International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 05 May 2024
Page No: 1166 - 1173
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0160

Adaptive Ambulance Management System

S.B. Bharatharam[1], M. Dhayalini[2], V. Gowthamram[3], Dr. P. Suresh[4]
[1,2,3,4]Department of Computer Science and Engineering, KPR Institute of Engineering and Technology, Coimbatore, India.
Emails: *sbharatharam49@gmail.com[1], dhayalinimohandass2003@gmail.com[2], ramgowtham2002@gmail.com[3], sps1765@gmail.com[4]*

Abstract
The ability to quickly and accurately retrieve information is essential for emergency medical response. This project integrates biometric technology and web applications to offer a comprehensive solution for improving emergency medical services. Our approach starts with the use of a fingerprint scanner, which records information on patients and guardians and links it to distinctive fingerprints. A Node MCU processes and stores this data, making it possible to quickly and securely identify patients in urgent situations. The Node MCU displays patient information on an LCD panel as soon as they provide their fingerprint. Both ambulance drivers and hospital administration have access to a user-friendly web application simultaneously. The software gives users access to a database of nearby hospitals that is divided into public and private facilities. Soon, the selected hospital will be informed about the patient condition and able to make the treatment arrangements earlier. The patient's preferences and the resources at their disposal can help ambulance crew make wise selections. Ambulance crew have two selection buttons, one is government hospital selection button and another is private hospital selection button. By reducing response times, this function improves patient care. In order to safeguard sensitive patient data, the project places a strong emphasis on data security and privacy. Our goal is to maximize emergency medical response through this integrated system, ensuring that patients receive prompt and efficient care when it counts.

Keywords: *Biometric verification; Emergency medical services; Patient identification; user-friendly interface.*

1. Introduction

Innovative solutions are needed to improve emergency medical response and patient care in the ever-changing world of technology and healthcare. The method described in this article uses cutting-edge biometric technologies and Internet of Things (IoT) gadgets to solve some of the most pressing problems facing emergency medical services (EMS). The utilization of a comprehensive and automated emergency response system has the potential to save lives. The primary motivation is to enhance the efficient handling of the aftermath of a road accident by leveraging IoT as a central resource [1]. The internet and its various applications have seamlessly woven into the fabric of modern human life, serving as a crucial tool across all spheres of existence [2]. Internet of Things (IoT) represents a highly sophisticated evolution of automation technology, wherein every smart device is equipped with its own distinct identification [3]. The manual nature of many current systems result in inefficiencies and the possibility of mistakes in patient identification and hospital choice. In response, this study suggests an integrated approach that combines a fingerprint scanner and a Node MCU to create a biometric verification system that guarantees quick and precise patient identification. Biometrics, in its most basic sense, involves assessing and measuring a human individual based on their physical and behavioural traits. This process allows for the identification and authentication of a person through a collection of distinctive and confirmable biometric data [4]. We suggest a creative idea that makes use of cutting-edge technology to address these issues and improve emergency healthcare. Our research is focused on integrating a fingerprint scanner with a Node MCU to provide a reliable biometric authentication solution. By collecting and preserving vital data,

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 05 May 2024
Page No: 1166 - 1173
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0160

such as patient names, guardian and parent numbers, and connecting them to distinctive fingerprints, this technology enables quick patient identification. The treatment procedure is streamlined when a patient is simply touched, triggering real-time patient recognition and Innovative solutions are needed to improve emergency medical response and patient care in the ever-changing world of technology and healthcare. The method described in this article uses cutting-edge biometric technologies and Internet of Things (IoT) gadgets to solve some of the most pressing problems facing emergency medical services (EMS). The utilization of a comprehensive and automated emergency response system has the potential to save lives. Instantly displaying patient information on an LCD screen. In addition, we provide an easy-to-use online application specifically for hospitals and ambulance drivers, supporting intelligent choices depending on the patient's choice between public and private institutions. The ultimate goal of our research is to develop a seamless, effective, and secure system that not only enhances emergency medical treatment but also has the potential to save lives by reducing response times and improving general patient care in life-threatening circumstances.

2. Related Work

In recent years, the issue of emergency medical response system optimization has received a lot of attention, leading to a number of relevant research and initiatives. An overview of the most important studies and initiatives in this area is given in this section.

- Biometric Verification in Healthcare
- IoT Integration for Emergency Response
- Web-based solution for hospital selection

2.1. Biometric Verification in Healthcare

The creative and scientific process of recognizing people based on their distinctive physical or behavioral characteristics revolutionizing the healthcare industry by improving safety, managing patient data, and providing individualized treatment. The role of WSN and biometric models is discussed by the authors in [5]. Instances encompass two-factor remote authentication, verification of fingerprint operations to bolster security, safeguarding healthcare privacy, utilizing cloud-based biometric applications for healthcare data, and utilizing a combined approach from trust computing to authenticate contributor profiles in online health data. To enhance the secure identification of patients, the author [6] integrated the method with the healthcare system. Furthermore, they introduced a novel approach that incorporates the electronic master patient index and periocular biometrics within healthcare information systems for individual identification in healthcare settings. This research investigation entails a thorough comparison and assessment of divperiocular biometric recognition techniques against both conventional and deep learning methods. Authentication of Biometric systems, particularly those utilizing deep learning for fingerprint verification, are widely employed in everyday scenarios. However, these systems are prone to attacks from adversaries, compromising their ability to accurately discern input data. Despite the introduction of several defense mechanisms, primarily centered around denoising approaches, their effectiveness remains limited. In this research [7], a new defense strategy was suggested to mitigate adversarial attacks targeting fingerprint recognition systems. To enhance its defense capabilities and incorporate the Deep Image Prior mechanism, renowned for its exceptional performance in image reconstruction without the need for extensive prior training or a large dataset. This approach seeks to remove adversarial alterations present in the input fingerprint image by utilizing Deep Image Prior, reconstructing it to closely resemble the original fingerprint image. An adversary involves manipulating a deep learning model, leading it to make inaccurate predictions through almost imperceptible changes to the target images [8]. For example, introducing adversarial perturbations into medical images could cause deep learning models to make incorrect diagnoses of diseases [9].

2.2. IoT Integration for Emergency Response

An emergency response system that leverages fog computing and IoT will continuously monitor linked devices and sensors, gather data, and transfer it to the cloud for analysis. After that, in

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 05 May 2024
Page No: 1166 - 1173
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0160

real time, the cloud may decide what to do and relay that information back to the user or device for further action. The paper [10] explores the integration of IoT technology into the emergency management sector, employing a customized task-technology fit approach to investigate its application in optimizing operational efficiency across the three phases of emergency response. This approach takes into account the information necessary to support three consecutive and discernible sequences in emergency response operations: mobilization, initial situation assessment, and intervention. The research results corroborate two hypotheses: H1 - IoT technology meets the specified information needs, and H2 - IoT technology enhances emergency response operations by promoting effective collaboration, accurate situational awareness, and comprehensive resource visibility. The increasing frequency of road accidents is leading to a corresponding increase in the mortality rate, with a direct correlation pertaining to the quantity of accidents [11]. Unfortunately, this urgent concern has evolved into a commonplace and ingrained facet of everyday life, particularly in developing nations. To achieve substantial societal progress, it is crucial to leverage our technical capabilities to prioritize individual safety. This involves, among other measures, reducing the response time to accidents. A system designed for detecting and responding to accidents relying on the Internet of Things (IoT) is geared towards reducing casualties and injuries stemming from road accidents, benefiting both passengers and vehicles. This fully automated system can promptly dispatch emergency notifications to nearby hospitals and fire stations, along with contacting an emergency contact in case of accidents. Utilizing a vehicle device installed in the consumer's vehicle and a responsive server system situated remotely, the objective is to swiftly provide the vehicle's location and assess the severity of the accident. This initiative underscores the potential of technology to enhance road safety and streamline emergency response mechanisms.

2.3. Web-based solution for hospital selection

Making educated healthcare decisions is made easier for consumers by a web-based platform that compares and locates hospitals based on user evaluations, services, and proximity. The author in [12] introduced a web-based survey employing a conjoint choice analysis to evaluate the influence of hospital quality and supplementary information on patients' decision-making. regarding hospital selection. Each patient was shown various comparisons of hospitals, each with attributes. If a hospital's features were regularly cited by patients as being the most crucial when choosing a new hospital, they were added. They contained details about the general hospital, information about the standard of care, and information particular to surgeries. To gain a deeper comprehension of how healthcare consumers make decisions when presented with comparable consumer information, the present study [13] conducts a qualitative descriptive survey among eighteen customers who have undergone hip or knee replacement surgery during the last five years. A preliminary document for a website providing comparative consumer data was utilized to examine their decision-making processes. Cognitive interviews and focus groups were used to gather data, which were then thematically analyzed. Efficient communication within healthcare is crucial, particularly in emergency scenarios. This paper [14] introduces a comprehensive emergency system that streamlines communication processes from the dispatch of the ambulance to the arrival of patient at the hospital and the subsequent transfer of responsibility. The system's overarching objective is to automate every phase of an emergency incident, beginning with the identification of the nearest ambulance and extending to accessing the patient's online health record for well-informed pre-hospital treatments. Furthermore, the system determines the closest hospital with specialization in the patient's condition and conveys crucial patient identification details to the emergency department. This document outlines the key components of the system, the technologies utilized in its development, and anticipates challenges while proposing effective solutions to overcome them.

3. Existing System

In the paper [15], the author introduces RF Fingerprint Identification using Deep Learning with mitigation of channel mitigation. One solution that shows promise for authentication of

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 05 May 2024
Page No: 1166 - 1173
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0160

physical layer is radio frequency fingerprinting (RFF)- based identification of device. In this study, they used 20MHz IEEE802.11signal to thoroughly examine the effect of channel fluctuation on RFF identification. A method for extracting features based on least mean square (LMS) equalization in the time domain has been suggested. Compared with the traditional frequency domain equalization (FDE) method, this method more closely preserves the subtleties of RFF features while gradually restoring the transmitted signal. Additionally, a hybrid identifier that utilizes both FDE-based and LMS-based techniques is suggested. For device identification, a four-layer convolutional neural network is created using the equalized data. [16] To record the wave shape of 68802.11 devices at various locations, an experimental system has been put up. The method proposed for identifying Radio Frequency Fingerprints (RFF) in IEEE 802.11 devices comprises several stages: Preamble Preprocessing, Classical Sequency Domain Equalization, Proposed Time Domain Equalization, Proposed CNN-Based RFF Extraction and Identification, and Hybrid Identifier. To mitigate multipath fading, a time-domain LMS equalization-based RFF extraction approach is introduced. [17] We employ this method in our research due to its four-layer deep learning architecture. The recommended hybrid identifier is capable of improving overall accuracy by 2%. The utilization of CNN for RFF Identification is specifically designed to enhance accuracy, providing a robust foundation for equalized sequences. The injury can happen anywhere on the body, including the finger, and this method is added to our research for the patient identification system. [18] Finger injuries and wounds can alter a fingerprint, making it more difficult to identify a staff member whose fingerprint doesn't match one that has already been pre-processed and stored in a database. In order to make fingerprint identification simple, even in cases where fingerprints are damaged due to injury, a deep learning CNN has been designed with four-layer.

4. Proposed Technique

In this section, we introduce our innovative ensemble approach, which aims to enhance emergency medical response systems by incorporating state-of-the-art technology into a holistic solution. The architecture of the proposed model is shown in Figure 1. This demonstrates the operation of the suggested concept, which includes Patient identification module.

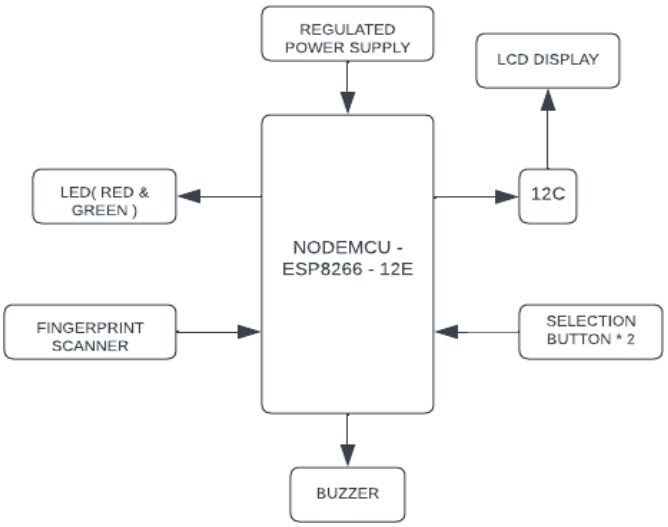

Figure 1 Proposed Architecture

4.1. NodeMCU

Figure 2 NodeMCU serves as a versatile and accessible platform within the realm of Internet of Things (IoT) development. Its foundation lies in the ESP8266 Wi-Fi System-on-Chip (SoC), a product of Expressive Systems, which integrates Wi-Fi capabilities with the Tensilica Xtensa LX106 core, commonly employed in IoT applications. The specific hardware configuration of NodeMCU is built upon the ESP- 12 module.

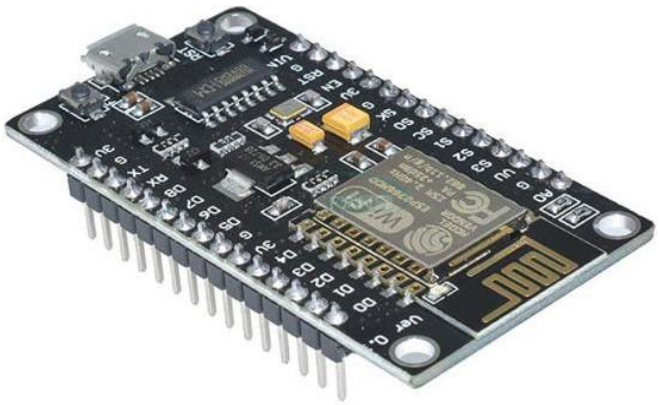

Figure 2 NodeMCU – ESP8266

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 05 May 2024
Page No: 1166 - 1173
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0160

The term "NodeMCU" is often associated more with its firmware than its development kits. The firmware is programmed using the Lua scripting language and is a derivative of the eLua project. It is constructed on Espressif's Non-OS SDK for the ESP8266, incorporating various open- source projects such as lua-cjson and spiffs. This combination of hardware and firmware makes NodeMCU a comprehensive solution for IoT development, allowing developers to create applications with ease. Despite the discontinuation of the original firmware project by its creators, a dedicated community of contributors has taken over, ensuring ongoing enhancements and support. By the summer of 2016, NodeMCU had expanded to include over 40 different modules, offering a wide range of functionalities for IoT projects. Users are provided the flexibility to select modules relevant to their projects and build customized firmware tailored to their specific needs, although resource constraints necessitate thoughtful module selection. In essence, NodeMCU plays a pivotal role in streamlining and simplifying IoT development, providing developers with an accessible and feature-rich platform for creating innovative and connected applications.

4.2. LCD Display

The Liquid Crystal Display (LCD) Figure 3 technology trace back to the replacement of older display technologies like Cathode Ray Tubes (CRTs). This evolution has been driven by the distinct advantages offered by LCDs, making them a staple in various electronic devices. The structure of an LCD typically consists of a layer of liquid crystals positioned between two layers of glass or plastic. A crucial component is the backlight, often employing Light Emitting Diodes (LEDs) or a cold cathode fluorescent lamp (CCFL) to illuminate the display uniformly. The operational principle of LCDs hinges on the ability of liquid crystals to control the polarization of light. When no electrical current is applied, these crystals naturally obstruct the passage of light. The introduction of an electric current prompts the liquid crystals to realign, allowing light to pass through and generate visual content on the screen. The integration of color into LCD displays involves the use of color filters and sub-pixels, typically in red, green, and blue configurations.

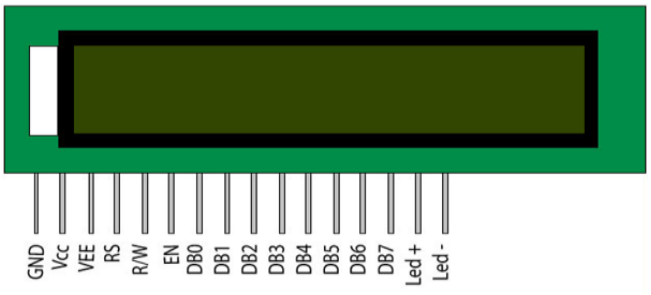

Figure 3 LCD Display

4.3. Buzzer

Figure 4 A buzzer is a compact and efficient device ideal for introducing sound features into our projects or systems. Its small and 2-pin structure allows for easy integration on breadboards, Perf Boards, and PCBs, making it widely utilized in various applications in electronics. There are two main types of buzzers, and the one depicted here is a straightforward buzzer that emits a continuous beep when powered. The alternative type, known as a ready-made buzzer, has a bulkier design and produces a beep-beep-beep sound owing to its internal oscillating circuit. However, the featured buzzer is often favored for its versatility, as it can be customized with additional circuits to seamlessly adapt to specific applications.

Figure 4 Buzzer

Powering a buzzer is a straightforward process, typically requiring a DC power supply within the range of 4V to 9V. While a basic 9V battery can suffice, it is recommended to use a regulated +5V or +6V DC supply for optimal performance. The buzzer is usually connected to a switching circuit, allowing for precise control of its activation and deactivation at desired times and intervals. This simple yet effective device finds applications in alarm systems, timers, and various interactive electronic projects where audible alerts or indications are required.

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 05 May 2024
Page No: 1166 - 1173
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0160

4.4. Fingerprint Module

Figure 5 Fingerprint Module

Fingerprint technology is an advanced biometric authentication method that leverages the unique patterns present in an individual's fingerprints for identification purposes. Figure 5. The R307 Fingerprint Module stands out as a comprehensive system, featuring key components such as an optical fingerprint sensor, a high-speed DSP processor, an advanced fingerprint alignment algorithm, and high-capacity FLASH chips. This module, with its stable performance and straightforward structure, serves as a valuable solution for applications requiring secure and reliable fingerprint recognition. In the operational context of an optical fingerprint scanner like the one in the R307 module, the Total Internal Reflection (TIR) principle plays a pivotal role. A glass prism, employed for TIR, allows controlled blue LED illumination to enter at a specific angle, enabling internal reflections. The reflected light exits through the opposite face, housing a lens and an image sensor. When no finger is present on the prism, the light is entirely reflected, resulting in a plain image captured by the image sensor. However, when a finger is introduced, a fascinating phenomenon called Frustrated Total Internal Reflection (FTIR) occurs. This happens as the ridges and valleys of the fingerprint interact differently with the evanescent wave, a small amount of light that escapes into the external medium during TIR. The image sensor captures these variations in intensity, and the data is processed to generate a high-contrast digital fingerprint image. Fingerprint technology has become ubiquitous in security systems, access control, and personal devices due to its unmatched accuracy, reliability, and the inherent uniqueness of each individual's fingerprints. It provides a secure and efficient means of authentication, significantly enhancing the overall security posture of various applications in our technologically advanced world.

4.5. Switches and Buttons

Figure 6 Buttons

Figure 6 Buttons and switches are fundamental components in electronics projects, often essential for interacting with code, displaying data on screens, activating LEDs, executing scripts, resetting boards, and various other functions. The operation of a button circuit involves the construction of a push button switch, a compact sealed mechanism. This switch completes an electric circuit when pressed. When the button is in the "on" state, a small metal spring inside establishes contact with two wires, enabling the flow of electricity. Conversely, when the button is in the "off" state, the spring retracts, interrupting the contact, and preventing the current from flowing. In summary, the press of a button in a circuit either opens or closes the electrical pathway, determining the flow or interruption of current.

4.6. LED Circuit

An LED circuit is a basic electronic arrangement designed to power and illuminate Light Emitting Diodes (LEDs); semiconductor devices that emit light when an electric current passes through them. This fundamental setup is widely utilized in diverse applications, ranging from simple indicator lights to sophisticated lighting systems. The key components of an LED circuit include the LED itself, a resistor, and a power source, typically a battery or power supply. The LED circuit configuration can be either in series or parallel. In a series circuit, the LED and resistor share the same current, while a parallel circuit allows independent control of multiple LEDs. LEDs have a forward voltage (Vf) requirement, and the power supply voltage must meet or exceed this value. The

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 05 May 2024
Page No: 1166 - 1173
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0160

forward current (If) determines the intensity of the LED's light. Resistor calculation in a series circuit is essential to limit the current and prevent LED damage. Polarity is a critical consideration in LED circuits as LEDs are polarized components with positive (anode) and negative (cathode) leads. Correctly connecting the LED with the appropriate polarity, typically indicated by the longer lead as the positive side, ensures proper operation.

5. Results and Comparison

Anticipating future outcomes, our system is poised to play a pivotal role in significantly reducing the fatality rate associated with accidents. As we project forward, we envision a sustained positive trend in safety improvement, with the implementation of our system continuing to mitigate the severity of accidents. The forthcoming years hold the promise of advancements and refinements in our system, elevating its efficacy and solidifying its position as a key driver in enhancing safety measures. Discussions surrounding these anticipated future results will likely focus on the transformative impact our system is expected to have on safety landscapes. This reduction in fatality rates, especially during periods of increased total accidents, suggests a proactive and resilient response from our system. The potential implications of these future results may extend to influencing policy decisions, safety standards, and broader societal perspectives on accident prevention. The envisaged positive trends underscore the ongoing commitment to innovation and safety enhancement, creating a foundation for discussions that anticipate, analyze, and guide the future trajectory of our system's impact on accident-related outcomes.

Conclusion

To sum up, the project that has been suggested offers a novel and comprehensive approach to addressing the pressing problems in patient care and emergency medical response. Its ability to seamlessly integrate state-of-the-art technologies with healthcare services makes it incredibly promising for further growth and improvement. By implementing these solutions, the Emergency Medical Response System aims to revolutionize emergency healthcare services, fostering a more responsive, efficient, and patient-centric approach that aligns with contemporary urban challenges. The system may also develop to support telemedicine, sophisticated resource management, and strict compliance with data protection laws. Active community participation and partnerships with several healthcare institutions will be essential to this project's success. In a constantly changing healthcare environment, this initiative is poised to continuously adapt, ensuring that patients receive prompt and efficient care during their most critical moments.

Future Scopes

Geographical Expansion

The project's impact might be further increased by expanding geographically and guaranteeing that more people have access to effective emergency medical treatment. Coordinated work would be required to incorporate the system into each region's current healthcare framework, guaranteeing that patients in any location may take use of the project's capabilities. This expansion would also include customizing the system to handle local healthcare issues and particular patient populations because healthcare demands differ by area. In the end, geographic expansion would increase the project's capacity to significantly improve patient outcomes and save lives.

Collaboration with International Health Organizations

In addition to offering access to important data and research, collaborating with international health organizations may help advance the adoption of best practices in patient care and emergency medical response. This partnership may result in the project becoming globally standardized, guaranteeing compatibility with various healthcare systems across borders. Moreover, it can support the development of uniform policies and procedures for the security and privacy of patient data. Furthermore, collaborating with global health organizations can lead to grants, money, and information sharing, which can accelerate the project's development and growth. It may make it possible to share important medical knowledge and resources, which would raise the standard of treatment given in an emergency.

Enhanced User Interface

Creating a platform that is more responsive, user-

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 05 May 2024
Page No: 1166 - 1173
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0160

friendly, and intuitive is a necessary step in improving the user interface. A simplified dashboard that enables instant hospital selection and real-time traffic light management should be available to ambulance drivers. Medical personnel want an interface that fits easily into their workflow and gives them immediate access to patient data. In order to successfully convey their demands during crises, patients need have an interface that is easy to use.

An improved user interface should also be flexible enough to adjust to various screen sizes and devices, so that it can be used and accessed on a range of platforms, such as tablets and smartphones.

References

[1]. Wortmann, F. and Flüchter, K. Internet of Things. Business & Information Systems Engineering, 57, 3 (2015/06/01 2015), 221-224.

[2]. P Suresh, JV Daniel, V Parthasarathy, RH Aswathy - 2014 International conference on science engineering (2014)

[3]. P Suresh, S Koteeswaran, N Malarvizhi, RH Aswathy - Handbook of Research on Cloud and Fog Computing (2018)

[4]. Ross A, Nandakumar K, Jain AK. Introduction to multibiometric. In:

[5]. Handbook of biometrics. Boston, MA: Springer; 2008

[6]. Nikhil Sharma, Ila Kaushik, Bharat Bhushan, Siddharth Gautam, Adithya Khamparia. "Deep Learning Strategies for Security Enhancement in Wireless Sensor Networks" ,2020.

[7]. Janelle Mason. Rushit Dave & Prosenjit Ckhatterite & leschecia Graham Allen Albert Esterline. Koushik Roy. "An investigation of Biometric Authentication in the Healthcare Environment", 2020

[8]. Hwajung yoo, Pyo min hong, Taeyong kim, Jung won yoon, and Youn kyu lee “Defending Against Adversarial Fingerprint Attacks Based on Deep Image Prior”

[9]. C. Szegedy, W. Zaremba, I. Sutskever, J. Bruna, D. Erhan, I. Goodfellow, and R. Fergus, ‘‘Intriguing properties of neural networks,’’ 2013, arXiv:1312.6199.

[10]. X. Ma, Y. Niu, L. Gu, Y. Wang, Y. Zhao, J. Bailey, and F. Lu, ‘‘Understanding adversarial attacks on ` medical image analysis systems,’’ Pattern Recognit., vol. 110, Feb. 2021, Art. no. 107332.

[11]. L. Yang, S.H. Yang.". L. Plotnick. "How the internet of things technology enhances emergency response operation".2012

[12]. Habib, Sahriar, Zawata Afnan, Sakib Anam Chowdhury, Sarah Altaf Chowdhury, and Abu SM Mohsin. "Design and development of IoT based accident detection and emergency response system." In Proceedings of the 2020 5th International Conference on Cloud Computing and Internet of Things, pp. 35-42. 2020.

[13]. P. J. Marang-van de Mheen, PhD, J. Dijs-Elsinga, PhD, W. Otten, PhD.

[14]. M. Versluijs, MSc, LLM, H. J. Smeets, MD, PhD, R. Vree, MD, PhD,

[15]. W. J. van der Made, MD, J. Kievit, MD, PhD " The Relative Importance of QualityofCare Information When Choosing a Hospital for Surgical Treatment: A Hospital Choice Experiment." 2011, IEEE.

[16]. Albine Moser Irene Korstjens. Trudy van der Weijden Huibert Tange " Themes affecting health-care consumers' choice of a hospital for elective surgery when receiving web- based comparative consumer information." 2009 International Conference on Computational Science and Computational Intelligence (CSCI),

[17]. El-Masri, Samir, and Basema Saddik. "An emergency system to improve ambulance dispatching, ambulance diversion and clinical handover communication—A proposed model." Journal of medical systems 36 (2012): 3917-3923.

[18]. Hua fu, Linning peng, Ming liu and Aiqun hu.” Deep Learning-Based RF Fingerprint Identification with Channel Effects Mitigation”.2023