



# QR based Hospital Health Card

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**Abstract:** The proposed web application is designed to provide a platform for patients and doctors to interact efficiently and effectively. The patient panel includes several features that enable patients to manage their medical data, book hospital appointments related to their health issues, read blogs on their diseases, purchase online medicines through the pharmacy, and use QR codes to access their medical information. The doctor panel, on the other hand, enables doctors to manage their appointments with patients, retrieve patient data through QR code scanning, and check the contents of medicines prescribed to patients. The application is built on modern web development frameworks such as ReactJS, NodeJS, and MongoDB, which provide a secure and scalable environment for data management. The proposed methodology includes a development process that incorporates rigorous testing and quality control to ensure that the application meets the highest standards of usability and security. The technology stack includes modern web development frameworks that offer the flexibility and scalability necessary to accommodate future expansion and growth. The potential results and outputs of the proposed web application are significant. By enabling patients to manage their medical data and access healthcare services online, the application can enhance patient engagement and satisfaction. Doctors can also benefit from the application by managing their appointments and accessing patient data quickly and efficiently. The web application has the potential to reduce healthcare costs by enabling patients to access healthcare services remotely, reducing the need for physical consultations. The application can also improve patient outcomes by providing patients with easy access to healthcare services, enabling them to manage their health more effectively.

**Keywords:** QR code, Health Card, Encryption, Cryptography, Decryption.

## I. INTRODUCTION

The proposed web application is designed to cater to the needs of both patients and doctors in the healthcare industry. The patient panel of the application provides a range of features, including the ability to manage medical data, book appointments, read disease-specific blogs, purchase online medicines, and use QR codes to access medical information. These features allow patients to take control of their healthcare needs and make informed decisions regarding their health.

The doctor panel, on the other hand, provides features such as appointment management, patient data retrieval through QR code scanning, and medicine content checking. The application enables doctors to manage their appointments with patients effectively, retrieve patient data quickly and efficiently, and ensure that the medicines they prescribe contain the right ingredients in the right doses. By providing a platform for patient-doctor interactions, the proposed web application has the potential to revolutionize the healthcare industry. The application enables patients to access healthcare services remotely, reducing the need for physical consultations, and providing a more convenient and cost-effective way of managing their health. Additionally, the application can improve patient outcomes by providing patients with easy access to healthcare services and enabling them to manage their health more effectively.

For doctors, the proposed web application can enhance patient care by providing them with a comprehensive patient profile, including medical history, treatment plans, and medication details. This information can help doctors make informed decisions regarding patient care, leading to better health outcomes. In summary, the proposed web application is an innovative solution that caters to the needs of both patients and doctors in the healthcare industry. By providing a platform for efficient and effective patient-doctor interactions, the application can enhance patient engagement, reduce healthcare costs, and improve patient outcomes. The application's features and functionalities are designed to provide a secure and scalable environment for data management and ensure its usability and accessibility to a wide range of users.



## II. PROBLEM STATEMENT

In many countries, individuals require a health card to access medical services, obtain prescriptions, and receive treatments. The current paper-based system for managing health cards is often inefficient, time-consuming, and prone to errors. Patients and medical professionals face challenges in retrieving and updating health card information, leading to delays, mistakes, and potential risks to patient health. Furthermore, the lack of a centralized system for managing health cards makes it difficult to track and analyze healthcare trends, allocate resources, and make informed policy decisions.

Therefore, there is a need for a digital QR based Health Card Management System that enables patients, medical professionals, and healthcare providers to easily access, update, and share health card information using a unique QR code for each patient. The system should be secure, reliable, and scalable to handle large volumes of data. By scanning the QR code using a mobile device, medical professionals can easily access and update the patient's health card information, including their health history, prescriptions, and treatment plans. This would reduce the need for paper-based records and improve the efficiency of healthcare services. The system should also be designed to facilitate data analysis, reporting, and decision-making to improve healthcare services and outcomes.

## III. LITERATURE SURVEY

[1] Coronavirus, often known as the epic Covid 2019, is a persistent infection that spread quickly over the world. The outbreak has a rising influence on daily life and impacts hundreds of thousands of individuals. The ecology and the world economy were also impacted. The key issue is that it is highly challenging to identify positive cases as early as feasible, to stop the disease's rapid spread, and to provide prompt treatment for the patients in the country's densely populated environment. This project proposed by Hiba K.F et al. (2021) aims to give medical professionals advice on how to use the "Health Monitoring System" to lower such viral flus. The creation of Android applications is the major emphasis of this project. It is primarily addressed to the individuals under quarantine. These folks will be asked for their information in order to gather it. By employing a QR code and a questionnaire, this application collects the information of individuals who took the Covid'19 test. By gathering user information, this application offers physically contactless and wireless technology to help stop the disease from spreading. Here, people's information and outcomes are communicated to the applications by scanning QR codes. The key benefits of this project are that health staff do not need to contact patients personally to inquire about their health.

[2] They provided a thorough summary of Chengdu's health code application in the hospital triage system, healthcare programme for pregnant people and kids who are in quarantine, and circle-layer management (a set of strict confinement measures of places confirmed cases and close contacts have recently been to and less strict quarantine measures of surrounding areas). In addition, they examined the number of distinct cases with epidemiological history or confirmed COVID-19 infections, pregnant women's attitudes towards the summer outbreak and healthcare services, the time required to collect epidemiological history, and the accuracy of the hospital triage system based on health codes. Chen S et al. (2021)

[3] In Zimbabwe, the delivery of healthcare is hierarchical, and patients must carry their physical medical record card while moving from one level of care to the next higher level. A medical record card proposed by Sibanda k et al. (2015) contains details about the patient's medical history, current medications being taken, allergies that have previously been known to exist, and other things. Such patient information is vulnerable to tampering, loss, and misinterpretation when it is recorded on a medical health card, in addition to being vulnerable to confidentiality violations. In this article, we suggest using Quick Response (QR) codes to communicate and safeguard this private patient data from one level of the healthcare delivery system to another.

[4] Due to the enormously expanding population and the enormous and quick shift to the digital world following the COVID-19 epidemic, people of all ages are now utilising technology like never before. In many ways, the years 2020–2021 have emerged as the global period of the digital boom across all industries and age groups. Several business concepts and technological advancements have emerged to make it easier for consumers to manage tiny everyday tasks like payments, health care, electricity bills, and others right away without the actual requirement to submit the data in hard copy. This invention uses IoT and RFID technology to relieve users of the hassle of carrying numerous cards for various purposes. As many industries as possible will be automated and integrated into the planned research's single card system. We can therefore proceed by just tapping our RFID card on the system. People can eliminate their need for several bank cards by combining all of their daily-use cards into a single RFID card. Gupta A et al. (2022).

[5] The availability of patient records is one aspect that affects the standard of medical care. In order to facilitate the sharing of complete lifetime patient records among healthcare providers and encourage broader usage of it, quick and easy access



to patient records is required. However, there have only been a few studies on how better access to these records can result in the acquisition of a complete lifetime patient record. This study proposed by Emran N.A et al (2014) will explain the conceptual model of data accessibility in the healthcare domain. The model will use QR code technology as a mechanism to provide cross-platform data access points. We will share comprehensive, current lifetime patient records through incremental data upgrades.

[6] The unique coronavirus disease (COVID-19) caused the temporary closure of schools, colleges, institutions, companies, and businesses by continuously destroying healthcare systems around the world and obstructing human movement. Governments, working in tandem with the World Health Organization (WHO), place a strong emphasis on population vaccination in order to lessen the devastation caused by the new COVID-19 variant. However, several nations have seen a sharp rise in new infections and fatalities that are linked to lax enforcement of laws, fraudulent COVID-19 certificates, reluctance to adopt digital health technologies, a taxed healthcare system, a lack of personal protective equipment, social risk behaviors, inadequate immigration policies and standards, and a lack of a standardized and synchronized regional and international health information system that supports the regular sharia. For many health systems, accessing COVID-19 data and patient health history data is still a problem. In order to ensure safe regional and global movement of individuals during the pandemic, we therefore suggest the deployment of secure fast response code-based regional and worldwide health systems to monitor migration trends, confirm COVID-19 test results, and certify vaccination certificates. Kavuu T.D. et al.(2022)

[7] The only method to prevent the spread of tuberculosis (TB) and eradicate it is by early detection. To assure the discovery and exploration of any other lung abnormalities, such as lung cancer, expert interpretations are always necessary. One of the most difficult jobs to do is the detection of TB disease by completely automated chest radiography (CXR) image analysis. This technique aims to propose e-health care measuring strategies for CAD systems that automatically detect tuberculosis (TB). This work proposed by Raja et al.(2023) presents the formulation of colour patterns and randomised key driven QR pattern creation for WBAN authentication. Here, the R, G, and B channel integration is developed based on user-defined key values and is utilised to validate the genuine patients with increased security. Together with enabling an authentication mechanism for managed data access, etc., this quick response (QR) pattern. This work begins with an active contour model-based deformable gradient-based lung ROI segmentation. The multi-level Gray level co-occurrence matrix (GLCM) texture feature creation and shape feature set are then carried out after the oriented texture categorization. The completion of a template-based electronic health care system includes authenticated data assessment and highly secured patient validation. Experimental findings further demonstrate the robustness of colour QR variant pattern analysis and validate its adaptability and embedding capability.

[8] For cancer patients having immune-related adverse events, prompt access to toxicity management information ensures prompt access to steroids/immunosuppressive medication, lowering length of hospital stays or completely avoiding hospital admission. The initiative to include a QR (quick response) code onto a patient-held immunotherapy alert card is covered in this article. The costs of adding a QR code into the warning card, after printing, were cheap while the potential advantages are enormous because QR code generation is free and the immunotherapy clinical management algorithms were already made available to the public through the trust's clinical network website. Patients getting anti-cancer treatment frequently utilise patient-held alert cards, and this well-established standard of care has been changed to allow quick access to information by incorporating a QR code. Marshall E et al.(2017)

#### IV. PROPOSED METHODOLOGY

The first step in developing a QR based Health Card Management System is to design the system architecture and user interface. This includes defining the system requirements, selecting appropriate technologies and tools, and designing the user interface to ensure ease of use and accessibility. The next step is to generate a unique QR code for each patient's health card. This can be done using a secure algorithm that generates a unique code for each patient, and stores it securely in a database. Once the QR code is generated, patients can register for the system using their personal information and health card details. This information can be verified and authenticated by the healthcare provider to ensure accuracy. The QR based Health Card Management System can be integrated with existing healthcare systems, including Electronic Medical Record (EMR) systems and medication management systems, to ensure accurate and up-to-date patient information. Medical professionals can scan the QR code using a mobile device to retrieve the patient's health card information, including their health history, prescriptions, and treatment plans. The system can also allow medical professionals to update the patient's health card information in real-time, ensuring accurate and up-to-date records. The system can be designed to facilitate data analysis, reporting, and decision-making to improve healthcare services and outcomes. This includes analyzing healthcare trends, resource allocation, and making informed policy decisions based on the data collected. The system should be designed to ensure the security and privacy of patient data. This includes implementing appropriate security measures such as access control, encryption, and data backups, and complying with relevant data protection laws and regulations.

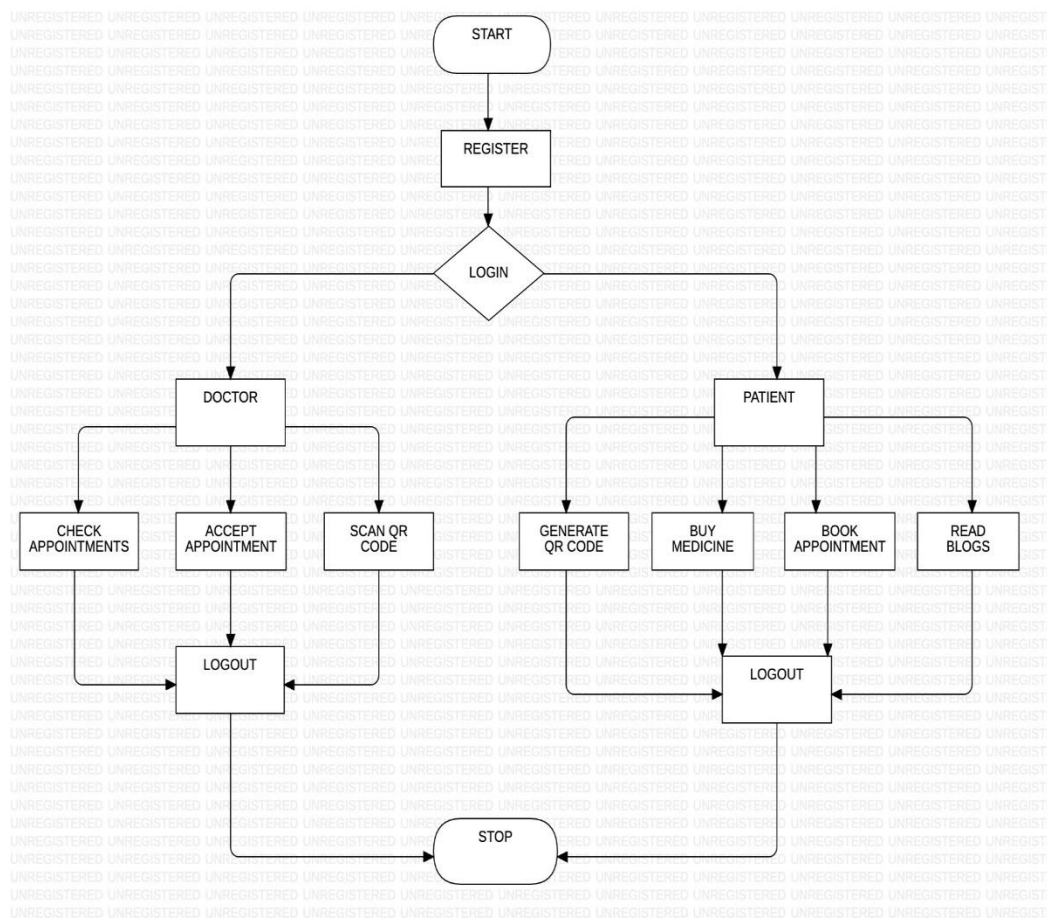


Figure 1: Flowchart

## V. RESULTS

The proposed web application has the potential to revolutionize the healthcare industry by providing a user-friendly and efficient platform that facilitates patient-doctor interactions. Patients can access a range of healthcare services through the online platform, including managing their medical data, booking appointments with healthcare providers, accessing healthcare services, and purchasing medicines through the online pharmacy. This can reduce the time and effort required for patients to access healthcare services, which can lead to better patient outcomes and an overall improvement in healthcare quality.

On the other hand, doctors can manage appointments more effectively, retrieve patient data through QR code scanning, and check medicine contents. These features can help doctors provide better care to their patients and improve their overall productivity. The potential output of the proposed web application can have a significant impact on the healthcare industry, as it can potentially improve patient outcomes and reduce healthcare costs by leveraging digital technologies. This can also improve access to healthcare services for patients living in remote or underserved areas. However, the success of the application will depend on various factors such as user adoption, scalability, and security. Further research can explore the impact of the application on patient-doctor interactions and healthcare services.

## VI. CONCLUSION

The healthcare industry has been undergoing a significant transformation with the adoption of digital technologies. The proposed web application is a step towards digitizing patient-doctor interactions and providing online healthcare services. By allowing patients to manage their medical data, book appointments, access healthcare services, and purchase medicines through the online pharmacy, the application can potentially enhance patient outcomes and reduce healthcare costs. Additionally, by enabling doctors to manage appointments, retrieve patient data through QR code scanning, and check medicine contents, the application can improve the efficiency of healthcare services.

However, the success of the proposed web application will depend on various factors such as user adoption, scalability, and





security. It is crucial to ensure that patients and doctors find the application easy to use, and the platform can handle a significant number of users without compromising its functionality. The application must also comply with data protection regulations and maintain high levels of security to protect patient data. Future research can explore the impact of the proposed web application on patient-doctor interactions and healthcare services. The application's effectiveness can be evaluated by measuring factors such as patient satisfaction, patient outcomes, and healthcare costs. Further research can also explore the scalability and security of the application in real-world scenarios.

In conclusion, the proposed web application has the potential to revolutionize the healthcare industry by enhancing patient-doctor interactions and providing online healthcare services. However, it is essential to ensure that the application is user-friendly, scalable, and secure to achieve its intended goals. Future research can provide valuable insights into the application's impact on patient-doctor interactions and healthcare services, leading to further improvements in the platform.

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