

Smart Tags for Safe Medication and Her Integration

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ABSTRACT:- Integrating smart tags in healthcare, particularly relating to managing safe medications and electronic health records, reveals a substantial step forward for patient safety and medication management efficiency. Medication errors contribute to some of the most adverse consequences for patients. Implementing smart tags, such as RFID, QR codes and barcodes and wearable devices, the risk of errors can be minimized. Connecting smart tags to an electronic health record leads to access to real-time and accurate information to enhance trust that right medications are given to the right patient at the right time. The interaction between smart tags and electronic health records improves medication safety and optimizes work processes and increases patient adherence, and facilitates collaboration amongst and improving healthcare team communications. All to offer a more straightforward, trusted patient-centered delivery of health care.

1.INTRODUCTION:- In the field of health, protecting the safety and delivery of medications is a necessary responsibility in providing care. Medication errors are dangerous. As a result, it is warranted to use technologies to achieve more safety and efficiency in this process. Smart tags, such as RFID, QR codes, and wearable devices, are emerging as a promising advancement. By incorporating smart tags to an Electronic Health Record (EHR) system, medications can be tracked in real-time and verified and monitored for making sure a patient has taken the correct medication at the correct time. Along with increased safety, this integration has the potential to increase workflows in health, increase adherence to medication in patients, and facilitate communication and collaboration among providers. Incorporating smart tags with EHRs has the potential to create a more efficient, reliable and patient-centered process in administration of medication..

2.PROBLE MINEXISTING SYSTEM:- The current social protection system faces a range of problems that

impair its effectiveness and efficiency, and subsequently, the degree to which it can deliver timely, competent support to at-risk populations, is undermined. One of the prominent problem areas identified is reliance on manual and paper-based systems resulting in inaccuracies and delays, which drives up frustration for beneficiaries and caseworkers alike. The absence of transparency and accountability leave the system subject to the risk of corruption and mismanagement, and diminishes stakeholder trust and confidence. Beneficiaries can have significant barriers to accessing the social protection the system is designed to provide and may have to contend with lengthy travel to services, complicated application processes, and an overall lack of awareness related to available services, which can all lead to delayed or denied benefits. The lack of specific services or a systemwide capability to provide real time updates or feedback, increases beneficiary frustration and sense of disillusionment, and accounts for the fact that stakeholder are often completely unaware of where things sit related to their applications, benefits, etc..

3.LITERATURE SURVEY FOR PROPOSED SYSTEM:-

[1] K Hari Kishore, KV Surrendra Nath, K V N Hari Krishna, D Pavan Kumar, V Mani kanta, Fazal Noor Bhasha, International Journal of Innovative Technology and Exploring Engineering, Vol 8, Issue 6, April 2019. Resolved in the literature is a CG-CS wideband balun-LNA using asymmetric capacitive cross-coupling (A-CCC) and an auxiliary current reuse amplifier (ACRA). It achieved a low noise figure (NF) and high gain, but not a high linearity. In order to improve the linearity of balun-LNA inductive loads were proposed, but the inductive loads increased the chip area. In this paper the authors proposed a balun-LNA using modified complementary derivative superposition and asymmetric CCC-DS techniques for the ACRA and A-CCC block respectively. The inductive loads are omitted. The authors implemented balun-LNAs with and without the proposed linearization

in UMC 180 nm CMOS technology with supply of 1.2 V, and simulated them post-layout. The authors found that the proposed LNA had 7.96 dBm increase in average IIP3 compared to without the proposed linearization. The proposed LNA averaged 5.49 dBm with peak gain of 24.2 dB and minimum NF of 2.18 dB over bandwidth of 1–3 GHz. The proposed LNA.

[2] Meria M George, Nimmy Mary Cyriac, Sobin Mathew, Tess Antony, "Patient Health Monitoring System using IoT and Android", Journal for research| Volume 02|Issue 01 | March 2016, ISSN :23957549. Monitoring a person's health status at home is a challenging task. This is particularly relevant for elderly patients and those recovering from diseases such as Malaria and Pneumonia, who will require periodic monitoring and updates to their relatives about their health status. To address this need, we present a new innovative system that simplifies this task. This paper presents an automated patient health monitoring system that monitors a patient's health using sensors, and uses the internet to relay their health status to loved ones based on the system's health monitoring. A home health monitoring system can sense the patient's temperature and heartrate to monitor the patient's health. If the system notes any abrupt changes in heartrate or body temperature, the system will initiate an alert to the user or family member about the patient's health status. The proposed system focuses specifically on health monitoring based on a sensor network which interfaces with a web application. The advanced feature of our new system allows distance communication using an internet connection to innovate traditional health monitoring systems. Implementation of our proposed system would be portable.

[3] Vedat Coskun, Busra Ozdenizci and Kerem Ok, "A Survey on Near Field Communication (NFC) Technology", J. Wireless Personal Communications: An International Journal, vol. 71, pp. 2259-2294, 2013. Near Field Communication (NFC) is an innovative contactless communication technique. It enriches mobile phone ownership for billions of consumers worldwide and offers services, such as payments/loyalty applications, access keys for offices and homes, etc. Ultimately, NFC condenses these various services into one mobile phone. NFC technology is relatively new and consequently there is still limited academic literature. However, because of promising business cases, studies will start to proliferate in the near future. This paper introduces the NFC concept comprehensively and from different lenses: communication basics, standards, ecosystem and business

considerations, applications, and security issues. Throughout the paper, there are recommendations for future studies and potential research areas. This survey is intended to serve as a useful academic and business reference and discussion guide for all interested in NFC technology.

[4] N. Borisov, I. Goldberg, and D. Wagner. Intercepting Mobile Communications: The Insecurity of 802.11. CiteSeer. IST Scientific Literature Digital Library, 2001. The 802.11 standard for wireless networks includes a Wired Equivalent Privacy (WEP) protocol, used to protect link-layer communications from eavesdropping and other attacks. We have discovered several serious security flaws in the protocol, stemming from mis-application of cryptographic primitives. The flaws lead to a number of practical attacks that demonstrate that WEP fails to achieve its security goals. In this paper, we discuss in detail each of the flaws, the underlying security principle violations, and the ensuing attacks.

[5] J. Brown. Trust installs wireless at eight London hospitals: 7,000-user network supports UCLH project to replace paper processes. Computing Magazine, UK, September 2005. One of the information technology applications in the cancer care process is positive identification of patients; several studies show that misidentification in cancer care may cause many problems such as lots of medical errors due to wrong person. Improvement in cancer care processes for positive patient identification through information technology is necessary to reduce mortality and morbidity rate; because errors due to misidentification decrease patient safety. For this reason patient identity information should be clear and explicit. Applying new technologies and standardized methods of patient positive identification can prevent these errors; and enhance the quality of cancer care process.

METHODOLOGY FOR PROPOSED SYSTEM:-

The proposed digital social protection system will be designed and implemented using a user-centered and iterative approach

3. PROPOSED METHODOLOGY

Our proposed system seeks to improve road safety by determining if a motorbike rider is wearing a helmet or not using an IoT device based on the ESP32-CAM. This approach involves setting up the ESP32-CAM to be the central part of the system, as it has a camera and Wi-Fi capability. The ESP32-CAM takes pictures of the rider in real-time as they ride, which can display whether they are

wearing a helmet or not. The ESP32-CAM runs a small machine learning model that has been trained to determine if the rider is or isn't wearing a helmet. This machine learning model will initially have been trained on a labeled dataset of images of motorcycle riders, so that it could differentiate riders that were wearing a helmet from riders that weren't. The training then concluded with the model being compressed (for example, TensorFlow Lite) to deploy on the ESP32-CAM as an embedded device. Once deployed, the ESP32-CAM will take pictures and conduct inference locally and will send an alert over Wi-Fi to an IoT platform like Firebase or Blynk if the rider is not wearing a helmet. The alert can be an indication to, for example, send a notice to a mobile app, secure a database for the violation, or in more advanced mechanisms, inhibit bike ignition

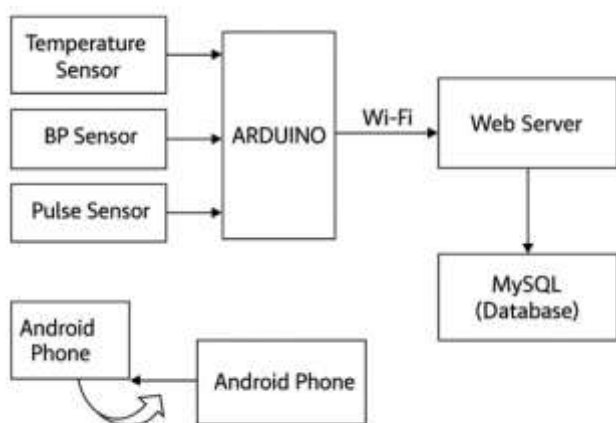


FIG1: Block diagram of the proposed system

1. Temperature Sensor:-

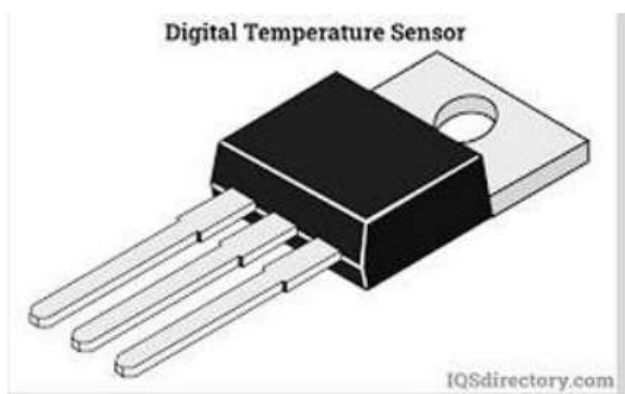


FIG: Temperature sensor diagram

The temperature sensor component is critical for precise measurements of temperature. It is made up of a sensor element, protective sheath, connection head, and temperature transmitter. The sensor element is responsible for converting temperature into an electrical signal, which is transmitted to control

systems or display devices. Temperature sensors are used in various applications, including industrial processes, medical devices, and environmental monitoring

2. BP Sensor:-

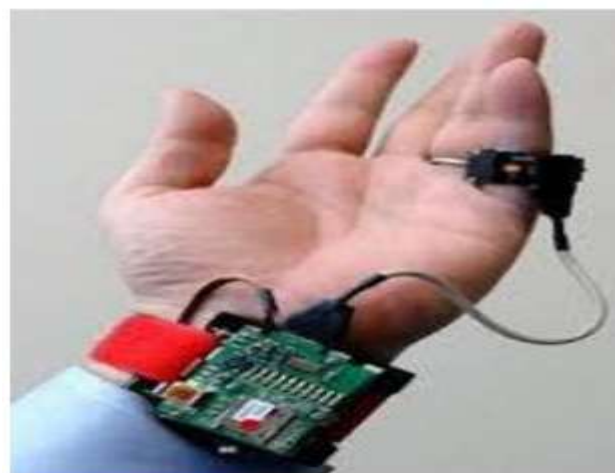


FIG2: BP Sensor diagram

These sensors can rest either on the upper arm or the wrist and supply real-time data that can be sent to a healthcare provider by way of a smartphone or any other connected device. Because BP sensors are integrated into Electronic Health Records (EHR), they prop up up-to-date, reliable information for the healthcare provider, allowing for more effective patient care and early discovery of potential ailments. Whether remote or in-clinic, BP sensors are documented to support safety, enhance management of conditions such as hypertension, and facilitate communication overall between the doctor and patient.

Pulse Sensor:-

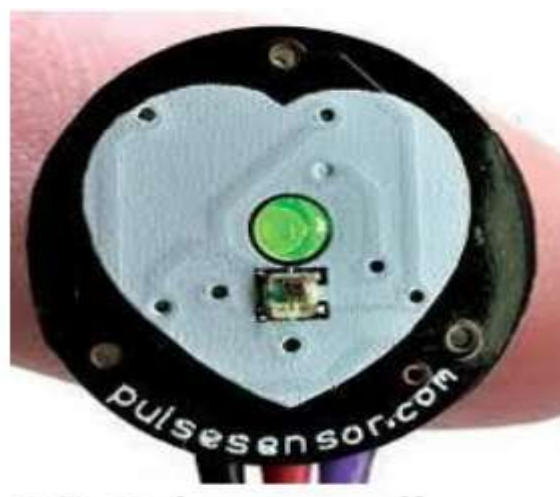


FIG3: Pulse sensor diagram

A pulse sensor is a device for measuring heart rate by monitoring the pulse, or the relaxing and contracting of blood vessels as blood is pumped throughout the body. Generally, pulse sensors are used to monitor cardiovascular health and come in a variety of forms including fingertip sensors, wrist bands, or as integrated devices in wearable health trackers. Pulse sensors measure heart rate using an optical sensor (e.g., photoplethysmography (PPG)), that senses light absorption through blood flow under the skin. They are used widely in healthcare settings for continuous heart rate monitoring, during exercise to monitor fitness levels, and for determining heart rhythm abnormalities. In a direct patient care setting pulse sensors are often incorporated with additional monitoring devices for concurrent assessment and monitoring of a patient's cardiovascular health status. Remote monitoring devices, with reporting capabilities, possess the ability to link with Electronic Health Record (EHR) collection systems which allows access to concurrent heart rate assessment by the physician, and may assist physicians in improved decision-making regarding patient care. This has a significant impact on the management of patients by providing immediate information on patients with arrhythmias or heart disease. Additionally, pulse sensors are an important aspect of wearable health devices for patient assessment in the community and for individuals to monitor their heart.

AURDINO:-

The Arduino IDE (Integrated Development Environment) is based on a simplified version of C, so coding is supply easy for the beginner yet powerful enough for advanced users. Arduino is used with a wide range of sensors, shields, and libraries to build a diverse application in DIY electronics projects, educational projects, and Internet of Things (IoT) devices. Its ease of access and flexible design make it an ideal platform for anyone interested in learning and experimenting with electronics.



FIG4: Aurdino diagram

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WIFI:- In a private context, considering a home network example, WiFi allows devices to connect to the internet and each other. Public WiFi stations, such as in coffee shops or airports, allow people to connect on-the-go with the convenience of WiFi. WiFi has become an indispensable technology in our daily lives by providing us connectivity to communicate, access information regardless of location, and link all devices to each other. As the demand and availability of wireless connectivity continues to grow, WiFi will continue to be a part of life, expected to provide even faster connectivity



FIG5: wi-fi diagram

Wi-Fi, which stands for Wireless Fidelity, refers to technology that allows electronic devices to connect to the Internet or communicate wirelessly with each other, generally using radio waves. WiFi has had such an impact on modern life that it is hard to find a smartphone, laptop, tablet, smart home device, or industrial machine that isn't connected to a Wi-Fi network (or doesn't connect wirelessly). In simple terms, Wi-Fi allows devices with Wi-Fi capability to connect to the Internet by communicating between the device and a router. This communication occurs within a certain distance (up to roughly 100 meters indoors) based on this type of wireless technology. The router will connect to the Internet via a wired internet connection (to a cable modem for instance) and the WiFi device(s) will wirelessly access the router's internet connection. Wi-Fi is based on IEEE 802.11 standards organized throughout the history of the Internet and is made available to passive Wi-Fi devices through the use of roaming access points, Wi-Fi antennae, and transmission standards (802.11a, b, g, n, ac) as well as bands.. Wi-Fi allows robots, smart devices, or the Internet of Things (IoT) to enable remote monitoring, remote control, or logging of sensor data over an Internet connection or to another IoT or smart device, allowing all connected devices to communicate in realtime regardless of distance.

Web Server:-

When the user fetches the URL, the web server receives that request and responds by supplying the appropriate web page or data. In electronics and IOT projects, in particular, projects that utilize the microcontroller models such as the ****ESP8266**** or ****ESP32****, it is possible to set up and run a web server completely on chip. This capability allows the user to view sensor data on a simple web interface or control an LED component from any browser in the same network. Web servers provide a vital tool for interactivity in digital electronics, and allow for devices to be remotely accessible, such as smart home or automation systems.



FIG :Web server diagram

MySQL(Data base):

MySQL allows users to use standard SQL or Structured Query Language commands including SELECT, INSERT, UPDATE, and DELETE to accomplish a variety of tasks with the data. MySQL databases are used in many applications such as web development, e-commerce, social media, and mobile apps*MySQL** is an accessible, user-friendly database system that stores information in an orderly manner. Think of it like a filing cabinet on your computer, but the information is stored in individual tables, all neatly organized, to access, edit, or analyze as required. In IoT and technology projects, especially with Arduino or other microcontrollers, MySQL can provide a method to ****store data**** from sensors measuring temperature, heart rate, light levels, and others. In this way, you can take readings which can, in turn, provide logs that can be viewed later from the data store instead of reading in real-time alone.



FIG: My SQL data base diagram

Android phone :



NFC tags can be used for a variety of purposes, which include being able to identify products, track inventory, provide advertising, and process mobile payments. What can these NFC tags do? NFC tags can also be used to activate functions and settings on users' mobile devices. An **Android phone** is a kind of smartphone that operates on the **Android operating system** developed by Google, which is one of the most widely adopted mobile software platforms available today. Android phones come in multiple model shapes and sizes from a variety of manufacturers (like **Samsung**, **Xiaomi**, **OnePlus**, **Motorola**, and **Google Pixel**, to name a few). The popularity of Android phones in the marketplace correlates with their flexibility, customization, and huge selection of apps available through the **Google Play Store**. Android can allow users to task anywhere from browsing the internet, use those internet-based social media apps, playing video games, take photos of very high quality, even trigger visual or auditory alerts or control smart home devices! Users who are particularly interested in technology will find Android useful and flexible. If you are using the Android phone as the primary controller for a project. In that case, you can install custom app solutions, developer tools, start integrating the phone, sensors, and/or microcontrollers (like **Arduino** and **ESP32**) into your DIY project. So, the Android smartphone can control lights, read the data from sensors, or even get alerts from your home automation system. Since you're using the Android phone for daily use or the main interface in a tech solution, you will find that an Android phone is a powerhouse of functional flexibility



ADVANTAGES:

- 1. Improved Efficiency:** Automation and digitalization of social protection services can reduce processing time and increase efficiency.
- 2. Enhanced Transparency:** Digital platforms can provide real-time updates and tracking, reducing corruption and increasing transparency .
- 3. Increased Accessibility:** Digital services can reach remote and marginalized communities, increasing access to social protection services .
- 4. Personalization:** Digital platforms can tailor services to individual needs and circumstances.
- 5. Cost Savings:** Digitalization can reduce administrative costs and improve resource allocation.
- 6. Data-Driven Decision Making:** Digital platforms can provide valuable insights and data, informing policy decisions and improving service delivery .
- 7. Enhanced Security:** Digital platforms can ensure secure storage and transmission of sensitive information.
- 8. Real-Time Monitoring:** Digital platforms can enable real-time monitoring and evaluation, improving program effectiveness

APPLICATIONS:-

- 1. Medication Verification** Ensures the right patient receives the right drug and dosage by scanning smart tags linked to EHRs
- 2. Patient Identification** Smart tags on wristbands quickly access patient information, reducing errors during treatment.

3. Automatic Medication Recording (eMAR Integration) Updates medication administration records in real-time, minimizing manual entry and improving accuracy.

4. Medication Adherence Monitoring Smart dispensers or tagged packaging track if a patient has taken their medication, syncing data to the HER

5. Real-Time Alerts and Notifications Sends warnings for wrong medications, missed doses, or potential risks based on the patient's medical history

EXPECTED RESULTS:-

Parameters	Details
1. Processing Time:	Reduction in time taken to process social protection services.
2. Automation Rate:	Increase in automation of social protection services.
3. Transparency Index:	Improvement in transparency of social protection services.
4. Accessibility Rate:	Increase in accessibility of social protection services to remote and marginalized communities.
5. Data Quality	Improvement in quality of data used for decision making.
6. System uptime & Reliability:	Expected continuous operation: 24/7 with proper power supply. System failure probability: less than 2% under normal operating conditions.



REFERENCES:-

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- George et al. (2019): "Digital Platforms for Social Protection: A Case Study of India" - This case study

examines the implementation of digital platforms for social protection in India, highlighting lessons learned and best practices

- World Bank (2020): "Digital Social Protection: A Guide for Policymakers" - This guide provides an overview of the key considerations for policymakers implementing digital social protection programs, including design principles, technology options, and implementation strategies

- Singh et al. (2018): "Feasibility of Digital Technologies for Delivering Social Protection Services in Remote Areas" - This study assesses the feasibility of using digital technologies to deliver social protection services in remote areas, highlighting the potential benefits and challenges.

- UNICEF (2019): "Innovating for Children: Using Digital Technologies to Improve Social Protection" - This report highlights the potential of digital technologies to improve social protection outcomes for children, including increased access to services, improved targeting, and enhanced accountability