International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

RFID –Based E-Canse Paper: A Smart Patient Record Management System

Prarthana Shivaji Jadhav[1], Dhanashri Uttam Gaikwad[2], Shravani Sayaji Gurakhe[3], Apurva Pandurang Kumbhar[4]

[1,2,3,4]Department of Computer Engineering D. Y. Patil Technical Campus, Talsande. Faculty of Management & Faculty of Engineering, India.

Abstract

The healthcare sector requires fast, secure, and accurate access to patient data. Traditional paper-based systems lead to delays, data loss, and inefficiencies. This research proposes an RFID-based E-Case Paper system that automates patient record management using RFID technology, IoT, and a web-based interface. Each patient is assigned a unique RFID card, which enables instant retrieval of medical history when scanned. The system integrates ESP32 microcontroller, MySQL database, and Streamlit framework to provide real-time data access. The proposed system improves efficiency, reduces manual work, and enhances healthcare service quality.

Keywords: RFID, Hospital Management System, IoT, ESP32, Streamlit, Patient Record Management, Healthcare Automation, Database Management, Real-Time Data Access

1. INTRODUCTION

The healthcare sector is increasingly adopting digital technologies to improve efficiency and patient care. However, many hospitals still use traditional paper-based systems for maintaining patient records, which are time-consuming, error-prone, and difficult to manage. Retrieving patient information in such systems can take a long time, especially during emergencies.

To address these issues, the RFID-Based E-Case Paper system is developed as a smart solution for managing patient records. This system uses Radio Frequency Identification (RFID) technology to identify patients through unique RFID cards. When the card is scanned using an RFID reader connected to an ESP32 microcontroller, the patient's data is instantly retrieved from a centralized database.

The system also includes a web-based interface developed using Streamlit, which allows doctors to view and update patient records easily. By integrating IoT, database management, and web technologies, the system reduces manual work, improves data accuracy, and provides fast access to patient information. This approach helps in creating an efficient, reliable, and modern healthcare management system.

2. LITERATURE REVIEW

Several studies have been conducted on hospital management systems using digital technologies such as Electronic Health Records (EHR), RFID, and IoT. Researchers have focused on improving patient data management by reducing manual work and increasing system efficiency.

Some studies show that RFID-based systems provide faster and more accurate patient identification compared to traditional methods. Other research highlights the use of IoT and web-based applications for

real-time data access and better system automation. However, challenges such as data security, cost, and internet dependency still exist.

This paper builds on previous work by implementing an RFID-based patient record system integrated with IoT and a web-based interface for efficient data management.

"RFID-Based Healthcare System"

Authors: A. Sharma et al. This study used RFID technology for automatic patient identification and record management, reducing manual errors and improving efficiency.

"IoT-Based Smart Hospital System"

Authors: P. Kumar et al. This paper focused on integrating IoT devices with hospital systems to enable real-time data access and improve automation.

3. PROPOSED SYSTEM

The proposed system is an RFID-based ECase Paper system for smart patient record management. It uses RFID technology and IoT to identify patients and retrieve their medical records instantly. Each patient is assigned a unique RFID card, which is linked to their digital data stored in a database.

The system consists of the following stages:

1. Patient Registration
2. RFID Card Assignment
3. RFID Scanning
4. Data Retrieval from Database
5. Record Management (View/Update)
6. Output Display on Web Interface

The system is implemented using Python programming language with Streamlit for the web interface and a database for storing patient records.

4. DATASET DESCRIPTION

The dataset used in this system consists of patient records stored in a centralized database. It contains information such as patient ID, name, age, gender, blood group, contact details, medical history, diagnosis, prescriptions, and appointment details. Each patient is assigned a unique RFID number, which is used to identify and retrieve their records from the database. The dataset is continuously updated whenever new patients are registered or existing records are modified by the doctor.

Basic data preprocessing is performed to ensure accuracy and consistency, such as handling missing values and maintaining proper data format. This structured dataset helps in efficient storage, retrieval, and management of patient information in real time.

5. METHODOLOGY

Initially, patient data is collected and stored in a centralized database through the registration process. Each patient is assigned a unique RFID number, which is linked to their records. When the RFID card is scanned using the reader, the system retrieves the patient's data from the database.

The retrieved data is displayed on a web interface where doctors can view and update medical records. The system ensures proper data handling and maintains consistency by updating records in real time. This methodology enables fast, accurate, and efficient management of patient information.

VI.TECHNOLOGIES USED

The following technologies are used in this system:

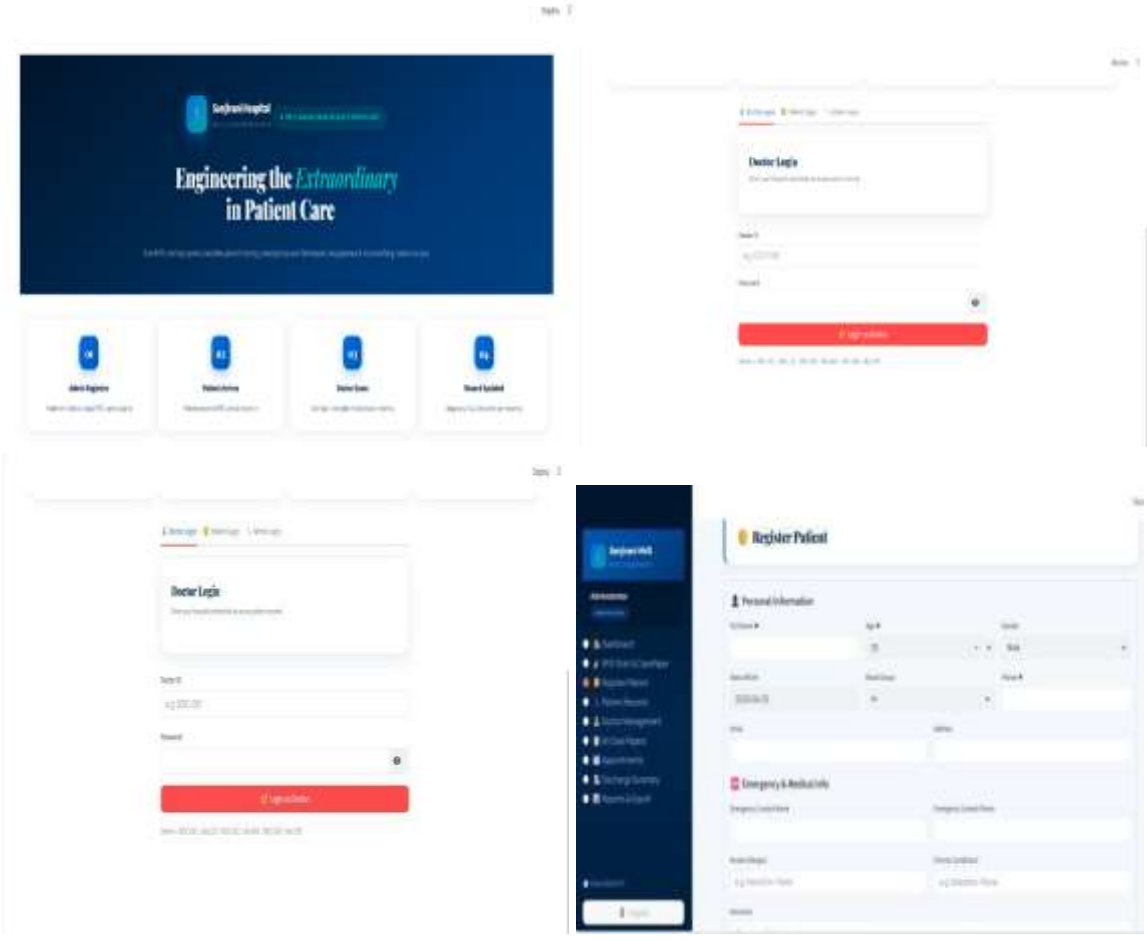
- **RFID (Radio Frequency Identification**): Used for unique patient identification through RFID cards.
- **ESP32 Microcontroller:** Acts as an interface between RFID reader and the web system for data transmission.
- **Streamlit:** Used to develop a user-friendly web interface for doctors and admin.
- **Database (MySQL/JSON):** Used for storing and managing patient records securely.
- **Python:** Used for backend logic and system implementation.

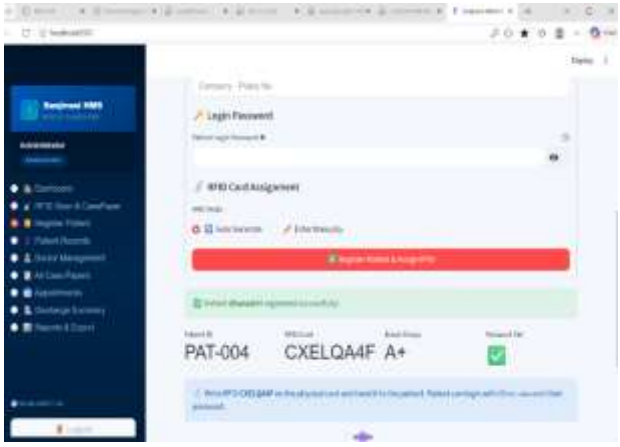
These technologies are integrated to provide fast, reliable, and real-time patient record management.

6. RESULTS AND DISCUSSION

The system performance is evaluated based on its ability to quickly and accurately retrieve patient records using RFID technology. The results show that the system successfully identifies patients and displays their data instantly on the web interface.

The implementation reduces manual effort and improves the speed of accessing patient information. The system is reliable, userfriendly, and ensures efficient management of medical records. It can serve as a helpful tool for healthcare professionals in hospitals.





7. CONCLUSION

This paper presents an RFID-based E-Case Paper system for efficient patient record management. The system uses RFID technology and IoT to provide quick and accurate access to patient data. It reduces manual work and improves the overall efficiency of hospital operations.

The results show that the system is reliable and user-friendly for healthcare professionals. In the future, the system can be enhanced by integrating cloud storage, mobile applications, and advanced security features to improve accessibility and data protection.

8. FUTURE SCOPE

The proposed RFID-based E-Casepaper system has significant potential for further enhancement and real-world deployment in healthcare environments. In the future, the system can be fully integrated with a **web-based and mobile application platform**, enabling doctors and hospital staff to access patient records instantly through RFID scanning, improving efficiency and reducing manual paperwork.

REFERENCES

1. K. Finkenzeller, *RFID Handbook: Fundamentals and Applications in Contactless Smart Cards, Radio Frequency Identification and Near-Field Communication*, 3rd ed., Wiley, 2010.
2. H. B. Ma and L. Y. Zhang, "RFID-Based Smart Hospital Management System," *IEEE Access*, vol. 7, pp. 1–10, 2019.
3. S. K. Singh and M. Singh, "Design of Smart Healthcare System Using RFID Technology," *International Journal of Computer Applications*, vol. 182, no. 5, pp. 1– 5, 2018.