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Smart Health Checkup Report Locker Using Android Application

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***Abstract* - For this study, we developed a QR code ID tag system to be integrated into the healthcare system. This system provides QR code based medical ID alerts and hospital patient ID system. A unique QR code is assigned to each member of the medical system. These QR codes are linked to the QR Code Identity website, which stores detailed information. A smartphone or a separate QR code scanner can be used to scan the code. The design of this system allows authorized individuals (e.g. paramedics, physicians, lab assistants) to access more detailed patient information than the average smartphone user, which EMS professionals have access to allow patients' physicians to access it to verify the accuracy of the to improve medical treatment. The healthcare system is hierarchical and when transferring patients from a lower level to a higher level of healthcare, patients must carry their physical medical records with them. A medical record contains information about the patient's medical history, pre-existing allergies, health conditions, prescription medications the patient is currently taking, among other things. Recording this patient information on a health record makes it vulnerable to alteration, loss and misinterpretation, as well as breaches of confidentiality. In this article, we propose the application of QR (Quick Response) codes to secure and transmit this sensitive patient information from one layer of the healthcare system to another. Other security methods such as steganography could be used, but in this article we propose the use of QR codes due to the high proliferation of mobile phones in the country, their high storage capacity, flexibility, ease of use and ability to maintain integrity.**

Keywords: Smart Health, Checkup, Report Locker, Android Application.

I. INTRODUCTION

QR codes in healthcare industry and hospital marketing can be of great benefit to patients and healthcare providers in terms of communication and treatment. Smartphones have improved convenience and speed, especially after the advent of technology services like online medical appointment apps, patient management platforms, EHRs, AI-based devices, etc. Although QR code technology, in the form of 2D barcodes, has been around for over 20 years, the concept is relatively new to the healthcare industry. That's not because the healthcare industry isn't advancing treatments and technology, but because smartphones have only recently become mainstream in healthcare.

Failure to properly coordinate a patient's care has resulted in hospital readmissions, higher medical costs and lower quality of care. The two main aspects of good care coordination include the ability to communicate with multiple parties and the ability to share accurate data. It can be seen that today's healthcare providers coordinate care through the use of shared data sources, phone calls, faxes, mail delivery or text messaging. These existing solutions do not support exactly the right platform needed for proper care coordination. For example, healthcare providers may be difficult to reach due to wait times, poor contact, or poor communication on a weak line. In this project we try to improve the coordination of care by implementing a mobile messaging application equipped with QR code technology.

II. PROBLEMS STATEMENT

Patient reports and files were managed manually in the early days, files were also kept in drawers and rooms. Because of this, the possibility of data loss becomes very high. After that time, a modern era of computers was introduced and many management systems were introduced in the market to reduce manual labor and create or maintain all records using computers, such as: Traditionally, healthcare systems have always evolved as isolated architectures. Patient data from one system or service may not exist in another system or service.

Since the current system is file-based, the hospital management has to make great efforts to secure the files. They are easily damaged by fire, insects, and natural disasters. It could also get lost and lose data and information. Limited file space is another problem they are currently facing with manual management. A problem arises with the organization of data information and schedules and the proper execution of the process, resulting in the malfunction of the manual system. If we want to look at a patient's history or any other administrative detail, we're in big trouble. Finding a record in

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a file is a long and difficult process. File management is time consuming and wastes many valuable man hours.

III. LITERATURE SURVEY

Evaluation and implementation of QR Code Identity Tag system for Healthcare in Turkey, The Health Transformation Program reform platform, with its motto of "People First," has been a major contributor to this successful improvement. The Turkish government is now putting the second phase of this program into action to enhance governance, efficiency, and quality in the health sector. As part of the health reforms, legal changes have been made within the Ministry of Health such as restructuring and reorganization of its units and affiliates. The restructuring efforts strive to empower the management function and improve its health system policy development, planning, supervision, monitoring, and evaluation. To reinforce the position in healthcare service provision the Public Health Institution has been created.

QR Code Based Patient Medical Health Records Transmission: Zimbabwean Case, Patient emergency information is accessed through the QR code's embedded web link. Emergency personnel access the emergency information by scanning the QR code with a smartphone. Many QR code-based medical identification alert services are available worldwide. We have developed a QR Code Identity system to be integrated into the Turkish healthcare system. It consists of a QR code-based medical identification alert system and a patient identification system for hospital environments. Therefore the system has to be cost-efficient and easily implemented. These requirements make QR code technology the best choice for our system, which will be used for both QR code-based medical identification alerts and patient identification in hospitals. A unique QR code tag is generated for each member of the medical identification alert system and each patient. When used to facilitate medical identification alerts, the QR Code Identity can be placed. The QR codes contain links to the QR Code Identity web page, which contains detailed information about the QR code holder. The code is scanned and decoded using the smartphone application or any QR code scanner. This application provides hierarchical levels of privacy, so that emergency medical responders (e.g., paramedics, firefighters, or police) can access more details than the average smartphone user can. Emergency medical responders and medical care providers can instantly retrieve a patient's medical history to provide more informed medical care.

IV. PROPOSED SYSTEM

QR codes in healthcare industry and hospital marketing can be of great benefit to patients and healthcare providers in terms of communication and treatment. Smartphones have improved convenience and speed, especially after the advent of technology services like online medical appointment apps, patient management platforms, EHRs, AI-based devices, etc. Although QR code technology, in the form of 2D barcodes, has been around for over 20 years, the concept is relatively new to the healthcare industry. That's not because the healthcare industry isn't advancing treatments and technology, but because smartphones have only recently become mainstream in healthcare.

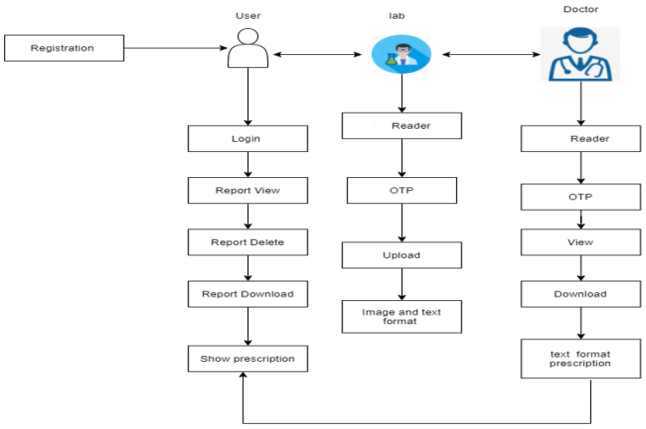

Figure 1: Proposed system

Healthcare providers today can be seen to coordinate care with the use of shared data sources, phone calls, faxes, postal mail delivery, or text messaging. These existing solutions do not accurately support the proper platform needed to properly coordinate care. For example, phone calls can be challenging in order to communicate with healthcare providers due to wait times, incorrect resources being reached or miscommunication over a weak line. In this project we seek to improve care coordination by implementing a mobile messaging application equipped with QR code technology. A QR code is a machine-readable barcode used in the application of product tracking, marketing, document management, item identification and more. The benefits include efficiency in storing data, greater data storage, andquick readability. An implementation of QR code technology which can be used to store general medical data and be scanned to display the general medical data to improve the coordination of care is presented.

V. SYSTEM DESIGN AND RESULT DISCUSSION

Due to time sensitive circumstances, the goal of this project is limited to a completed implementation and a plan for future beta testing. This project will implement a mobile application utilizing QR code technology to store and read general medical data. Along with the implementation of this project, a plan for future beta testing will be structured to verify the application's proof of concept. The implementation includes the following:

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- An alpha test plan will test all core application features with each test case and actual result.
- A beta test plan will be formed for future pilot testing purposes to verify the application's proof of concept.
- A landing page will be formed which will include FAQs, Privacy Policy, Terms of Service and contact information.
- A new user will have the ability to login as a new account or returning user.
- A user will have the ability to fill in, edit, and save their general medical information within the app.
- A user will have the ability to view their QR code image. By scanning the QR code image within the app, the user's general medical and primary care physician information will be displayed.
- The doctor will have the ability to edit the user's general medical information as well in order to reflect up-to-date information when the user's QR code is scanned.

Data Flow Diagram

A data-flow diagram is a way of representing a flow of data through a process or a system (usually an information system). The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow — there are no decision rules and no loops. Specific operations based on the data can be represented by a flowchart.

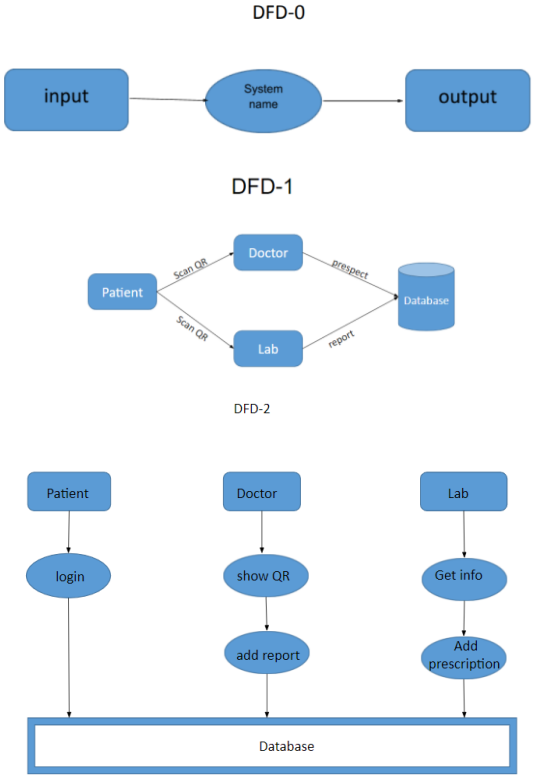


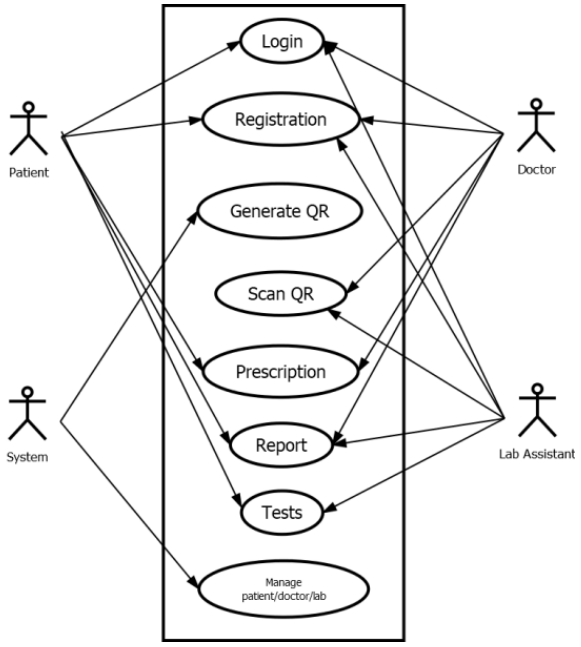
Figure 2: Data flow diagram of levels

The data-flow diagram is a tool that is part of structured analysis and data modeling. When using UML, the activity diagram typically takes over the role of the data-flow diagram. A special form of data-flow plan is a site-oriented data-flow plan.

Data-flow diagrams can be regarded as inverted Petri nets, because places in such networks correspond to the semantics of data memories. Analogously, the semantics of transitions from Petri nets and data flows and functions from data-flow diagrams should be considered equivalent.

UML Diagram

A use case diagram is a graphical depiction of a user's possible interactions with a system. A use case diagram shows various use cases and different types of users the system has and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses. The actors are often shown as stick figures.



Sequence Diagram

A sequence diagram or system sequence diagram (SSD) shows object interactions arranged in time sequence in the field of software engineering. It depicts the objects involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of scenario.

Sequence diagrams are typically associated with use case realizations in the logical view of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.

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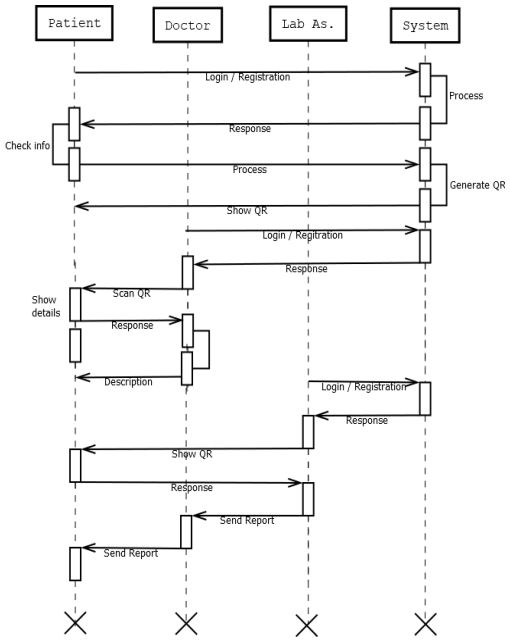

For a particular scenario of a use case, the diagrams show the events that external actors generate, their order, and possible inter-system events.[1] All systems are treated as a black box; the diagram places emphasis on events that cross the system boundary from actors to systems. A system sequence diagram should be done for the main success scenario of the use case, and frequent or complex alternative scenarios.

VI. CONCLUSION

This application will help improve the outdated filing system in hospitals and keep our data safe. This app helps doctors and nurses to manage and update data digitally through their mobile phones. This application helps hospital staff to properly manage data in cloud and not store handwritten data in warehouses. From this it can be concluded that this app will not only help the hospital staff and doctors but also the patients as their data is now safe and difficult to erase. The data will also be very useful in the future to apply data science and machine learning algorithms to it. We create a management system for hospitals based on QR codes. In doing so, the QR code will be used as a label or identifier of the patient, thanks to which the large amount of patient information, will be accessible in the application that will be installed on a mobile phone or tablet. The QR code is used to scan patient information with the mobile phone or tablet camera on demand. We use the QR code because it's cheap and fast.

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