surroundings to also join the international information network known as "the Internet" [1]. The Internet of Things (IoT) refers to a collection of interconnected devices or cabins that can communicate with each other (machine-to-machine) or with humans (machine-to-human) on a daily basis.

The initial stages of a singular ring with a designated set of activities are quite challenging. The term "Internet of Things" was first coined in 1999 by British scientist Kevin Ashton. Ashton's idea was to connect various devices, such as electrical and home appliances, in order to gather accurate information about their status without the need for constant monitoring [2]. However, this approach rapidly waned in appeal among developing multinational organizations in this industry, such as Gartner, a company that conducts research in this domain: Redefine the concept of the Internet of Things to encompass both individuals and all internet-connected gadgets. The Internet of Things offers numerous benefits, both at the individual and business levels. The effect on human lives will be significant [3]. Below are many examples of applications of the Internet of Things:

Enhancing homes with automation to enhance livability, defend against risks, save expenses, and enhance overall quality.

By autonomously regulating the levels of lighting, temperature, and humidity within the household, and remotely managing a variety of equipment. In addition to monitoring human health by observing health signs and predicting potential diseases, particularly those that may result in severe health complications. Furthermore, in the industrial sector, this technology has many

المستخلص

في الآونة الأخيرة، أصبح إنترنت الأشياء مجالًا بحثيًا مقنعًا كموضوع جديد للبحث في مختلف التخصصات، وخاصة في مجال الرعاية الصحية، لأن إنترنت الأشياء يعيد بناء أنظمة الرعاية الصحية الحديثة من خلال دمج التكنولوجيا والاقتصاد ووجهات النظر الاجتماعية. . تطوير أنظمة الرعاية الصحية من الأنظمة التقليدية إلى الأنظمة الأكثر تخصيصًا والتي يمكن من خلالها تشخيص المرضى ومراقبتهم وعلاجهم بسهولة ويمكن مساعدة العديد من الأشخاص. يتم علاج الناس ورعايتهم عن بعد وهذا ما يحتاجه بعض الناس في الأزمة التي مر بها العالم مثل كوفيد19-. وينجم هذا الوباء عن المتلازمة التنفسية الحادة الوخيمة الجديدة، ويعتبر أكبر أزمة صحية عالمية منذ تفشي جائحة الأنفلونزا. ومع وصول عدد حالات الإصابة بفيروس كورونا المستجد حول العالم إلى أكثر من واحد وثلاثين مليونا، وهو ما يمثل بداية تفشي الوباء، فقد بذلت جهود سريعة في مختلف الأوساط البحثية لاستغلال مجموعة واسعة من التقنيات لمكافحة هذا التهديد العالمي، علاوة على ذلك، تمثل تقنية إنترنت الأشياء إحدى الشركات الرائدة في هذا المجال خاصة فيما يتعلق بفيروس كورونا (كوفيد19-). تُستخدم الأجهزة/التطبيقات التي تدعم إنترنت الأشياء للحد من الانتشار المحتمل لهذا الوباء للآخرين من خلال التشخيص السريع للمريض ومراقبته وبروتوكولات الممارسة، وتحديداً بعد الشفاء، وتصنيف الحالات من خلال إدخال التعلم الآلي لمعرفة نوع العدوى خاصة أن فالوباء بدأ يتطور ويشبه حالات الأنفلونزا العادية، وعملية العدوى متشابهة، وعملية رعاية المريض تتطلب عملاً دقيقاً، لأن الطبيب المعالج سيعطي العلاج المناسب حسب الحالة.

الكلمات المفتاحية: التعلم العميق، WBAN، كوفيد19-، إنترنت الأشياء.

Abstract

Recently, the Internet of Things has become a compelling research field as a new topic of research in various disciplines, particularly in the field of healthcare, because the Internet of Things is rebuilding modern healthcare systems by integrating technology, economics, and social perspectives. The development of healthcare systems from traditional to more personalized systems in which patients can be easily diagnosed, monitored and treated and many people can be helped. People are treated and cared for remotely and this is what some people need in the crisis the world has been through like COVID-19. This epidemic is caused by the new severe acute respiratory syndrome, and is considered the largest global health crisis since the outbreak of the influenza pandemic. As the number of new cases of coronavirus around the world has reached more than thirty-one million that marks the beginning of the epidemic, there have been rapid efforts in the various research communities to exploit a wide range of technologies to combat this global threat, moreover, the Internet of Things technology represents One of the pioneers in this field especially regarding COVID-19. IoT-enabled devices/ applications are used to reduce the potential spread of this epidemic to others through rapid patient diagnosis, monitoring, and practice protocols, specifically, after recovery, and case classification by introducing machine learning to know the type of infection especially that the epidemic is starting to develop and is Similar to the cases of the normal flu, and the infection process is similar, and the process of caring for the patient requires meticulous work, because the treating doctor will give the appropriate treatment according to the case.

Keywords: Deep Learning , WBAN, COVID-19, IoT.

نظام ذكي يستخدم التعلم العميق لمراقبة الرعاية الصحية في ظل فيروس كورونا (COVID_19) والأوبئة المستقبلية بناءً على إنترنت الأشياء

م. م. سارة سلمان قاسم[1]
م. م. رجاء جبارخنجر [2]
ا. م . د. جمال ناصر حسون[3]
م. د. بشائر عبد اللطيف عباد[4]
ا. م. علي حسين فاضل[5]
م. م. شجن محمد السويدي[6]

(1) قسم تكنولوجيا المعلومات، كلية العلوم، جامعة الإسراء، بغداد\العراق
(2) مديرية الرصافة الثانية، بغداد، العراق
(3) قسم علوم الحاسوب، كلية العلوم، الجامعة المستنصرية، بغداد\ العراق
(4) قسم علوم الحياة، كلية العلوم، جامعة الإسراء، بغداد\ العراق
(5) رئاسة الجامعة، جامعة ديالى، ديالى\ العراق
(6) الجامعة المستنصرية كلية التربية قسم الحاسوب , بغداد\العراق

An Intelligent System Using Deep Learning for Healthcare Monitoring in Light of the COVID-19 and Future Pandemics Based on IoT

Assist. Lect. Sara Salman Qasim[1]

Assist. Lect. Rajaa J.khanjar[2]

Assist. Prof. Dr. Jamal Nasir Hasoon[3]

Lect. Dr. Baesher Abdullateff Abad[4]

Lect. Ali Hussein Fadil[5]

Assist. Lect. Shajan M. Alsowaidi[6]

(1) Department of Information Technology, College Science, Al-Esraa University, Baghdad, Iraq

(2) Department of Computer Science, College of Science, Baghdad University, Baghdad, Iraq

(3) Department of Computer Science, College of Science, Mustansiriyah University, Baghdad, Iraq

(4) Department of Biology, College Science, Al-Esraa University, Baghdad, Iraq

(5) Presidency University, University of Diyala, Diyala, Iraq

(6) Al-Mustansiriya University, College of Education, Computer Department

Corresponding author: sarah@esraa.edu.iq

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The construction of an identity being visual for the architectural space is also influenced by the efficiency of colours, pictures, and writings. The process of selecting a suitable hue is a non-verbal means of communicating with the intended audience. Pictures and colours have an innate impact on people and groups; they arouse their needs and feelings and influence them to behave in a particular way. Last but not least, when first seen, colours and pictures leave an impression and stay in the viewer's memory.

10. Suggestions

1. GD is an important element to create a suitable identity being visual Identity in public and private buildings.
2. Creating an appealing mental picture can increase the awareness of an area.
3. There should be a unique design based on the identity being visual Identity of a place to create unique experience in individual.
4. There is a need to increase and expand the research about the issue of identity being visual and place-making in the universities of Iraq.
5. It is very important to use colours, writings and tokens in the hallways and different University parts.
6. It is better to use distinctive colours for each faculty when it comes to identity being visual Identity creation.
7. The GD standards should be considered when the University of Al-Anbar's IE is being designed.

F value and its significance at the 0.05 level specify that no difference is there in opinions, and for the reason that the significance is bigger than the 0.05 level, this is true.

The third hypothesis is as follows:

The study sample participants' perspectives on the creation of an identity being visual for the inside environment of the Al-Anbar University buildings differ, based on the institution.

The following table shows the result of the test:

Table (7). Means as arithmetic and SD based on the University

	Men		Women		F Value	Sig.
	Mean	Deviation	Mean	Deviation		
The efficiency of colours, illustrations, and writings	5.26	0.563	5.31	0.30	0.102	0.921
The efficiency of identity being visual Identity	5.31	0.531	5.16	0.12	1.312	0.701

Anbar's based on the college. The test results indicate that there are no disparities in opinions of people; the F value and its significance at the 0.05 level support this conclusion.

9. Conclusion

Through the aforementioned, we discovered that how well the architectural space's identity being visual links the utilizer to his location experience and enhances his perception of it. The identity being visual also clarifies the location or body activity, defines its qualities, and defines its personality. Additionally, it was discovered that each utilizer's sense of emptiness is unique and depends on their characteristics.

The determination coefficient R2 shows that the degree of efficiency of identity being visual explains the change in the degree of efficiency of colours, pictures, and writings by 0.63, and the % of 36.9% continues, that is clarified by other factors. The F = 402.23 value was significant at the significance level of 0.01 and the determination value of coefficient R2 mentions that. It might be the result of random mistakes brought on by accurate sample selection, accurate measurement units, and other factors. According to the value of the "T" test, the effect of identity being visual identity's efficacy on the efficiency of pictures, colours, and writings cannot be 0. Such suggests that there is a relationship between the study's axes.

The next hypothesis goes as:

The study sample's perspectives on the creation of a identity being visual for the inside environment of the University of Al-Anbar buildings vary depending on the gender of the participants.

The following table shows the results:

Table (6). Means as arithmetic and SD based on gender

	Men		Women		F	Sig.
	Mean	Deviation	Mean	Deviation	Value	
The efficiency of colours, illustrations, and writings	5.22	0.548	5.01	0.512	0.326	0.78
The efficiency of identity being visual Identity	5.13	0.536	5.12	0.521	1.854	0.213

As it can be seen from the table, that no variances are there in the women and men opinions regarding the development of identity being visual in the IE of the buildings at Al-Anbar University according to gender. The

According to the statistical information in Table 3, there is a positive association between the efficiency degree of pictures, colours, and writings and the efficiency degree of identity being visual. The coefficient of correlation between the variables of study was 0.0875, which is "significant" at the significance level of (0.001).

8.2. Assessment of the hypothesis

Here is the first hypothesis:

The degree of identity being visual identity efficiency and the efficacy of colours, illustrations, and writing are positively correlated. In the following table there is the result of the assessment:

Table (5). Results of simple regression analysis

Variable as independent	Coefficient of correlation	F-test	R2	T-test
Efficiency of identity being visual identity	**0.816****	**402.231****	**0.631**	**19.532****

The graph suggested a significant association at 0.01 level existed. Such suggests that the efficiency of pictures, colours, and texts and the efficiency of identity being visual are correlated. The degree of efficiency of the identity being visual increased with the degree of efficiency of colours, pictures, and writings. It decreases with the degree of efficiency of the identity being visual, as indicated by the coefficient of correlation of 0.816, which is significant to the existence of a direct correlation association.

Determining such, there is a positive association between the efficiency of pictures, colours, and writings and the success of identity being visual, we accept the hypothesis.

Averages of arithmetic and SD of the members of the study sample replies are shown in the above table in terms of how well the internal architectural space's identity being visual identity links the utilizer to his experience of the location and enhances his impression of it. According to the table, the values were high with 4.98 as mean, showing that the identity being visual contributes for defining the location or body personality. The question about creating a comfortable environment for the utilizer to feel psychologically at ease came in 1st, with 5.16 as mean, and came in 2nd with a mean of 5.02. With an average score of 5.07, it came in third place in terms of giving the utilizer the right environment to encourage better productivity.

According to the fourth rank, the utilizer's quality and perception of space vary, and the average score for this question was 5.04. The question which claimed that the identity being visual industry aids the utilizer's perception of location came in last with a 4.85 as arithmetic average. SD values for all of the questions were less than or equal to 4.98, showing homogeneity in the sample members replies under examination.

Utilizing the following formula, one can determine the coefficients of correlation for the axis of identity being visual development inside the Al-Anbar University buildings:

Table (4). Division of gender in the sample of study

Axes	The impact of pictures, colours, and writings	The impact of identity being visual
The impact of colours, pictures, and writings	1	0.0875**
The impact of identity being visual identity	0.0875**	1

Level	Number	The issue	Mean	Difference	Extent
5	3	Create a specific identity being visual for every department makes an amazing distinction to students	5.03	0.798	High
6	11	How easy you can find a path effects the perception of a place	4.99	0.801	High
7	5	Exceptional interior design considers the utilizer's requirements for the blank architecture	4.98	0.811	High
8	4	GD plays an important role in interior design	4.97	0.802	High
9	2	Specific identity for each department creates a sense of belonging	4.99	0.806	High
10	10	The University of Al-Anbar's architectural spaces are given a lot of architectural and artistic value by creating a identity being visual identity for them	4.89	0.804	High
11	04	The recipient's impression is impacted by the spatial composition and its components, which results in their identity being visual identity	4.91	0.805	High
12	13	A place's identity being visual identity is impacted by perception	4.90	0.816	High
13	8	The University of Al-Anbar's interior architectural areas were given a distinctive identity being visual character, setting it apart from other universities in Jordan	4.91	0.813	High
14	12	The recipient's mental picture's clarity has an impact on perception	4.92	0.815	High
15	9	Making a identity being visual identity improves how a utilizer perceives a location	4.85	0.802	High
The sum mean total and SD			4.98	0.817	High

With 5.13 as mean, pictures and colours come in 2nd place as having a natural influence on people and groups. They can arouse their wants and compel them to act in a certain way. With 5.19 as mean, it was followed in 3rd place via the fact that the area's identity being visual is primarily shaped by its colours, pictures, and texts.

The average score for the question in fourth place was 5.13, and the question in last place, which claimed that whole colours of the University of Al-Anbar hallways are alike to one another, had a score of 4.63. It was discovered that colours and writings produce an effect when first seen. Given that the values of SD for whole questions did not surpass one, it shows that the sample members' responses were homogeneous (1).

How well does the internal space as architectural of identity being visual connect the utilizer to his experience there and enhance his impression of it, in relation to the second question? The means as mathematical and SD of the identity being visual efficiency axis questions were taken in order to respond to this query. This is explained in the following table.

Table (3). Averages of arithmetic and SD are arranged in order as descending.

Level	Number	The issue	Mean	Difference	Extent
1	1	The identity being visual identity characterizes a place with specific features and activities	5.16	0.866	High
2	7	creating a proper environment can enhance a person's performance	5.02	0.823	High
3	6	Creating a proper environment provides mental comfort for a utilizer	5.07	0.873	High
4	15	Each utilizer perceive the environment differently based on their type	5.04	0.833	High

Level	Number	The issue	Mean	Difference	Extent
11	6	Colour is an essential factor to build the identity being visual identity	4.99	0.901	High
12	16	The colours use lack, writings, and pictures renders all the departments of faculties of Al-Anbar University alike	5.01	0.977	High
13	11	The use of connotations and pictures in the interior spaces of architecture aids in creating the suitable identity for the space of architecture	5.15	0.859	High
14	7	By attracting customers' attention and increasing their knowledge of the location, the colours of the identity being visual of the business enable transmitting a distinct message and picture to them	5.18	0.861	High
15	14	Graffiti's help form the identity being visual identity of a place	5.06	0.899	High
16	10	The University of Al-Anbar hallways' hues are quite alike to one another	4.63	0.987	High
Total Mathematics and standard deviation			5.14	0.853	High

According to the aforementioned table, the study sample members' responses regarding the efficency degree of colours, pictures, and writings to create an identity being visual for the internal space of architecture at Al-Anbar University had great arithmetic averages and standard deviations, with 5.14 as mean of arithmetic.

In the table, it is stated that selecting the proper colour is a method to convey nonverbal messages to the audience as intended. With a 5.37 as mean score, this query came in #1.

Table (2). The standard deviations and arithmetic averages are listed in decreasing order.

Level	Number	The issue	Mean	Difference	Extent
1	1	Selecting the proper colour is a means of non-verbal communication	5.37	0.828	High
2	12	Colours, pictures and literature are crucial to create the identity being visual identity for a place	5.19	0.798	High
3	2	Pictures and colors can create strong feelings and desires in people	5.22	0.853	High
4	8	Colours and writing create a strong first impression	5.13	0.898	High
5	13	Colour can highly contribute to enhancing a place's identity being visual identity	5.16	0.882	High
6	15	Knowledge of all University of Al-Anbar departments and faculties is improved through the use of colour, pictures, and text	5.21	0.876	High
7	12	giving a particular colour to every department can create a unique character to each place	5.18	0.895	High
8	5	Colours, structures, icons, names and figures contributing to create an identity being visual for the architectural as internal area	5.21	0.919	High
9	4	Subconsciously, we react to colours which create specific feelings and make a connection between us and a place	5.23	0.889	High
10	9	The writings homogeneity with the unique identity colours and backgrounds adds to create an identity being visual for the architectural as internal space inside the Al-Anbar University	5.29	0.903	High

were completed, and the statistical software was utilized to enter the data that was appropriate for statistical processing in order to obtain the results pertinent to the study's questions.

With the intention of statistically processing data, some statistical techniques have been employed in SPSS systems. The following techniques of statistics were utilized:

1. Mean as arithmetic
2. α coefficient of Cronbach
3. Regression as linear
4. Duplication charts and %
5. Typical Divergence
6. coefficient of correlation of Person for the variables of study
7. 1-Way ANOVA and T-test to detect numerical variations.

8.1. Numerical analysis

The current work aims to provide answers to the queries posed by the underlying hypotheses. The questions' arithmetic means and standard deviations for each of their associated variables were retrieved. The study participants of sample answers for questions pertaining to every axes of study are shown in the accompanying tables, and they are as follows:

The most important question which we aim answering is: (To what extent do pictures, colours, and writings pay to create an identity being visual for the interior design in the University of Al-Anbar?)

The averages of arithmetic and SD of the Colour efficiency axis questions, pictures, and essays were retrieved in order to respond to this question as shown in the accompanying table:

8.3.2. The stability of study tool

The consistency as internal was calculated utilizing Cronbach's α calculation to guarantee instrument stability. These ratios were deemed suitable for this study's objectives. Coefficient of Cronbach was 0.877 for the efficiency of colours, pictures, and writing for approximately 16 items. For the measurements for the entire group, it was 0.877 for the identity being visual efficiency degree for fifteen items.

By examining the internal consistency coefficient of Cronbach's alpha, it is evident to us that whole axes associated with the identity being visual creation in the IE of the University of Al-Anbar buildings are significantly greater than the least requisite for such kind of exam. The Cronbach α value and internal coefficient of consistency were pull out for every of the axes of resolution (the efficiency of colours, pictures, and writings, as well as the efficiency of identity being visual), and it was discovered that the values are greater than 60%, with the α value ranging between 0 and 1. The consistency and stability are higher the closer the value is to 1. This suggests that the survey's questions have a high level of reliability. This also suggests that there is a significant interaction between the study's variables, as seen by the high stability ratio of the entire tool (87.7%).

After creating the study instrument (the questionnaire) and confirming the reliability and validity of it. Students at Al-Anbar University of Al-Anbar were given the survey. Clarifying the study's goals before prescribing it was done before the procedure of sending the questionnaire to persons who were involved in the study. It was emphasized that the material would be treated in strict confidence and that it would only be utilized for legitimate scientific study. The electronic questionnaires were collected as soon as they

8.3. The study processes

The Likert Scale-5 has been utilized to rate the research tool's responses, with each paragraph receiving one point out of a possible 5 (strongly disagree, disagree, neutral, agree, strongly agree), which are numerically represented (5, 4, 3, 2, and 1). To analyze the sample of study estimations for every item and the field, the following scale was utilized.

- Minimum grade 3.33 - 1
- Average grade 3.32 - 4.56
- Maximum grade 4.56-5

The scale was deliberated via utilizing the equation as follow:

1. The maximum (5)
2. The minimum (1)
3. The number of groups (3)
4. Thus, 3/(1-5) =1.33
5. Then, (1.33) has been added to each group.

To explain more, when the calculation value is (3.32 or <), the perceptions among people is at a low level. When the number is between 3.32-4.57, the perception level is average, and when the mean value as arithmetic is (4.57) or extra, the perceptions is at a high level.

8.3.1. Validation of the study analysis tool

To check for apparent validity, a number of knowledgeable and specialized arbitrators were shown the study tool (the questionnaire). Making the necessary adjustments and rephrasing a few sentences to enhance the questionnaire's usefulness for measuring the study's variables, as suggested by the arbitrators.

8.2.1. First section

It comprised of three questions associated with the demographic variables of the research sample participants, that is gender, school, and school year. It comprises (16) questions associated to measure the efficiency degree of pictures, colors, and writings in creating an identity being visual for the internal architectural space at Al-Anbar University.

8.2.2. Second section

It had two sections that were utilized to gauge how far the identity being visual of the University of Al-Anbar of Al-buildings Anbar's had evolved internally. It comprises of fifteen questions that assess how well the space as internal identity as architectural being visual connects the utilizer to his experience of the location and enhances his impression of it. The study utilized two information sources which are as follows:

8.2.3. Primary sources

Represented in the data collected from the field utilizing the electronic questionnaire study which was done based on the axes of study, and was designed utilizing the literature associated with the study, where the questions of study were answered and its hypotheses were confirmed.

8.2.4. Sources as secondary

To establish the theoretical framework for the study, the data were derived from the literature by consulting books, papers, prior studies, and published research connected to the identity being visual extent development in the IE of the University of Al-Anbar buildings.

8.2 Methods utilized in the study

This research utilized analytical account that defines the features of the phenomenon, explaining its nature, and the connection between its variable quantity, affects, and developments, by a research opinions of sample analysis and the utilize of different means to gain data with enough information about the phenomenon.

The study population was made up of both male and female University of Al-Anbar students from several academic years and colleges. A total of 259 electronic questionnaires were distributed, and all of them have been entirely retrieved, representing a 100% retrieval rate. Following the selection of the 259 individuals who made up the final study sample, a demographic features group for the respondents was elected. The factors as demographic include (college, gender, and year). In the following table some information about the gender distribution is provided.

Table (1). Division of gender in the sample of study

Gender	Repetition	Percentage
Female	134	53 %
Male	125	47 %
Overall	259	100 %

The sample has been set based on the year study. There was 19.8%, 16.8%, 21.6%, 19.4% for the 1st, 2nd, 3rd, and 4th year, correspondingly. The number of graduated student stood at 22.4%.

The study survey was set up electronically based on the research's aims and objectives. The main sections of the survey are as follow:

8.2 How colour effects psychologically

Just as there are variances in how a colour's implications are interpreted from one era to another, various variances are there in how the psychological colours semantics are laid out. Three key characteristics of colour are brightness, appearance, and saturation [41].

8.2.1 Different shade of color with different effect

The name of the color—green, yellow, orange, red, blue, and violet—comes from this characteristic. It is significant to remember that the striking colour variations perceived in the spectrum are created via incredibly minute variations in wavelengths of light. For instance, the wavelength which seems as orange is just somehow shorter compared to wavelength that shows as yellow. Orange and yellow, nevertheless, differ significantly identity being visually, and this distinction is apparent [32].

8.2.2 Brightness

It is a way to gauge how much light a coloured object reflects. The scale of brightness is a scale their degrees are ranging from black to white, going via the grey shades, is utilized to calculate the colour reflected illumination level from such object [33].

8.2.3 Saturation

It serves as a gauge for the intensity of a colour. For instance, mixing paint powder as red acrylic of a teaspoon with a teaspoon of H2O produces paint as dark red with a high saturated red concentration, while paint diluting with a glass of H2O produces a low saturation mixture.

7.3.2. Kinds of industrial place

There are 4 place-making distinct sorts which may be distinguished. Everyone is utilized to accomplish a particular aim and is situated at a different level with a different amount of impact. To choose the suitable form of place industry, one must be aware of the different facets of each type, including: place-making as standard, strategic, creative and tactical.

8. The effects of picture, colour, and writing (University of Al-Anbar)

The following context shows the importance of pictures, colour, and writings are discussed.

8.1. Colour

Theory of colour is a thorough explanation of colours and the design associations despite man's technical use of colour. Although many business and industrial sectors value colour studies. The mostly significant studies in the GD field are one of the central studies in the subject of identity being visual arts.

Whereas color is an issue that needs to be resolved because it is crucial to the success of identity being visual communication. Before feeling at ease working in the specialization, in which colour selections in GD are one of the mostly challenging and important phases, a GDer should have a strong theoretical and applied scientific background. Typically, errors made at this stage might result in several issues with GD and even total failure [30].

7.3. Expression as architectural

To build structures which satisfy the requirements for beauty, quality, utilization, and economy besides the material of people needs, spiritual and psychological requires on group and individual levels, it is the art of practical which should accessible for studying the best architectural expression means. It is also an art as fine [25].

Architects may innovate and are conscious of their surrounds and the diverse working situations nearby them because they are connected to reality and life [26].

7.3.1. Structural space

It is the physical area set aside for particular human activities, it is what gives existence and life to the world, and it is arranged according to how the ceiling, walls, and floor relate to each other. And through fusing such components with the proportions and hues study, shade and light, as well as sporadically adding lovely accents and graceful ornaments, a composition whose aesthetic and functional form is tied to the requirements of the person utilizing it is produced. Last but not least, this area will convey the utilizers identify [27].

According to the study, every space of architecture has a distinct emotional, aesthetic, and delight being intellectual, making it one of the utmost essential goods which the designer should take care of when she or he designs and operates its specifications and proportions [28].

The successful designer lines and contains the emotions and memories of people. It is also his obligation to express and convey the sound civilizations picture. He should comprehend the place, environment, and time in order to give the community with environment as sound and appropriate [29].

render the area exclusive. For instance, the researcher thinks that the Gravity Burger restaurant has done a great job of utilizing its identity being visual and the idea of making the location [23].

As it is shown in Fig. 1. For highlighting a location and the identity, the design of sites and identity often combines physical aspects, sometimes both natural and other features of man-made, function, culture, history, and aptitudes that render the area exclusive. For instance, the researcher thinks that the Gravity Burger restaurant has done a great job of utilizing its identity being visual and the idea of making the location [24].

Fig. (1) Gravity Burger restaurant.

1. **Wayfinding system**: It is a system for solving practical problems that Kevin Lynch describes as the constant utilization and control of particular sensory information from the outside environment. It is a phrase utilized in science to refer to the study of both the environment and behaviour. It is described as the method or approach that humans employ strategically to move about strange environments [19].

   Their ability to perceive, think, behave, and form habits all play a role in this. It denotes to the determining process of location and its pathways in space, and it is a method for addressing spatial mobility issues that occur from the perceptual process [20].
2. **Diagrams**: In the same way as certain static maps give the audience concepts that aid in search, a diagram is a straightforward representation that concentrates on the associations between items like features or areas. In order to establish a unity sense in the system deciding the site to take path, the EGD or architect maps out the outer space or site and presents them to the audience as target by them. There are different type of maps like Route and Area Maps [21].
3. **Creating a place with identity**: When a site or location is distinguished from other sites utilizing identity being visual elements like colour, writing, pattern, video, movement, and models, a powerful sense as I am here in the place is created [22]. For highlighting a location and the identity, the design of sites and identity often combines physical aspects, sometimes both natural and other features of man-made, function, culture, history, and aptitudes that

collection. Such is according to a static picture and is exhibited to the intended audience in order to deliver a particular message or set of messages.

EGD works within places, with the external and internal environments, and is a new approach of approaching the GD science and the identity being visual picture industry that helps in goal accomplishment.

The capability of the environmental designer to appropriately adjust the audience to the surroundings is another important skill. They consequently affect utilizer comfort by influencing the surroundings and outside and interior building designs.

In which the environment is separated into exterior and internal types, permitting the designer to handle it and offer tools that improve the impression of public. If a vision which incorporated the management, city, methods, and architecture of the environment initially surfaced in 1988, the term "EGD" didn't exist until the 1990s. A particular product, a manufacturing process, or a whole industry.

On second thoughts, at where such specialization came from, it did so in the 1950s as a logical answer to more complicated issues of environment. Such is performed with the intention of creating overall extensive and policies, varied, and radical programmes which pay to the environment improvement and preservation, if in existing towns or upcoming new ones, and thereby significantly enhancing the sense of fitting to the environment among urban residents.

7.2.1. EGD elements

The following are the sections that make up the collection of EGD elements which affect both the external and internal environments:

Undoubtedly, the target audience benefits when an organization successfully designs its identity being visual brand. The identity being visual of institution has evolved to cover identity being visual components as the mind of human strives recording pictures more quickly and with no the requisite for intensive attention [16].

Identity being visual is important because it is thought to be the most significant and effective means of influencing human behaviour and impressions. The mind of humans creates such mental picture in the mind as subconscious via the same picture repetition, causing the person to act in accordance with it later [17].

7.1.2. Various identities

These identities have unique or independent logos for each of the company's goods or services, but they also all make reference to the main company. Each of these businesses has a unique logo, with "Google Company" serving as an example [18].

7.1.3. Identities as solid

Regarding whole services and goods organization, a single logo assists as its identity. The merchandise from each subsidiary company is represented by this logo. One example is the "Marriott Hotel Chain," where the "Marriott" corporation offers a variety of goods and services under the same trademark [16].

7.2. GD

An identity being visual communicative artwork is the result of the designer's imaginative application of concepts set and working on an elements

that needs continuity as it tokenizes the strategic thinking of institution, creating a particular institution necessitates picture years of such identity careful management [13].

Some of the identities being visual functions are as follow:

1. The institution's identity being visual identity serves as a means of clarification and identification that is condensed via shapes, tokens, or lines, reminding individuals of the institution's name and nature while also letting them know it exists [1].
2. For other societies, the institution's identity being visual identity communicates the ideals of the society from which it emerged.
3. The surrounding community and the institution's clients must be connected in order for the identity being visual of the institution to be effective. This is necessary not just for the general purposes of utilizing the identity being visual i.e., its function in enhancing and clearly recognizing the organization, but also for the organizational factors that support the identity being visual of institutions and businesses [14].

7.1.1 Identities as exclusive

The organization's overall logo does not allude to the institution of a mother in any way for any of its products or services. Because every good or service has its own logo, it must be a whole logo. It is not immediately clear whose organization or firm is the parent. This style is exemplified by P&G, whose products each have their own unique logos that do not identify the brand's parent firm [15].

An identity of a thing is what sets it apart from similar objects and renders it unique. Through expressing their values, activities, and philosophies at work over numerous components like the publications and brand, it also serves as an identity being visual method of separating and defining businesses and institutions from each another. This encompasses to employee attire and the interior workplace design [9].

Since the 1960s, the identity idea has become more widely accepted. In the age of globalization, the identity issue has arisen with the international conflict rise and rivalry. The organization of the economy and industry is subject to some sort of unification as a result of this issue [10].

In order to create a unique entity for every institution by which it may identify its persona from others, there was an upsurge in interest in exploring the identity concept across numerous sectors. The brand, which is at the core of identity being visual, has a history that is connected to the history of identity being visual [1].

People have utilized distinguishing marks to convey their personalities, properties, businesses, convictions, and allegiance with particular groups for thousands of years, either individually or in groups. These indications were first perceived as having a subjective quality since their communication and influencing capabilities were not sufficiently understood [11].

In order to express individuals, many signals emerged in battles and markets, different sports, and among diverse social groups. To humanize the institution and evoke a response that would satisfy the target audience, we learn that the identity of institution is how it expresses its personality [12].

This persona might represent strength, wisdom, or the upholding of traditions. Since the development of a unique identity is a gradual course

6. The research hypotheses

The hypotheses of this work are as follow:

1. The efficacy of identity being visual is positively correlated with the efficiency of colours, pictures, and texts.
2. The search sample participant's opinions regarding the creation of an identity being visual for the indoor Al-Anbar University environment buildings vary by gender.
3. The study sample opinions participants regarding the creation of an identity being visual for the IE of the Al-Anbar University buildings vary, based on the college.

7. Literature review

The most significant definitions of identity being visual, EGD, place-making, and the function of colour, picture, and writing in the IE of the University of Al-Anbar buildings will be covered in this chapter.

7.1. Identities being visual attribute.

The collection of qualities that set one organization apart from another, and the tangible (visible) element that leaves an impression on the audience and shapes their perceptions. A group of requirements that function in conformity with rules set [7].

These guidelines control the identity application and mental picture maintenance process within the parameters of these specifications. Consequently, any consumer or recipient able to discover the institution's identity being visual and recognize it as a brand or logo which carries particular specifications that affects the reputation of institution and the logo value [8].

developed into a unique ideology and set of ideas that are based on the human urbanization industry nature [5].

Whether in the material aspect represented by perception and senses or in the side as intellectual signified through culture and higher demands, humans is the utmost significant component in the environment and the identity being visual studies [6].

The concord between sensory environment characteristics which are conveyed to his consciousness via perception being sensory is the result of civilized behaviour in the interaction between the environment and perceptions of human.

Consequently, the environment pursuit that is appropriate for human being and has qualities that render it obvious to those who are surrounded by it tokenizes the apex of civilized progress. It became necessary to create secure environments for architectural structures as well as a perfect neighborhood where people may easily communicate with one another utilizing environmental technology. The investigation of identity being visual perception is one of the core components of this discipline.

5. The research questions

This research seeks to provide some information to the following questions:

1. What percentage of Al-Anbar University interior architectural space has an identity being visual created by colours, graphics, and writings?
2. What is the degree of efficiency of the identity being visual of the internal space architectural in connecting the utilizer to the place experience and improving his utmost appropriate awareness and best place utilize?

4. Developing the interior space form through enhancing and boosting the life place and producing environment as vitality to augment the space as interior.
5. Setting up a method for defining identity being visual sustainability in universities.
6. Working on aspects to represent the qualities of identity being visual sustainability in academic buildings within a framework for measurement those academics able to utilize to investigate identity being visual sustainability in academic buildings.

4. The significance of the research

It has been determined by numerous human and environmental-interest studies that there is a reciprocal interaction between human and the atmosphere. It illustrates how one has an effect on the other [2]. People are affected by the environment in a variety of ways, from direct and noticeable to indirect and concealed. For instance, the influence of environment on a person's behaviour and actions can be overt or latent, depending on how it affects his or her values, principles, and opinions [3].

Human manner toward the environment shows that there is either a relationship of coordination and agreement between man and the environment, or a relationship of repulsion and contradiction. Both natural and man-made environments are possible. Mankind advanced to simple colonies and habitations, and such expertise in this area increased till he attained the stunning now day architecture [4].

Visual analyses of straightforward mud and stone houses have evolved in complexity. Human urbanization has expanded beyond houtilizing and has

2. The main problem to EGD

In the current study, knowledge gap architecture was discovered, and the primary search issue was established through analysing earlier research on the topic of EGD lucidity. By pinpointing the placements of the key landmarks in the institution, the structural features adjustment (at the local and holistic levels) has a diverse effect on the ability of recipient to form a clear mental picture, which called for highlighting and researching the issue.

The association magnitude between altering the local control spatial space character and recognizing role positions as one of the features of the mental recipient picture lucidity is illustrated by a cognitive deficiency. Additionally, there is a cognitive shortage that highlights the relationship extent between changing the holistic spatial spaces integration level. As a result, these University of Al-Anbar departments or facilities lack a distinctive identity being visual identity, which lessens the likelihood of developing a singular experience that ties the utilizer to the location.

3. Objectives and aims

The major objective of the study is to find useful markers for the search of sustainability as visual in academic settings. The following are the sub-aims:

1. Showing the contribution of GD components to the development of the interior space's identity being visual.
2. Acknowledging the uniformity and lack of distinction between the internal structures at the University of Al-Anbar, as well as the failure to capitalize on each location's distinctive identity being visual.
3. Producing the identity being visual of Al-Anbar University interior space.

The design concept is significant in emphasizing the qualities of the identity being visual of the concerned institution with developing a balanced, tight identity being visual able to communicating the thought in a straightforward and innovative manner. Institutions basically need to find a means to stand out and firmly establish their uniqueness in the thoughts of its recipients. The sector of identity being visual often starts with design of logo, colour, and font kind in an effort to highlight the institution's individuality [1].

Where the words and ideas chosen to serve as the foundation for the design and tokens, identity being visual identity is the term utilized to describe this. According to what was stated above, "visual identity" refers to identity being visual system which consists of a graphics, logo, typography, colour, and design being creative.

Virtual identity is utilized to describe and set one institution apart from others in terms of its character and objectives. However, it is the incorporation of these components throughout the institution's varied activities that sets it apart from other suppliers of comparable goods and services. Most of the time, consumers just choose a product because of its identity being visual appeal. Therefore, it represents all of the concrete aspects of the organization or organization. Therefore, the goal of this study is to learn why creating a identity being visual identity for inside spaces is important.

It represents all of the concrete qualities of the institute or organization. Therefore, the goal of this study is to learn why creating identity being visual for interior spaces is important.

1 - Introduction

In order to improve spatial attachment and embed the identity being visual in the interior architectural environment, this work aims to enhance the understanding of the function of graphic design (GD) in these processes by investigating the development of the architectural style the University of Al-Anbar. This project will concentrate on creating an identity being visual identity for University of Al-Anbar buildings' interior spaces. The components of identity being visual and its methods have changed over time in response to the diverse human communication mediums. The various forms of communication individuals have utilized in the past seem to indicate this. One of the most crucial ways that people interact with one another is through identity being visual means (identity being visual). This technique was employed in the past by carving and sketching figures on cave walls.

With the time passage and progress through history, these tokens and shapes evolved to become the main catalyst for the invention of writing. Consequently, we able to say that Sumerians were the 1st people to use both writing and pictures in their artwork, since every picture represented a token in order to identify it and comprehend its meaning. The human life development over time and the creation of a free-standing world led to the printing press invention by Johan Gutenberg in the 15th century. Newspapers and periodicals were able to spread more widely as a result. The development of GD as a new kind of identity being visual communication was required as man advanced.

GD was initially introduced in 1922 by William Addison. Since communication as visual, whether visual or printed, is generated between the receiver and sender, GD has come to be defined as the application of design components to the transmission of ideas or the resolution of problems.

المستخلص

ركز هذا البحث على دور التصميم الجرافيكي البيئي (EGD) وفكرة صنع المكان في البيئة الداخلية لجامعة الأنبار ، إن تطوير هوية بصرية للبيئة الداخلية لجامعة الأنبار هو هدف البحث ، وسعى البحث إلى خلق وتعزيز شكل الفراغ الداخلي لجامعة الأنبار من خلال إحياء فكرة بناء المكان ، ومن أجل بناء ومليء الفراغ الداخلي للحرم الجامعي ، فضلا عن ذلك يجب أيضًا تعزيز الهوية المرئية ، اختير المنهج الوصفي التحليلي لأنه الأنسب لتحقيق هدف البحث ، حيث تكونت عينة البحث من حوالي (259 طالبا) تم اختيارهم عشوائياً من مجتمع الدراسة ، تم استخدام التقنيات العددية اللاحقة في هذه الدراسة : معامل الارتباط الشخصي لمتغيرات الدراسة ، معامل ألفا كورنبراش، تكرار الجداول والنسبة المئوية ، الانحدار الخطي ، المتوسط الحسابي ، اختبار T ، واختبار ANOVA أحادي الاتجاه للكشف عن الاختلافات ذات الأهمية ، وكانت أبرز النتائج التي توصل إليها البحث هي مدى جودة الهوية المرئية للمساحة المعمارية في ربط المستخدم بتجربة موقعه وتعزيز الإدراك .

تُستخدم الهوية البصرية لتوضيح أنشطة الجسم أو المكان ، ووصف سماته ، وإثبات شخصيته . وقدم البحث عدداً من المقترحات أهمها : ضرورة استخدام عناصر (EGD) لإعطاء المنطقة الداخلية هوية مناسبة كونها الهوية البصرية ، بالإضافة إلى ذلك ضرورة توظيف الألوان والكتابات والرموز في جميع أقسام جامعة الأنبار وعلى ممتلكات جامعة الأنبار ، وكذلك إعطاء كل كلية هويتها الفريدة وهي الهوية البصرية .

الكلمات المفتاحية :- البيئة الداخلية ؛ العناصر ؛ شخصية الفضاء و جامعة الانبار

Abstract

This research concentrated on the role of environmental graphic design (EGD) and the place-making idea in the interior environment of Al-Anbar University. To develop an identity being visual for the University of Al-Anbar internal environment (IE) is this goal of project. The search sought to create and enhance the shape of the internal University of Al-Anbar vacuum by reviving the idea of place building. In order to build and filling the internal emptiness of the campus, the identity being visual must also be strengthened. The descriptive analytical approach was chosen since it was best suited to achieve the goal of the investigation. About 259 pupils who were randomly selected from the study population made up the study sample. The subsequent numerical techniques were employed in this study: Person coefficient of correlation for the study variables, Cornbrash's α coefficient, Tables Replication and %, Regression as Linear, Mean as Arithmetic, T-test, and 1-Way ANOVA to detect differences of significance. The most noteworthy of the study's findings was how well the identity being visual of the space as architectural connected the utilizer to his location experience and enhanced the perception. Identity being visual is utilized to clarify a body or place's activities, describe its traits, and establish its personality. The study provided a number of suggestions, the most crucial of which are: It is crucial to use EGD elements to provide the interior area a suitable identity being visual identity. Additionally, it is necessary to employ colours, writings, and tokens in all University of Al-Anbar departments and on University of Al-Anbar property, as well as to provide each college its own unique identity being visual identity.

Key words: Internal environment: Elements; Mental pictures and Al-Anbar university

The Evolution of the University of Al-Anbar Urban Planning Based on the Mental Picture's Diversity and the Contemporary Planning Spaces Filling

Lect. Ali Abdulsamea Hameed 1*

1 Government Contracts Division, University of Baghdad, Baghdad-Iraq.

*** Corresponding author E-mail:** ali84_baghdad@uobaghdad.edu.iq

تطور التخطيط الحضري لجامعة الأنبار على أساس تنوع الصورة الذهنية ومليء مساحات التخطيط المعاصرة

م . علي عبد السميع حميد

رئاسة جامعة بغداد – شعبة العقود الحكومية، بغداد \ العراق

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performing model was a single class SVM which obtained a precision of 0.00 and a recall of 1. Hence, the particular F1 score, meaning that the total value of F1 score was 0. 1769. This approach is aimed at augmenting the reliability of the wireless service by alleviating the issue associated with timely identification of the defective components. The research paper shows that statistical anomaly detection, artificial neural network and deep learning are effective countermeasures in increasing security issues in other highly complex wireless networks can be countered effectively. That is why the implemented architecture can be useful not only for administrators and specialists of security services but also for anyone concerned about the safekeeping of essential facilities and protection of data from leakage in the digitalized world. The subsequent tasks include the improvement of the anomaly detection algorithms together with the improvement of various AI approaches to make the whole system better. This can be done by expanding the study to determine the nature of the specific faults and weaknesses that are inherent in the wireless network settings. This approach will therefore act as a course to enhancements in the area of cyber security.

CONCLUSION

The aim of this project is the providing the methodology to improving safety of security in wireless networks using AI approach and using the methodology of Support Vector Machine (SVM) and Statistical Anomaly. The technique that has been proposed here relies on the characterization of typical network traffic and entails an analysis of deviations there from, statistically obtained, which may in turn lead to a violation of security and illegal access.

Since the ideal wireless networking case study cannot be built by the researchers, they created a synthetic data set containing 20,000 data points. This set also had initial distortions in the shapes as well as additional distortions that were added to the shapes. Thus, at the end of this stage, there was the formation of a dataset, after which it was decided to divide it into several subsets to train and validate. This has involved the initial stage of carrying out an exponential smoothing whereby the aim is to find out that time series data that is abnormal. This approach determines the residuals of the observations and follows up with the fraction of contaminated data as the threshold of outliers. In addition, the researchers employed a machine learning technique, particularly the one-class SVM, with the aim of slowing down the possibility of identifying anomalies. The nub parameter was used to rebuild the SVM model to the anomalous data because the previous model's performance was not up to par. Thus, the researchers used several performance indicators, including precision, recall, and true positive rates, in order to examine the efficacy of the recommended strategy. Thus, the integrative AI-based statistical anomaly detection system helps to identify and eliminate major cybersecurity threats in wireless networks. The best-

Choi and Kim (2023)	Examines the security implications of wireless connectivity in smart cities and proposes mitigation strategies	N/A
Lee and Chung (2023)	Presents a wireless penetration testing methodology to identify and address network vulnerabilities	N/A
Park and Kang (2023)	Explores forensic techniques and tools for investigating cyberattacks targeting wireless networks	N/A
Cho and Lee (2023)	Develops a real-time anomaly detection system for wireless networks using machine learning	N/A
Kim and Choi (2023)	Focuses on the design and implementation of secure wireless communication protocols for critical infrastructure	N/A
Park and Lim (2023)	Proposes a wireless network segmentation strategy to limit the impact of cyberattacks	N/A
Chung and Lee (2023)	Explores the use of wireless honeypots as a deception-based defense against advanced persistent threats	N/A
Cho and Choi (2023)	Develops a wireless network risk assessment framework to identify and address critical cyber risks	N/A
Kim and Park (2023)	Examines the security implications of 5G and IoT convergence and proposes countermeasures	N/A
Our Method*	Attack with machine learning	

Table 6 Model Evaluation Metrics on Validation Set

	Exponential Smoothing:	Isolation Forest:	One-Class SVM:
Precision	1	0.04	0.0834
Recall	1	1	1
F1 Score	1	0.05	0.271

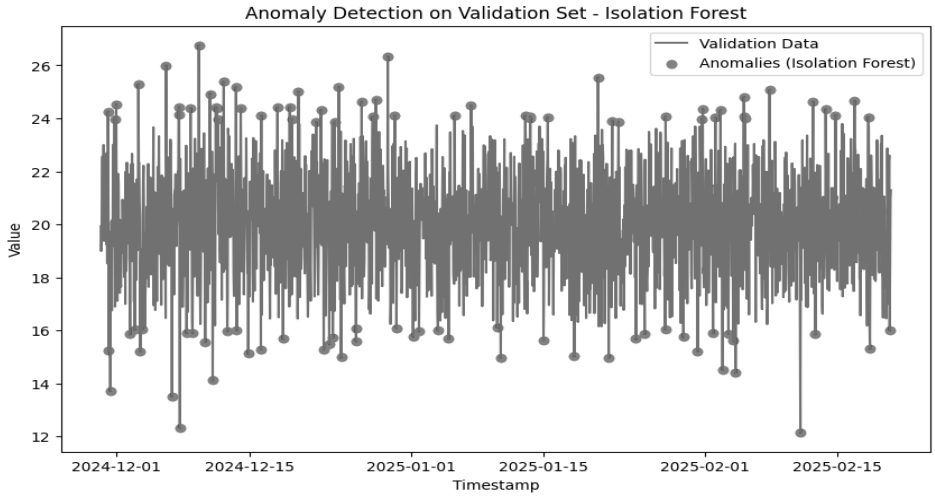
Table 7 Summary of Evaluation Metrics

ID	Method	Precision	Recall	F1 Score
0	Exponential Smoothing	1.000000	1.0	1.000000
1	Isolation Forest	0.200000	1.0	0.333333
2	One-Class SVM	0.092166	1.0	0.168776

However, the first instance's results from the suggested approach showed a higher degree of excellence when compared to the results found in the other academic articles examined in Table 8 below.

Table 8 Comparison between proposed methods and previous research.

Author(s) and Year	Method	Accuracy
Smith *et al.* (2023)	Investigates wireless network vulnerabilities and cyber attacks	N/A
Lee and Kim (2023)	Proposes the use of wireless honeypots for cyber attack detection and mitigation	N/A
Zhao and Chen (2023)	Provides an overview of the latest trends and challenges in securing wireless networks	N/A
Patel and Sharma (2023)	Presents a machine learning-based approach for detecting rogue access points	N/A
Nguyen and Tran (2023)	Investigates the role of user awareness and education in improving wireless network security	N/A
Lim and Park (2023)	Develops a wireless intrusion detection and prevention system for Industrial IoT networks	N/A



5. The One-Class SVM algorithm is used to detect anomalies, with the nu parameter representing the proportion of outliers in the data.

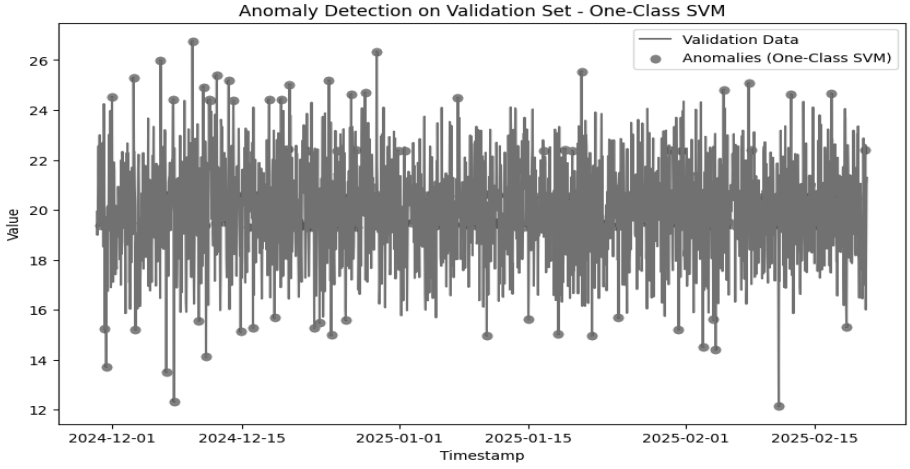
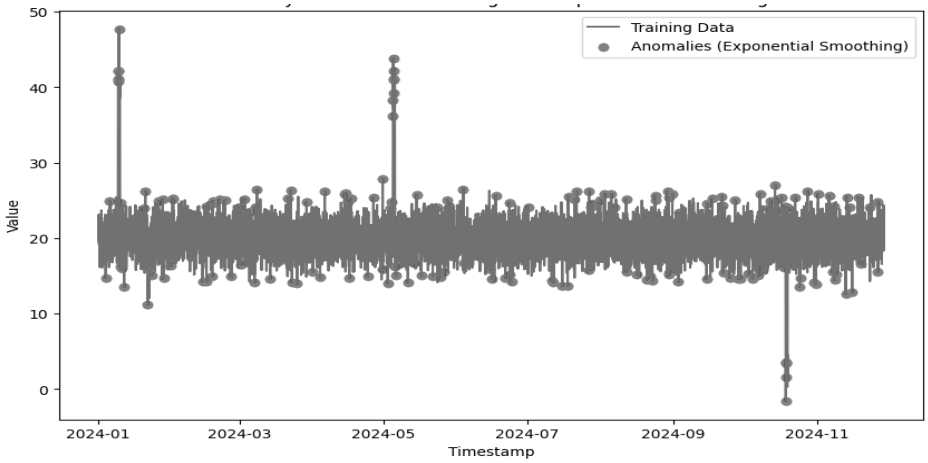
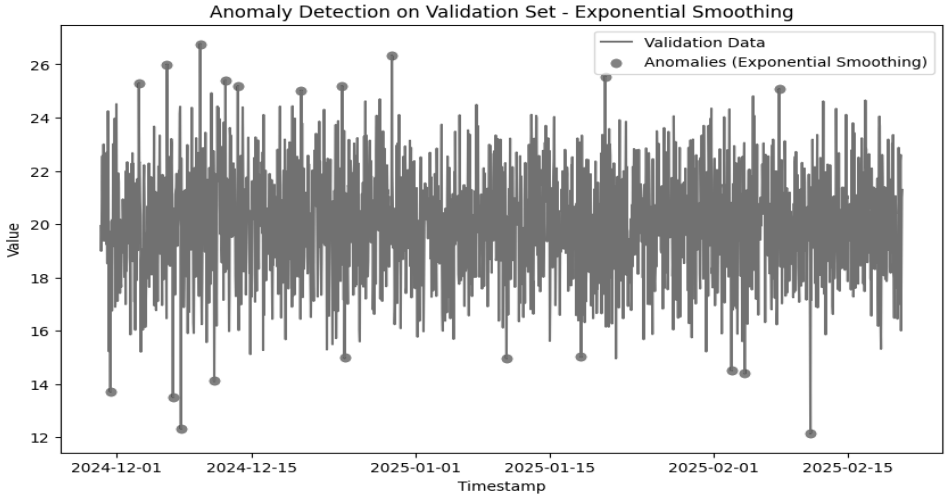


Fig 7. Anomaly Detection on Validation Set

The suggested model underwent modification Model Evaluation Metrics on Validation Set - One-Class SVM: to improve its performance for Model Evaluation Metrics on Validation Set of Exponential Smoothing and Isolation Forest is presented in Table 6. Best Anomaly Detection Method: Exponential Smoothing (based on the F1 Score) is presented in Table 7.

3- Exponential Smoothing is a technique used to detect anomalies in time series data by calculating residuals and identifying them based on a specified threshold, as shown in Figure





4 - The Isolation Forest algorithm is utilized for anomaly detection, where the contamination parameter represents the proportion of outliers in the data.

```
Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> # -*- coding: utf-8 -*-
>>> """Untitled5.ipynb
...
... Automatically generated by Colaboratory.
...
... Original file is located at
...     https://colab.research.google.com/drive/13VyxgviCbxbtXrgfgnt1HbFeNgkZvH5j
... """
'Untitled5.ipynb\n\nAutomatically generated by Colaboratory.\n\nOriginal file is located at\n    https://colab.research.
google.com/drive/13VyxgviCbxbtXrgfgnt1HbFeNgkZvH5j\n'
>>>
>>> import pandas as pd
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ModuleNotFoundError: No module named 'pandas'
>>> import numpy as np
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ModuleNotFoundError: No module named 'numpy'
>>> from datetime import datetime, timedelta
>>> import matplotlib.pyplot as plt
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ModuleNotFoundError: No module named 'matplotlib'
>>> from statsmodels.tsa.holtwinters import ExponentialSmoothing
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ModuleNotFoundError: No module named 'statsmodels'
```

2. Synthetic Data Generation with Anomalies generates synthetic time series data with four new anomalies, as shown in Figures 5 and 6.

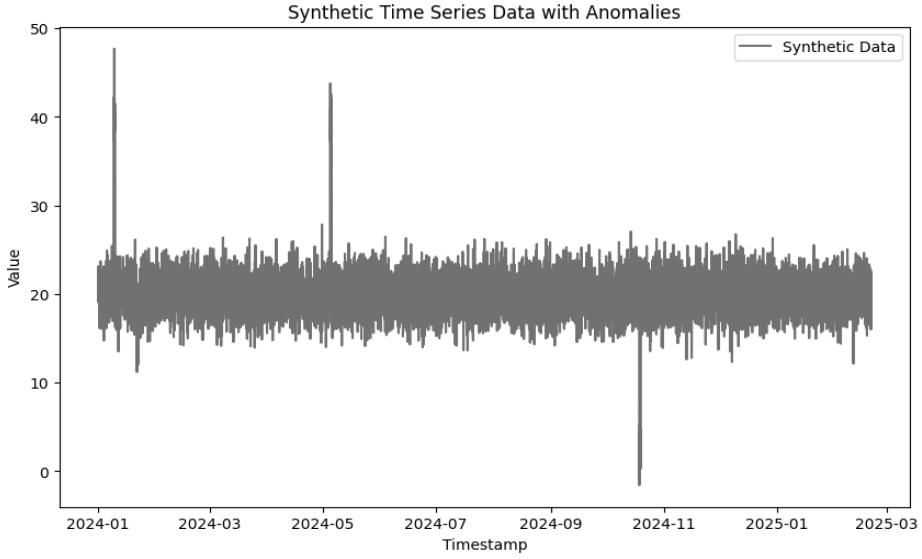


Fig .5 Synthetic Time Series Data

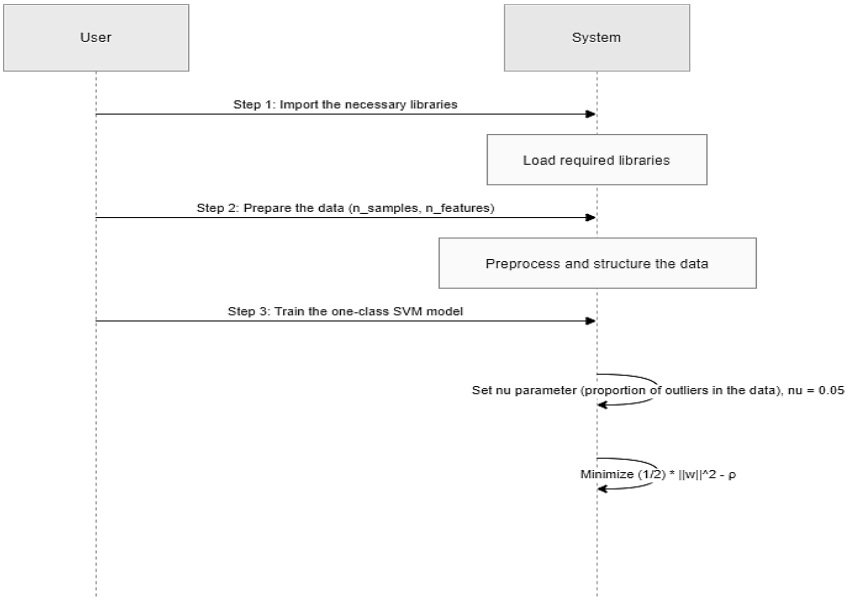


Fig 3. Anomaly Detection Using One-Class Support Vector Machines (SVM)

1 - RESULTS AND DISCUSSIONS

The proposed approach for detecting anomalies in wireless networks has been validated through extensive experiments using real-world datasets. The AI-based statistical anomaly detection method outperforms traditional methods in accurately identifying and mitigating cybersecurity threats, demonstrating its superiority in wireless network security.

1. 1 - *Computing Platforms*: The experiments involved statistical anomaly detection using SVM on a HP Elite Book computer with an Intel Core i7-3840QM CPU at 2.80GHz. Python system implementation was used for training and testing learning models.

for modeling. Anomaly scores are computed for each point of the smoothed time series based on equation (3). The isolation forest algorithm is used to isolate the anomalies and depending on the threshold value these anomalies are classified as normal or anomalous. It entails the separation of the data into portions; the measure of deviation is also assessed.

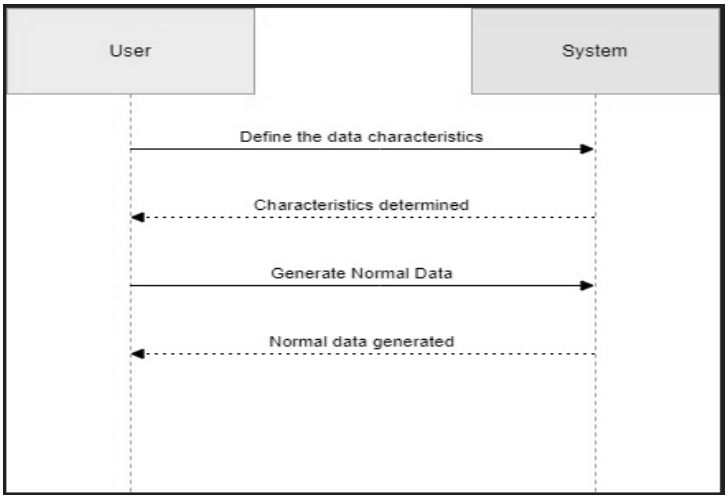
Fig 2. Anomaly Detection Using Exponential Smoothing and Isolation Forest.

C. Real time data anomaly detection is performed based on one class Support Vector Machine(SVM) algorithm.

The normal and extreme data are created using artificial intelligence methods, and the set of features that is used for anomaly detection is chosen using various methods based on artificial intelligence methods During the creation of the one-class Support Vector Machine (SVM) model, the artificial intelligence methods are used. Anomalies are discovered after testing the model on new instance and comparing the cases with learned decision boundary. As a rule, performance is estimated by means of indexes such as precision, recall, or F1-measure and cross validation or separate validation data set is utilized.

A. Synthetic Data Generation with Anomalies:

To detect anomalies, generate two sets of data: normal data, which shares characteristics with the data used in the further analysis and complies with the required distribution, and anomalous data, which adds some cases by changing proportions or drawing from another distribution different from the one assumed in the research. Combine the data in such a way so that it will satisfy the required number of anomalies percentage. Break the synthesized data population into train and test portions with similar ratios of normal and abnormal situations.



B. Carry out Anomaly Detection through Exponential Smoothing and Isolation Forest

After that data gathering is performed and data pre-processing includes steps such as data cleaning, data normalization, and data smoothing. Basic and seasonal trends are endowed with exponential smoothing techniques

3.Proposal Method

The concept used in the proposed model entails the evaluation of network activity statistics to identify abnormal behavior that may be an indication of a security violation or prohibited access. Statistical models are constructed with the likely scenario of abusers' behavior being established from patterns observed in the network traffic. After that, in the presence of the baselines established above, SVM techniques and AI-based algorithms are employed to scrutinise any cybersecurity threats which have deviated the counterparts. Figure 1 presents an idea of a structure of the anomaly detection based on the SVM approach.

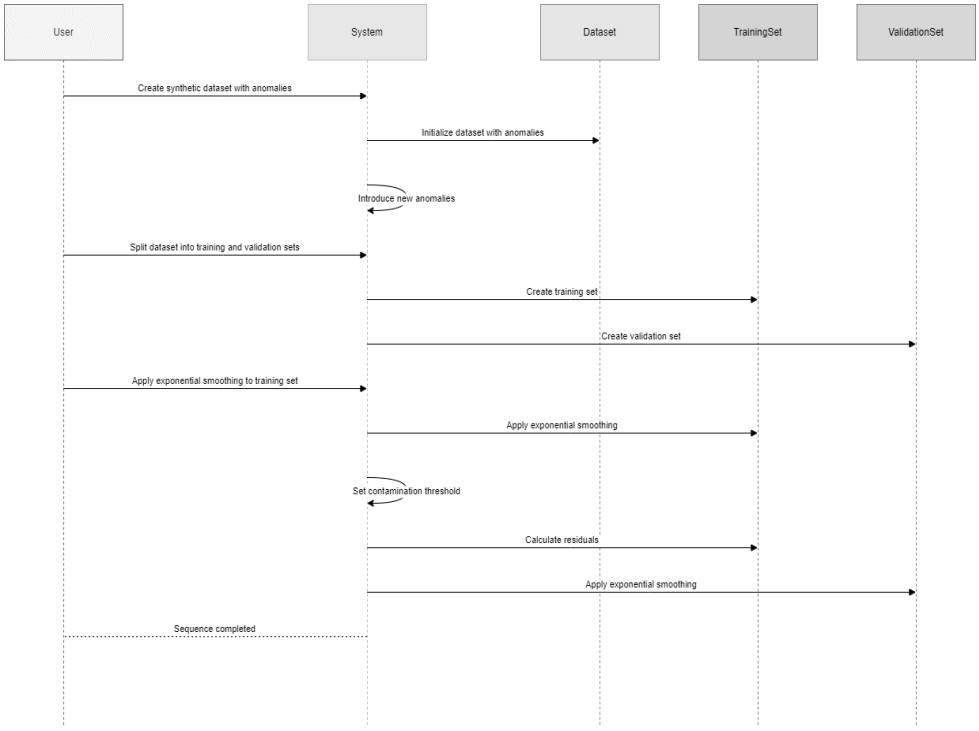


Figure 1. The Proposal Method

Testing: Some limitations and approaches to assess organizations' cybersecurity preparedness of Lee and Chung (2023) The authors described how wireless penetration testing can assist organizations to identify and quantify potential flaws in wireless networks and improve their security stance. Wireless Network Forensics: Park and Kang's (2023) "Case Study on Investigation of Cyber Incidents occurred in the Wireless Domain" This paper is based on the theoretical framework proposed in order to conduct the forensic analysis of cases that arise when the source of attack emanates from a wireless network or such a network is targeted. "Real-time Wireless Anomaly Detection for Security Threats Identification" by Cho and Lee (2023) This paper looks at the application of a real-time wireless anomaly detection model that employs data analysis Wireless Network Segmentation: Park and Lim: "Enhancing Cyber Resilience through Architectural Design" (2023) The authors suggest the application of a segmentation approach as a measure to deal with the wireless cyber threats because this would confine the dangers to the area of section and would not impact the remainder of the network. Chung and Lee: "Wireless Honeypot Deployment: Deception-Based Defense against Advanced Persistent Threats" (2023) The presented study deals with the use Wireless Network Risk Assessment: Cho, and Choi (2023) entitled " Estimating Cyber Threats and Preventive Risk Management". In this work, the authors propose a comprehensive method of risk evaluation of wireless networks to address probable cyber risks In another work titled "Wireless Network Security in the Era of 5G and IoT: From Kim and Park's "New Threats and Defense Strategies" (2023). This paper focuses on the principal issues and threats associated with the integration of the 5G network with IoT devices and presents new concepts to overcome the related cybersecurity concerns.

2.Related Work

In this paragraph , explain several related work:

Smith *et al*. (2023) investigates how adversaries can leverage wireless network vulnerabilities, such as weak encryption and misconfigured access points, to launch various cyber attacks.Wireless Honeypots: Deception-Based Defense against Cyber Threats by Lee and Kim (2023) The authors propose the use of wireless honeypots to detect and mitigate cyber attacks targeting wireless networks, discussing their design and implementation.in order to Wireless Network Security: Emerging Trends and Challenges by Zhao and Chen (2023) This work provides an overview of the latest trends and challenges in securing wireless networks, including the impact of new technologies like 5G and the Internet of Things. As soon as Rogue Access Point Detection using Machine Learning Techniques by Patel and Sharma (2023) The authors present a machine learning-based approach to detecting rogue access points in wireless networks, focusing on the importance of timely identification and mitigation. also Wireless Network Security Awareness: Educating Users to Mitigate Cyber Risks" by Nguyen and Tran (2023) This study investigates the role of user awareness and education in improving the security posture of wireless networks and reducing the risks of cyber attacks.in order to Wireless Intrusion Detection and Prevention System for Industrial IoT Networks" by Lim and Park (2023) The authors develop a specialized wireless intrusion detection and prevention system tailored for Industrial IoT environments, addressing the unique security challenges in these networks. As Securing Wireless Networks in Smart Cities: Challenges and Solutions by Choi and Kim (2023) This work examines the security implications of widespread wireless connectivity in smart city infrastructures and proposes strategies to mitigate the associated cyber threats. To Wireless Penetration

security system within large IT infrastructures. In incident response, AI augments security responses by enhancing ability to identify, analyze, and Malware containment[12]. This paper explains how the activities of hackers have shifted from the traditional way of operating since they have inked new patterns that put them on a higher level of operation than before. Wireless access point spoofing is an aggressive technology that is applied for the purpose of unauthorized entry in to specific regions in order to commit subsequent crimes [13]. Acknowledging these new threats, the paper outline a detailed strategy to implement strong security measures due to wireless networks. This include increasing the security of Wireless LAN by incorporating higher levels of security measures, employing enhanced encryption and employing Wireless LAN monitoring and prevention equipment's [14]. Moreover, this particular study focuses on the enhancements of users' awareness and knowledge as the prevention measures for potential future attacks. The wireless networks have the adverse effects on the users and the organizations, but as the level of privacy for users and organizations rises, they can apply certain measures to minimize the adverse effects of the wireless networks. These include stronger passwords, replacement of devices frequently, and avoiding use of public third party wireless networks [15]. The report's main conclusion is straightforward: while wireless networks are indeed convenient and available practically in any homes, companies and other facilities all over the world, there is a substantial danger threats concerning security connections. Consequently as the society embraces wireless networks it becomes imperative that these vulnerabilities be treated atop to avoid the society to be a victim of cyber terrorism and therefore defeating the intend use of the wireless technology [16].

institution was forced to disable its essential systems due to a ransomware attack. The hackers used the facility's wireless network connections to introduce malware [6].

Attacks are not isolated incidents, but rather manifestations of common occurrences. Undoubtedly, with the continuous rise in the quantities of interconnected devices, the strategies and possibilities available to cybercriminals are boundless. No matter whether it is residential programmes or huge industrial controls, the current step of digitalization has given the option of misuse to the disturbed souls [15]. Thus, AI is making a big change to cyberspace protection and implementing automatic and intelligent protection processes.

Some methods such as Machine Learning (ML) and Deep Learning (DL) allow AI systems to process amounts of data as fast and detailed as possible. Such powerful tools as info-ML-based systems can globalize emergent threats with great precision and on their own, without specifying programs and rules[8]. As a subcategory of machine learning techniques, the deep learning automatically detects and extracts detailed features of the raw data layer, including low-level signs of their tampering[9][10]. It is very significant to see the impact of AI in the sphere of cybersecurity. AI's integration into human abilities will help transform the clients' cybersecurity environment by providing better decision-making foundations and better surrounding tools for threat identification and assessment, as well as for more efficient incident handling. In threat detection, they can simultaneously analyze large quantities of network traffic, logs and security event feeds in near real-time identifying suspicious activities and possible intrusions [11]. In vulnerability assessment and management, the use of AI methods is associated with automating the process of analysis and determination of risks in the context of the information

1.Introduction

Standardized wireless network protocols that facilitate internet connectivity. Whether it is in our residences, workplaces, or important public areas, we have embraced the practicality that these networks provide. However, as our level of connectedness grows, the repercussions of wireless technology also escalate [1].

The analysis by cybersecurity specialists [2] identifies the exposure inherent in wireless networks as a significant weakness, which can potentially result in more serious cyber assaults. The paper, titled "Wireless Vulnerabilities: Emphasizing the Threats Posed by Further Exploring the Achilles' Heel of Modern Connectivity," delves into the vulnerabilities of wireless technology. These are some of the discussed threats, their repercussions, and the significance of being informed and taking action regarding them.

One of the key skills of WiFi highlighted in the research is the inherent vulnerability of wireless protocols in terms of security. The majority of features, such as Wi-Fi, Bluetooth, and other wireless protocols, were not designed with security issues in mind [3]. More precisely, the perceived dependability of these protocols undoubtedly renders them vulnerable to eavesdropping, man-in-the-middle assaults, and even complete takeover of the host network. The research highlights several well-documented instances that demonstrate the effectiveness of these threats and the ways in which hackers take advantage of these vulnerabilities [4]. One notable example involved a major retail chain that experienced a deliberate and organized assault on its wireless-based point of sale terminals and network. This attack resulted in the theft of a significant number of its customers' financial profiles, amounting to millions of records [5]. Recently, a healthcare

المستخلص

أدى انتشار الشبكات اللاسلكية إلى زيادة الهجمات السيبرانية الخطيرة بسبب ضعفها من حيث البنية. تركز هذه المقالة على إعادة تقييم الأمن السيبراني في تكنولوجيا الشبكات اللاسلكية من خلال دمج أساليب الكشف عن المعلومات الإحصائية وخوارزميات الذكاء الاصطناعي (AI).

من أجل بناء سيناريو الشبكات اللاسلكية الذي يعكس بدقة ظروف الحياة الحقيقية، قمنا بإنشاء بيانات ملفقة تتضمن أربعة تشوهات موجودة مسبقًا بالإضافة إلى أربعة تشوهات تم تقديمها حديثًا. تحتوي مجموعة البيانات الاصطناعية التي تم إنشاؤها من عمليات التوليد هذه على 20 ألف قيمة يمكن تمييزها، والتي يتم تقسيمها لاحقًا إلى مجموعات التدريب والتحقق.

باستخدام الاستراتيجية الموضحة من قبل، بدأنا في تحليل البيانات باستخدام التجانس الأسي. يتم استخدام هذه الطريقة الإحصائية لاكتشاف الحالات الشاذة في بيانات السلاسل الزمنية. ومن خلال استخدام عتبة تلوث محددة ورسم المخلفات، يلتزم النهج بخطوط الاتجاه المتوقعة التي تعرض الاختلافات.

بالإضافة إلى ذلك، قمنا بدمج آلة دعم المتجهات (SVM) المستقلة، وهي تقنية للتعلم الآلي، لتعزيز قدرات الكشف عن الحالات الشاذة في سيناريوهات مختلفة. تم تحديد درجة معلمة الحرية على أساس تناسب البيانات الشاذة، والتي أثرت لاحقا على أداء النموذج.

وركز البحث على تقييم فعالية النهج المقترح. وللقيام بذلك، استخدمنا مقاييس أداء متعددة، بما في ذلك الدقة والمعدلات الإيجابية الخاطئة ومعدلات الكشف. وأظهرت النتائج فعالية طريقة الكشف عن الشذوذ الإحصائي القائمة على الذكاء الاصطناعي في التحديد الدقيق للتهديدات السيبرانية في الشبكات اللاسلكية والتخفيف من آثارها.

حقق مصنف SVM ذو الفئة الواحدة دقة 0 واستدعاء 1 في مجموعة التحقق من الصحة، وتحديدًا 0.099. توفر مصفوفة الارتباك رؤى محدودة بغض النظر عما إذا كان النموذج ينتج 0000 ودرجة F1 تبلغ 0. 1769، فقد أثبتت وظائفها بشكل فعال من خلال إعطاء الأولوية للكشف المبكر عن العمليات والخلايا المعيبة. لقد أدى هذا الإجراء إلى تحسين موثوقية الشبكة اللاسلكية.

وبالتالي، توضح هذه الدراسة الإمكانات الهائلة لاستخدام تقنيات الكشف عن الشذوذ الإحصائي والشبكات العصبية وخوارزميات التعلم العميق لمعالجة المخاطر الناشئة المرتبطة بالتعقيد المتزايد للشبكات اللاسلكية. يمكن أن تكون البنية المتوفرة بمثابة أداة فعالة للغاية لمسؤولي الشبكات وأفراد الأمن لحماية البنية التحتية الحيوية والبيانات الحساسة من التعرض للخطر في العصر الرقمي.

الكلمة المفتاحية: آلة المتجهات الفائقة، التعلم الآلي، الذكاء الاصطناعي.

Abstract

Wireless networks have become popular mainly because of the weak architectural designs that have enhanced serious attacks. Specifically, this article is dedicated to the reassessment of cybersecurity aspects in wireless network technology based on the combination of statistical information detection methods and AI algorithms. In order to create conditions resembling real-life wireless networking environment, a data fabrication was created containing four anomalies present in the initial configuration and four additional anomalies. The objects of such generation processes are used to generate a synthetic dataset with 20 thousand distinguishable values before being separated into the training and validation datasets. Thus, following the described before strategy, it is possible to start the data analysis based on exponential smoothing. This statistical method is used for detecting discrepancies in time series data analysis The method… Thus, utilizing the particular contamination level and plotting of the residuals, this work follows the expected trend lines indicating fluctuations. Furthermore, we have implemented an independent SVM, a machine learning technique, to boost other scenarios' anomaly detection performances. The freedom parameter was thus found from the fit to the anomalous data and was used to influence the model performance. Therefore, spare evaluation aimed to uncover the effectiveness of the proposed approach in the research. To do this, several performance measures such as accuracy, the false positive rates, and the detection rates were utilized. The results showed the effectiveness of the statistical anomaly detection method based on artificial intelligence in accurately identifying cyber threats in wireless networks and mitigating their effects. The one-class SVM classifier achieved a precision of 0 and recall of 1 on the validation set, specifically 0.099. The confusion matrix provides limited insights regardless of whether the model produces 0000 and an F1 score of 0. 1769. It has effectively demonstrated its functionality by prioritizing early detection of defective processes and cells. This measure has improved the reliability of the wireless network. Thus, this study demonstrates the tremendous potential of using statistical anomaly detection techniques, neural networks, and deep learning algorithms to address emerging risks associated with the increasing complexity of wireless networks. The available architecture can serve as a highly effective tool for network administrators and security personnel to protect critical infrastructure and sensitive data from exposure in the digital age.

Keyword: super vector machine, machine learning, artificial intelligence.

Unveiling the Hidden Threat:

How Wireless Networks

Fuel Serious Cyber Attacks

Assist. Lect. Ibtesam Jomaa Hawi

Presidency of Diyala University, Diyala / Iraq
ibtesam.jomaa .h@uodiyala.edu.iq

الكشف عن التهديد الخفي:
كيف تغذي الشبكات اللاسلكية الهجمات السيبرانية الخطيرة

المدرس المساعد ابتسام جمعة حاوي

رئاسة جامعة ديالى، ديالى \ العراق

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decrease in lateral displacement as compared to the uniaxial support because it delays the bending and failure process by stopping the bending at the side margins of the walls. This gain in load capacity and decrease in lateral displacement that achieved by the lateral restraints increases with increasing of aspect ratio (AR) and decreasing in slenderness ratio (λ). Overall the two-way action prevents the bending that occurs at the side edges of the walls and thus delays the process of bending and failure. The stresses are concentrated on the central region, and thus tends to crushing failure, not bending, as is the case in one way.

Abbreviations

ATP: attapulgite

AR: aspect ratio

BC: boundary condition

C.L: centerline

OW: One-way action

RCW: Reinforced concrete wall

SCC: Self-compacting concrete

SSCC: sustainable Self-compacting concrete

TW: Two-way action

λ: slenderness ratio

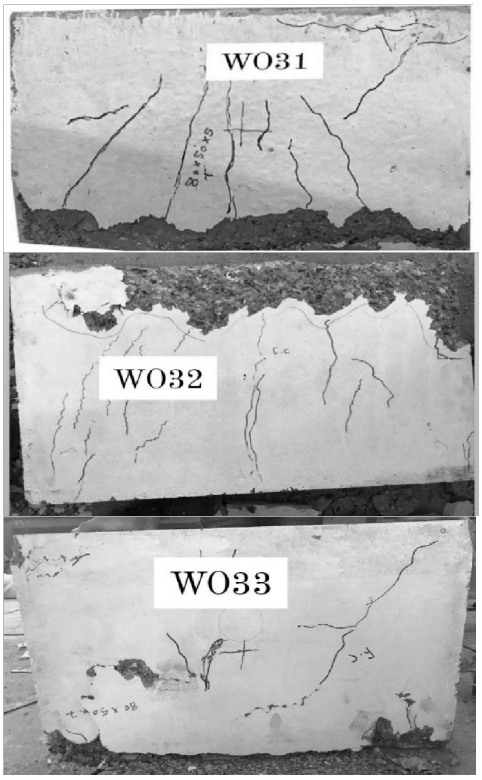

Figure (10) Crack pattern of third group

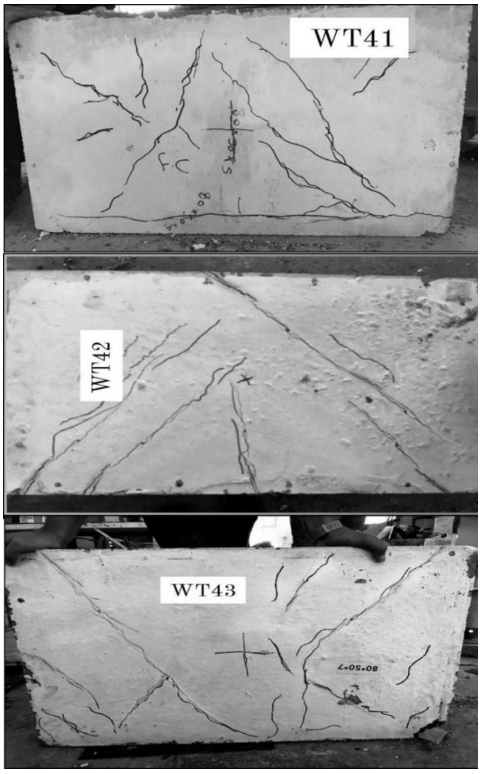

Figure (11) Crack pattern of fourth group

8. Conclusion

From this research work the experimental result refer to inversely proportional of aspect ratio (H/L) and slenderness ratio (H/T) to the load capacity of RCW samples which decrease with increasing the wall height (H), or decreasing wall thickness (T), both of these factors affect the ultimate load and failure mode, decreasing of aspect and slenderness ratio leading to tendencies of failure by crashing, also decrease in width, numerous of cracks and lateral displacement. Finally, the case of ends one way or two-way action, the support from all sides had a greater load capacity, in addition to the

Furthermore, Figures 6 and 7 reveal the following results (one-way and two-way action):

a. The loading capacity of the SCC wall panel increases by two-way action as compared with one-way action, but the lateral displacement decreases on the contrary.
b. The increase in ultimate load for SCC wall panels for change from one-way to two-way action were about 11.36%, 8.33%, and 5.55% at (λ) =16, 13.33, and 11.43 respectively.
c. The decrease in lateral displacement is as follows, 13.85%, 8.66%, and 8.86% at λ=16, 13.33, and 11.43 respectively. The increase of (λ) results in an increase in lateral displacement for SCC wall specimens whether it is (one or two) way action.

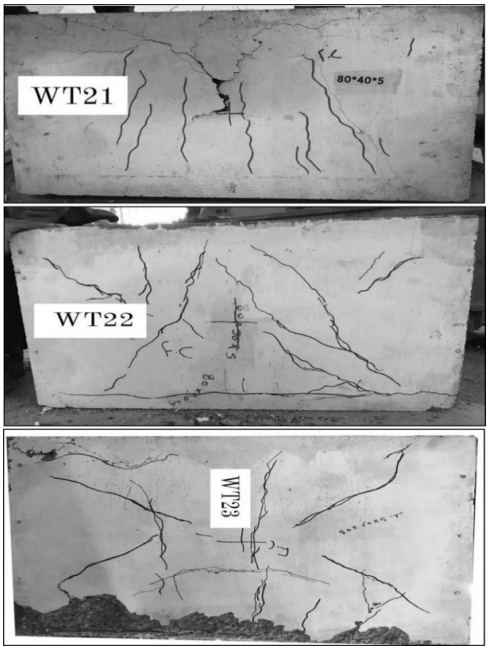

Figure (8) Crack pattern of first group

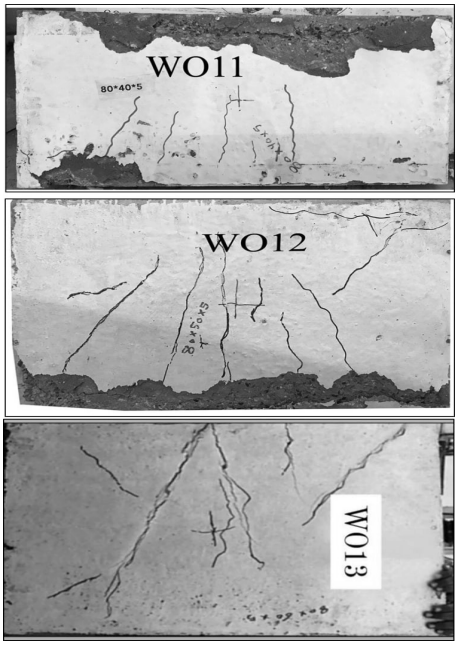

Figure (9) Crack pattern of second group

From figures can be noticed the following:

a. The RC wall specimen's maximum strength falls as (λ) rises from (11.43 to 16).

b. The increase of final load for the SCC wall specimen is about 6.12 %, 9.62%, and 16.3% for a decrease in (λ) from (16 to 13.33), (13.33 to 11.43) and (16 to 11.43) respectively.

c. For SCC wall specimens, a decrease in lateral displacement is accompanied by a decrease of (λ). from (16 to 13.33), (13.33 to 11.43), and (16 to 11.43). the decrease in lateral displacement is approximately (20.2%, 26.9% and 41.64%) respectively.

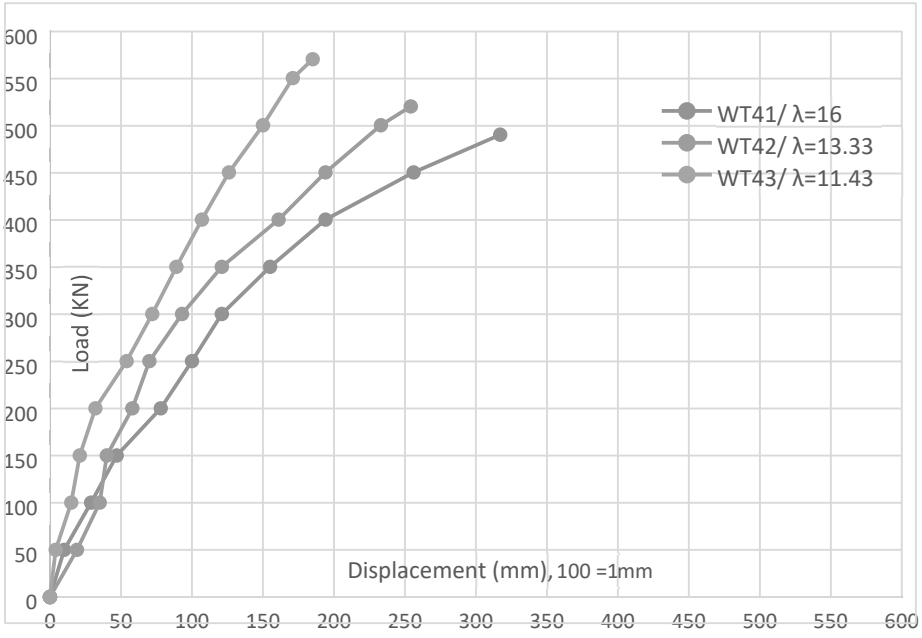

Figure (7) Slenderness Ratio (λ) effect On Ultimate load And Lateral Displacement.

(13.33 to 16), and (11.43 to 16), the increase in lateral displacement is approximately (36.45%, 32.85%, and 81.28%) respectively.

d. All the samples of the group failed by bearing, not bending. Increasing thickness reduces the slenderness ratio and thus reduces the cracks associated with the loading process, and failure becomes more brittle.

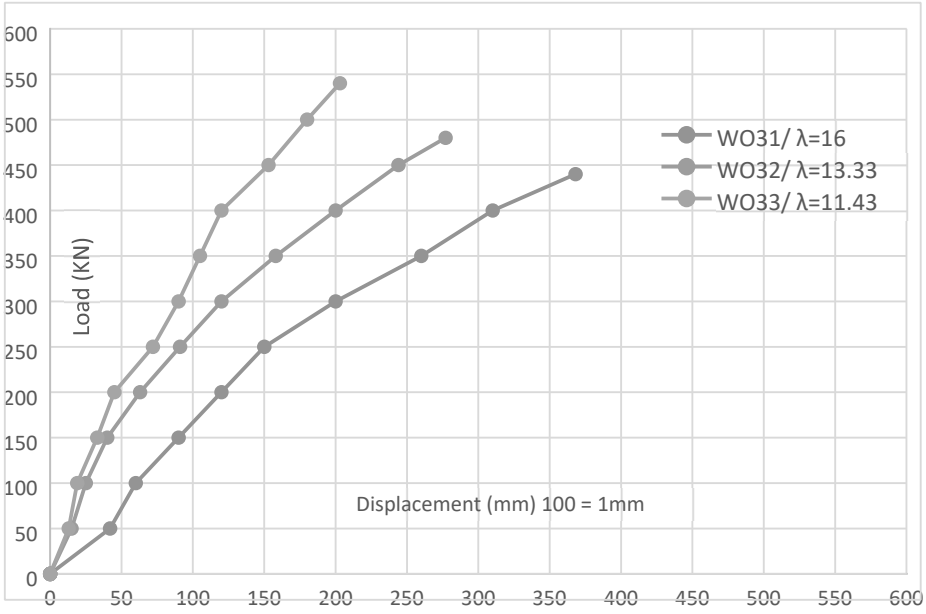

Figure (6) Slenderness Ratio (λ) effect On Ultimate load And Lateral Displacement.

4. Slenderness Ratio effect by two-way action

For two-way action only, the relation between loading capacity and lateral displacement under the effect of Slenderness ratio (λ) is shown in Figure (7), and figure (11) show the crack pattern of this group.

Furthermore, Figures 4 and 5 reveals the following results (One-way and two-way action):

a. The loading capacity of the SCC wall panel increases by two-way action as compared with one-way action, but the lateral displacement decreases on the contrary.
b. The increase in ultimate load for SCC wall panels for change from one-way to two-way action was about 7.84% at AR=0.5, 11.36% at AR=0.625, and 15% at AR=0.75.
c. The decrease of lateral displacement as follow, When AR=0.5 the decreasing is about 12.11%, AR=0.625 decreased by 13.86% and when AR=0.75 decreased by 20.09%. The increase of AR results in an increase in lateral displacement for SCC wall specimens whether it is (one or two) way action.

3. Slenderness Ratio effect by one-way action

For one-way action only, the relation between loading capacity and lateral displacement under the effect of the Slenderness ratio (λ) is shown in Figure (6), and figure (10) show the crack pattern of this group.

From figures can be noticed the following:

a. The RC wall specimen's maximum strength falls as (λ) rises from (11.43 to 16).
b. The increase of final load for the SCC wall specimen is about 9.09 %, 12.5%, and 22.73% for a decrease in (λ) from (16 to 13.33), (13.33 to 11.43) and (16 to 11.43) respectively.
c. For SCC wall specimens, an increase in lateral displacement is accompanied by an increase of (λ). When raised (λ) from (11.43 to 13.33),

From figures can be noticed the following:

a. The wall specimen's maximum strength falls as AR increases from (0.5 to 0.75).

b. The increase in final capacity for SCC wall specimen is about 6.52 %, 12.24%, and 19.56% for decreasing AR from (0.75 to 0.625), (0.625 to 0.5), and (0.75 to 0.5) respectively.

c. The decreasing of AR results accompanies a decrease of lateral displacement for the SCC wall specimen. The decrease in lateral displacement is about (22.08%) when AR decreased from 0.75 to 0.5 and about (2.76%) when decreased from 0.75 to 0.625, also the decrease in lateral displacement about (19.87%) for AR decreased from 0.625 to 0.5.

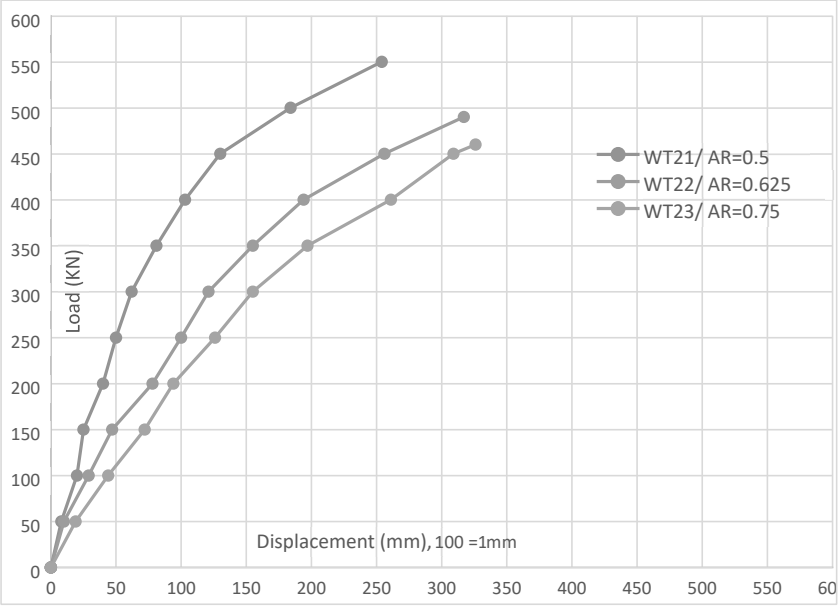

Figure (5) Aspect Ratio (AR) effect On Ultimate load And Lateral Displacement.

c. For SCC wall specimens, increasing lateral displacement is accompanied by an increase in AR findings. When AR is increased from 0.5 to 0.75 and from 0.625 to 0.75, the lateral displacement increases by about (41.176%) and (10.87%), respectively. When AR is increased from 0.5 to 0.625, the lateral displacement increases by about (27.3%).

d. The increase in height (H) is what causes this decrease in ultimate strength

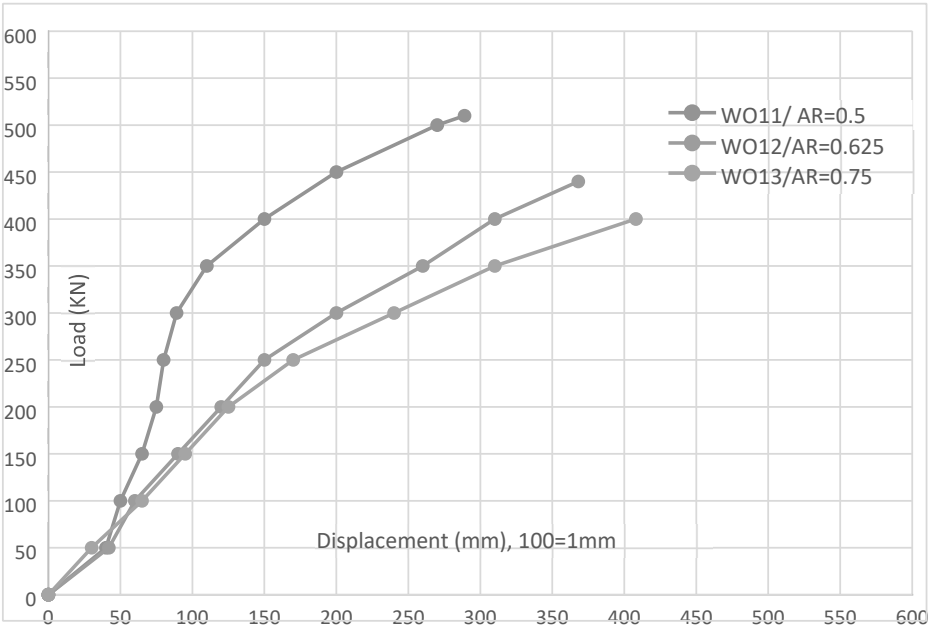

Figure (4) Aspect Ratio (AR) effect On Ultimate load And Lateral Displacement

2. Aspect Ratio effect by two-way action

For two-way action only, the relation between loading capacity and lateral displacement under the effect of aspect ratio (AR) is shown in Figure (5), and figure (9) show the crack pattern of this group.

loads allow us to record all values of loads with lateral deflection that get with it. as shown with Figure (3) below.

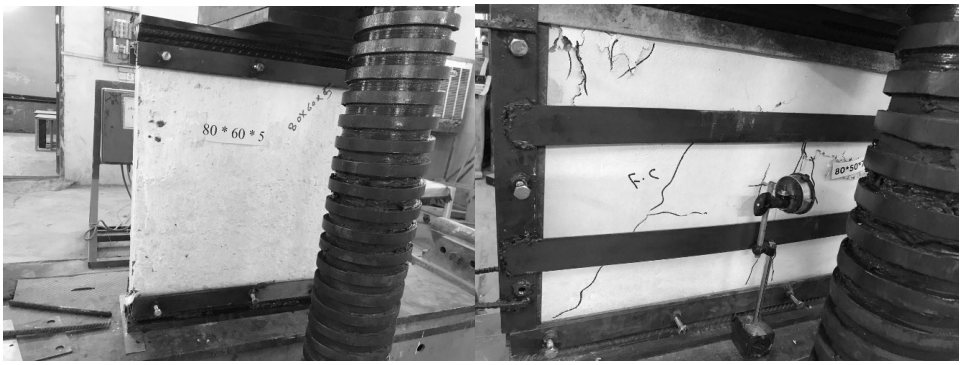

Figure (3) Wall samples under testing

7. Result and Discussion

The following parameters are studying on the structural behavior of SSCC wall panels

1. Aspect Ratio effect by one-way action

For one-way action only, the relation between loading capacity and lateral displacement under the effect of aspect ratio (AR) is shown in Figure (4), and figure (8) show the crack pattern of this group.

From figures can be noticed the following:

a. The loading capacity of RCW specimens drops with increasing of AR from (0.5 to 0.75).

b. The increase of final load is about 10 %, 15.91%, and 27.5% for decreasing AR from (0.75 to 0.625), (0.625 to 0.5), and (0.75 to 0.5) respectively.

Table (7) The full information of wall samples*

NO.	Symbol	L	H	T	NO.GROUP	BC
1	WO11	80	40	5	AR (1) = 0.5	one-way
2	WO12	80	50	5	AR (1) = 0.65	one-way
3	WO13	80	60	5	AR (1) = 0.75	one-way
4	WT21	80	40	5	AR (2) = 0.5	Two-way
5	WT22	80	50	5	AR (2) = 0.65	Two-way
6	WT23	80	60	5	AR (2) = 0.75	Two-way
2	WO31	80	50	5	λ (1) = 16	one-way
8	WO32	80	50	6	λ (1) = 13.33	one-way
9	WO33	80	50	7	λ (1) = 11.43	one-way
5	WT41	80	50	5	λ (2) = 16	Two-way
7	WT42	80	50	6	λ (2) = 13.33	Two-way
10	WT43	80	50	7	λ (2) = 11.43	Two-way

***All dimension by cm unit**

6. Testing Procedure

After preparing the testing device, the samples were installed and locked by upper and lower supports to be examined one after the other. Leveling the samples to achieve the orthogonally of specimens with applied load which done by t/6 eccentricity. The dial gauges are positioned in the middle for solid walls and at a quarter of distance for opening walls to measure the lateral displacement corresponding with applied loads. Each test begins with application of around (2KN) to seat panels with supports, then the applied loads are gradually increase by 10 (KN) until failure. Gradual

5. Abbreviated naming of Wall Specimen

Panels are naming as (W x1 x2 x3), where:

W: Indicates to the Wall.

X1: Indicates the type of restrain (O= one-way action or T= two-way action).

X2: Indicates the number of the group, a group for each parameter

X3: Indicates to numerous samples within the groups.

The full information of the wall samples is shown in Table (7) and Figure (2)

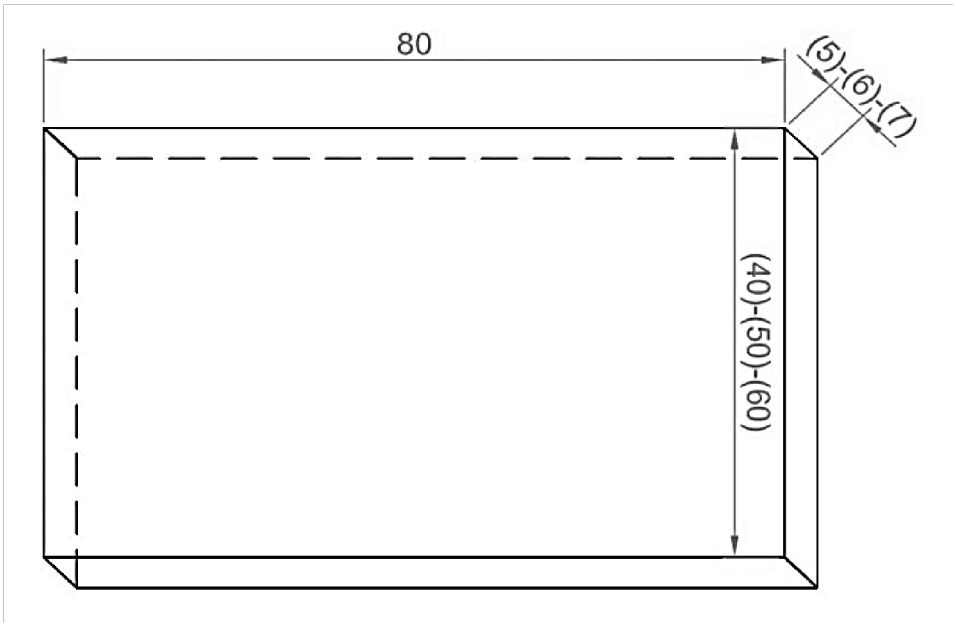

Figure (2) Wall samples configuration

Table 4. Results of Trials Mixes of SCC with (0,10,15,20) % of Attapulgite

Self-compacting Concrete Mix	SCC With 0% ATP	SCC With 10% ATP	SCC With 15% ATP	SCC With 20% ATP
Modulus of rupture of SCC for days 28 (MPa)	7	7.6	6	5.4

Table 5. Proportions of SSCC Mix.

Material	Cement	Sand	gravel	limestone	Attapulgite	water
Proportion	315 kg/m^3	788 kg/m^3	890 kg/m^3	150 kg/m^3	35 kg/m^3	170 kg/m^3

4. Characteristics of Hardened SSCC

The tests of mechanical properties of hardened SCC mixes include the compressive, Flexural, Tensile strength, and modulus of elasticity as illustrated in Table (6).

1. Compressive Strength: Three cubes with (10) cm agreement with **B.S:1881: part116:1989**
2. Splitting or indirect tensile strength test is carried out on three cylinders of (10x20cm) by **ASTM C496/C 496M-17**.
3. Flexural strength (modulus of rupture) is tested by three prisms (10x10x50cm) with **ASTM C78-15**.
4. static modulus of elasticity is obtained by testing a 150x300 mm cylinder to get the statically elastic modulus according to **ASTM C469/C 469M –14**.

Table 6. Characteristics of Hardened SSCC.

Compressive Strength (fc_u)	40.806 Mpa
Modulus of Rupture (f_r)	7.65 MPa
Splitting Tensile Strength (f_{ct})	5.11 MPa
Modulus of elasticity (E_C)	28650 MPa

the required properties of SCC, four mixtures with different proportions of attapulgite clay 0%, 10%, 15%, and 20% as a partial replacement of cement. as shown in Tables (3&4). The mixture with a ratio of 10% attapulgite is chosen to be the control mixture because at this replacement percentage the highest pozzolanic activity occurred, so it consumed more $Ca(OH)_2$ to produce more cement gel, thereby the voids between discrete cement and micro-cracks was reduced. because it is a good percentage as a relative substitute for cement, and the decrease in compressive strength is not significant, so it is suitable for pouring RCW samples. The proportions of the final mix are shown in Table (5). The second part of this work study includes testing ten opening RCW samples which are separated into four groups, each one containing three specimens to examine the effects of the following variable of SSCC wall samples.

1. Aspect ratio (AR): The magnitudes of aspect ratio (H/L) are (0.5, 0.625, 0.75)
2. Slenderness ratio (λ): The values of slenderness ratio (H/t) are (16, 13.33, and 11.43)
3. Boundary condition (BC): all specimens are tested by one-way and two-way action

Table 3. Results of Trials Mixes of SCC with (0,10,15,20) % of Attapulgite

Self-compacting Concrete Mix	SCC With 0% ATP	SCC With 10% ATP	SCC With 15% ATP	SCC With 20% ATP
Compressive Strength of SCC for 7 days (MPa)	35.133	32.2	24.566	22.033
Compressive Strength of SCC for 28 days (MPa)	41.866	40.806	32.75	30.21

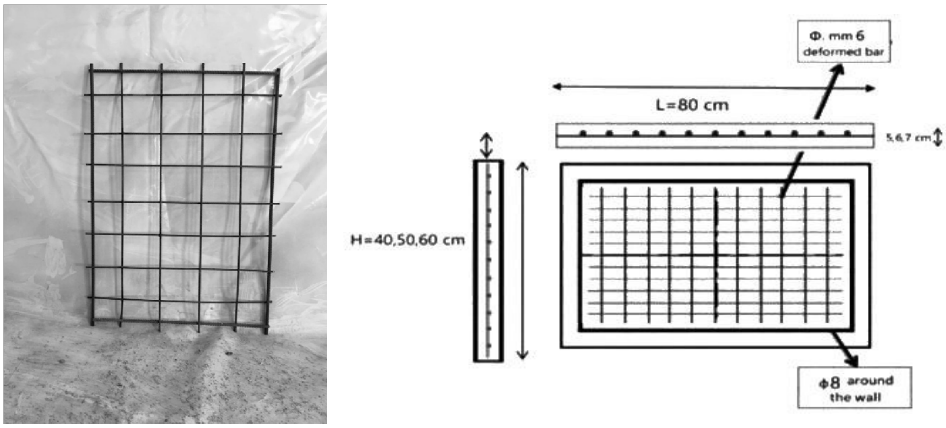

Figure (1) Steel reinforcement of wall panel

Table 2. The reinforcement mesh specification*

Property	Diameter 6 mm	Diameter 8 mm
Yield stress	MPa	515MPa
Ultimate strength	MPa	MPa
Elongation %	4.905	11.78
Location with mesh	(10*10) cm (C/C)	Around mesh

*** Each value is an average of three specimens, by ASTM A615-86**

3.3 Concrete Mix

The first part of the experimental program includes a set of trial mixtures to get the desired characteristics of the SCC mix. Where the mixture is chosen that is compatible or commensurate with the standard properties of SCC by conducting the standard cone test and V funnel test, according to (**EFNARC 2005**), and then pouring the mixture into six cubes of size (10x10) cm and 3 prisms (10x50) cm to measure the compressive and tensile strength,

respectively. This procedure or method is adopted for each mixture until the required properties are reached. After obtaining the mixture with

Table 1. Chemical analysis of Attapulgite

Oxide Composition	Oxide content (%)
SiO_2	50.82
Al_2O_3	11
Fe_2O_3	6.455
TiO_2	1.019
CaO	22.78
MgO	6.942
SO_3	1.211
Na_2O	2.531
K_2O	2.302

3.1.5. Superplasticizer S.P

Water Reducing Admixture of superbly Water Reducing. Layda's superplasticizer is designed for the production of an SCC mix.

3.1.6. Limestone Powder

Limestone was used during this work, and it is a common addition to self-compacting concrete. Limestone, a white powder, is locally called (AlGubra). Limestone is used as a filler material to improve certain properties, as compared to cement.

3.2. Steel reinforcement properties

Steel bars, welded with each other to become a mesh located by the center of the specimen's width with a 15mm concrete cover (use one layer of reinforcement due to limited thickness). The bar's diameter (6mm) was designed with (100mm) c/c spacing in both directions. also, an (8mm) steel reinforcement is positioned around the mesh to brace or guard the wall's edges and strengthening, as shown in Figure (1) and Table (2)

3. Materials and Methods

3.1 Material properties

In this investigation, the materials used are:

3.1.1. Cement

In this investigation, ordinary Portland cement (OPC) type (I) is utilized. which conforms to **IQS No.5/1984**

3.1.2. Fine Aggregate (sand)

Natural sand was utilized as a fine aggregate for SCC mixtures with specific gravity (2.56) and modulus of fineness (2.6). By the requirements of Iraqi standard **(IQS) No.45/1984 zone** (2).

3.1.3. Rough Aggregate (gravel)

The largest size of gravel is (12 mm) with specific gravity (2.7), which is used in the SCC mix. Accordance with Iraqi Specification **(IQS) No. 45/1984**.

3.1.4. High Reactive Attapulgite:

This particular clay, which appears as bluish-green and grey claystone in the Al-Najaf and Karbala districts, after breaking up the large stones into smaller pieces with a hammer, attapulgite can be made by burning it for half an hour at 750°C in an electric oven after ground it into tiny bits to become a fine powder. for this investigation, the properties of attapulgite powder comply with **ASTM-C618** (Table, 1).

low internal stress and a noticeably higher compressive strength. Research is ongoing in this field, as industrial and plastic wastes, and even natural plant wastes, are used as sustainable materials. In any case, concrete gains strength over time and has a long service life. So, it is considered the most suitable material to be the basic component in building structural elements; one of the most important elements is walls. Reinforced concrete walls (RCW) were previously utilized to guard against the outside environment. They were regarded as non-load-bearing walls, without taking into account the wall's strength as a structural component. this is because the early published concrete codes had very low operating design stresses, and little study of these components was conducted. Concrete load-bearing walls that principally sustain vertical loads that operate downward on the upper region of the wall may experience weak-axis bending due to the eccentric behavior of the applying axial vertical load, according to (James & James, 2011). The wall is defined as a vertical load-bearing element with a length greater than four times its depth in clause 1.3.4.1 of Part 1 of British Code 8110 from 1997, which differentiates walls from columns. RCW has become as popular today as the traditional structural elements such as beams, slabs, and columns. whether they are walls restricted from two directions (one-way action) or all sides (two-way action). This is what will be studied in our research using a sustainable, selfcompacting mixture that includes attapulgite as a relative alternative to cement.

effective role in the strength of SCC. In another study, high reactivity attapulgite (HRA) was used to produce lightweight LWSCC by (Abbas, *et al.*, 2016); optimum content of HRA used 10%, causing growth in compression load also splitting tensile value as compared with the original mixture (10.0%, 12.1%, 11.1%, and 12.4%) and (12.0%, 18.2 %,16.6%, and 16.2%) respectively with 7, 28, 56 and 90 days. for this, the attapulgite is appropriate to contribute to the production of LWSCC. Also, (Qassim & AL-Saraj, 2021) found that HRA with silica fume has a significant improvement in the properties of concrete and its resistance to shear stresses, as the axial load improves the shear capacity and reduces the shear failure in the (LWSCC). The Iraqi clay (Attapulgite) has been processed to pozzolanic material HRA. The possibility of replacing the Iraqi clays with cement can reduce the cost and the impact of cement manufacturing on the environment. In the study of (Zghair, *et al.*, 2022), three percentages of HRA were used as a replacement: 0, 10, and 20 % by weight of cement. The test result shows that the10% of HRA is an optimum ratio, which increases the compressive strength compressive strength. (Abdulrasool, *et al.*, 2023) used different percentages of attapulgite, including 0%, 4%, 8%, 12%, and 16%, in replacement of cement. The findings indicate that using attapulgite enhanced the compressive strength by 9% and 8% for flexural strength. In general, all concrete mortar mixes that were prepared with different attapulgite percentages result in acceptable mechanical properties. (Abdulrasool, *et al.*, 2022) used Attapulgite fine aggregates (AFA) in place of two different amounts of normal sand. To examine the effectiveness of internal wet curing, AFA has been proven to be beneficial for internal treatment. It has been discovered that enhancing the properties of highperformance concrete properties with 20% AFA results in

2. Related Research

There is a group of research on the production of this type of concrete SSCC, one of them (Ofuyatan, *et al.*, 2021) about SCC with silica fumes as a cement substitute by the extents of 0%, 15%, 25%, and 35% of volume. Results for compressive strength at 21 Days (kN/mm2) were 39.24, 34.42, 25.10, and 20.60, respectively. This study's evaluation of a variety of qualities relevant to concrete production employing silica fumes as a substitute for cement proved successful. In another study (Hilal, *et al.*, 2020) investigate the initial and final performance of SCC prepared by coal ash besides fly ash (CA&FA), each one alone a fractional exchange of cement. mixtures done with 0%, 10%, 20% and 30% (by weight) of cement. The findings indicated that the CA had detrimental effects on the fresh characteristics of SCC. However, the outcomes still align with the fresh SCC's requirements. also has significantly increased SCC's durability and water absorption. versus the addition of FA. (Younis Khudair, *et al.*, 2020) used recycled glass powder (RGP) as a partial alternative to cement, the test findings showed that increasing the amount of cement replaced with RGP generated a modest reduction in passing ability while maintaining flow ability and improving segregation resistance. The resulting mixes' mechanical characteristics improved up to a 30% replacement level. (Kumar, *et al.*, 2020) used the metakaolin and plastic fiber substitute the cement in the SCC mixture; metakaolin with 20% constant replacement and plastic fiber ratio are 0%, 0.25%, 0.5%, 0.75%, and 1%, respectively with metakaolin. The research result demonstrated that with the inclusion of plastic fiber, SCC's ability to fill and pass is reduced, but the characteristics are not significantly altered. The parameters of hardened SCC demonstrate that both substances have an

1. Introduction

Concrete is one of the most widely used and durable building materials. It provides sufficient strength to bear loads and is resistant to external conditions. It comprises different constituent materials with significantly different properties that complement each other. One type of concrete is self-compacting concrete SCC, which is defined as concrete that must meet the requirements of Passing and flow ability, Segregation resistance, and attaining complete compaction with the weight of one's own body alone, independent of external compaction. Moreover, it can be filled in small places with reinforcement steel, eliminating the need for external compaction equipment according to EFNARC (2005). Concrete in general, has unique and qualitative properties, and the presence of cement as its main component is considered one of its most important properties. So, Large quantities of tons of cement are produced annually, and in addition to being expensive, cement also pollutes the environment by emitting a lot of carbon dioxide during production; for this reason, there are many research directions on the production of concrete using sustainable alternatives that limited the use of cement. The first part of this research is about the production of sustainable self-compacting

concrete SSCC, which includes the properties of SCC in addition to containing a sustainable material with a partial or complete replacement of one of its components.

المستخلص

هذا البحث يدور حول الأداء الإنشائي للجدران الخرسانية المستدامة ذاتية الر ص والمعرضة لأحمال محورية لامركزيةموزعة بانتظام بما في ذلك تأثير نسبة العر ض إلى الارتفاع (AR) ونسبة النحافة(λ) من خلال العمل في اتجاه واحد وفي اتجاهين. ويتضمن البرنامج التجريبي اختبار عشر لوحات جدارية، تعادل انحراف نظام التحميل سدس العمق. يتم تقسيم هذهالألواح الجدارية إلى أربع مجموعات، تتكون كل منها من ثلاث عينات. توضح المجموعتان الأولى والثانية تأثير نسبةالعرض إلى الارتفاع (H/L). أشارت النتائج إلى انخفا ض AR من (0.75 إلى 0.625)، (0.625 إلى 0.5)، (0.75 إلى0.5)، وبلغت زيادة الحمل النهائي حوالي 10%، 15.91%، 27.5%، كما بلغ انخفاض الإزاحة الجانبية 20.1% و21.4%و29.2% على التوالي للعمل في اتجاه واحد. الزيادة في السعة النهائية 6.52%، 12.24%، 19.56%. كما انخفض بحوالي 2.76% و19.87% و22.08% في الإزاحة الجانبية للعمل في الاتجاهين على التوالي. أما المجموعة الثالثة والرابعة لتأثيرنسبة النحافة (λ) والتي انخفضت من (16 إلى 13.33) و(13.33 إلى 11.43) و(16 إلى 11.43)، وبلغت زيادة الحمل النهائي حوالي 9.09%، 12.5%، 22.73%. في اتجاه واحد و6.12% و9.62% و16.3% في الاتجاهين على التوالي. وأيضا عند رفع (λ) من (11.43 إلى 13.33)، (13.33 إلى 16)، و (11.43 إلى 16)، فإن الزيادة في الإزاحة الجانبية تبلغ تقريباً (36.45%، 32.85%، 81.28%) للحركة ذات الاتجاه الواحد، و (36.76%، 25.29%، 71.35%) للعمل في الاتجاهين على التوالي.

الكلمات المفتاحية: أتابولجيت؛ نسبة الابعاد؛ نسبة النحافة؛ الاسناد في اتجاه واحد؛ الاسناد في اتجاهين.

Abstract

This investigation about the structural performance of sustainable self-compact concrete walls exposed to eccentric axial regularly dispersed loading, including the effect of aspect ratio (AR) and slenderness ratio (λ) by one-way and two-way action. The experimental program includes testing ten wall panels, the eccentricity of the loading system equivalent to one-sixth of depth. These wall panels are separated into four groups, each one consisting of three specimens. first and second groups clarify the aspect ratio (H/L) effect. The results indicated for decreasing AR from (0.75 to 0.625), (0.625 to 0.5), and (0.75 to 0.5), the increase of final load is about 10 %, 15.91%, and 27.5%, also the decreasing of lateral displacement is 20.1%, 21.4%and 29.2% respectively for one-way action. The increase in final capacity 6.52 %, 12.24%, and 19.56%. also about 2.76%,19.87% and 22.08% decreasing in lateral displacement for two-way action respectively. third and fourth groups for the effect of slenderness ratio (λ) which decrease from (16 to 13.33), (13.33 to 11.43) and (16 to 11.43), The increase of final load is about 9.09 %, 12.5%, and 22.73% for one way and 6.12%, 9.62%, and 16.3% for two-way action respectively. Also when raised (λ) from (11.43 to 13.33), (13.33 to 16), and (11.43 to 16), the increase in lateral displacement is approximately (36.45%, 32.85%, and 81.28%) for one way action, and (36.76%, 25.29% and 71.35%) for two way action respectively.

Keywords: Attapulgite; Aspect ratio; Slenderness ratio; One-way action and Two-way action

Capacity of Self Compact Concrete Walls Using Attapulgite as A Partial Replacement of Cement Under One Way and Two Way Action Restriction

Prof. Dr. Wissam Kadhim AlSaraj (*)
Asst. Prof. Dr. Luma Abdul Ghani Zghair (**)
Akhlas Hashem Mohammed (***)

(*) https://orcid.org/0000-0003-3995-7267
(**) https://orcid.org/0000-0002-5889-599X
(***) https://orcid.org/0009-0002-7591-3608
Civil Engineering Department, College of Engineering, Mustansiriyah University, Baghdad/Iraq

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