

Healthcare System by Using QR Code Strategy

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Abstract: As seen in the past few decades, it is very common to observe the patient's paper work at the hospital. Even though the same personal information is used, an unusual way to actually decrement the amount of these paper works does not exist. The development of mobile web provides development direction for medical industry and a new service mode. In this paper, we introduce QR code based e-health authentication system to obtain patient's health record easily and securely in the local hospital and also to reduce the redundant paper work. One of the aims of this project is to use the dataset and machine learning techniques to predict the type of disease based on the symptoms. A QR code which includes predicted disease and personal information of patient is sent to the doctor automatically via email. Further the doctor sends a QR code generated prescription to the patient which is scanned by the pharmacist. Here, we describe an integrated system, developed for use by the healthcare personnel within healthcare facilities, adapted to all handheld devices. With our proposed scheme, we believe that it will improve efficiency in terms of the cost and time for the patient, hospital and the doctor and protect patient's personal information.

Keywords: Healthcare System, QR Code Strategy

1. Introduction

Medical data is an ever growing source of information generated from hospitals consisting of patient records in the form of hard copies which can be made easier and convenient by using QR code of the patient details. Our aim is to build a Health-care Portal system which will provide the features like clinical management, patient records, disease prediction and generate QR code for every patient as per their updated disease information. Disease is being predicted by KNN algorithm and doctor recommendation by Apriori algorithm.

Keeping track of all the activities and records is very error prone for the hospital authorities. It is also very inefficient and time consuming process. Recording and maintaining the records are highly unreliable. It is also not economically and technically feasible to maintain the records on paper. The main aim of project is to provide paper-less up to 90%. It also aims at providing low cost and reliable automation of the existing system. Quick Response codes appear everywhere these days, therefore using the QR codes is one of the most intriguing ways of digitally connecting consumers to the internet via mobile phones. Patient's personal health information and the predicted disease will be automatically mailed to the doctor in the form of QR code. Thus, the doctor scans the QR code on his/her smart phone and prescribes medicines which is mailed back to respective patient in the form of QR code. The pharmacist scans

the QR code shown by the patient and gives medicines accordingly.

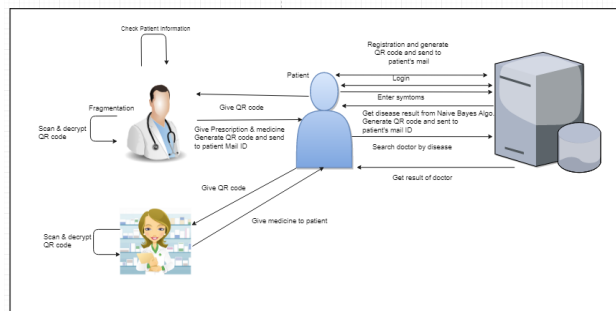


Fig. 1. Procedure

2. Literature survey

Interaction with medical data using QR-codes.

Authors: Krzysztof Czuszyński, Jacek Ruminski

Highlights: In this paper an application of QR codes to exchange of laboratory results is presented. The secure data exchange is proposed between a patient and laboratory and between Electronic Health Records and patient.

Limitations: The interaction between professional healthcare and patient can be improved, since physician can receive a file with complete set of test results from the patient and comment them in reply.

2. Amplification of Hospital Healthcare and Data Management using QRcodes

Authors: Paschou Mersini, Evangelos Sakkopoulos, Athanasios Tsakalidis

Highlights: In this work, they have described an integrated system, developed for use by the healthcare personnel within healthcare facilities, adapted to smart phones, tablets and handheld devices. Key goal is to facilitate doctors, nurses and the involved personnel throughout the facility, regardless of the existence of network connection in the area using a typical smart phone.

Limitations: Disease prediction and medicine prescriptions by specific doctor is not being implemented.

3. Barcode Readers using the Camera Device in Mobile Phones

Authors: Eisaku Ohbuchi, Hiroshi Hanaizumi, Lim Ah Hock

Highlights: This paper shows new algorithms and the implementations of image reorganization for EAN/QR barcodes in mobile phones.

Limitations: The threshold deciding method will be developed based on the modeling of the camera device model.

4. Design and Implementation of Doctor-Patient Interaction System Based on Android

Authors: Ran Wei, Zhimin Yang

Highlights: It is presentation of doctor-patient interaction system based on Android. Its glorious performance on mobile terminals makes it potential that patients area unit able to access the hospital server to get the mandatory suggestion regarding the symptoms and move with the doctors on their own mobile terminals, whereas doctors will track patients whenever and where potential or build a diagnosing of alert depends on the observation knowledge from the hardware of mobile terminals. Limitations: System has shortcomings, such as in the monitoring module, when the objects in the camera changes in a large scope, the amount of coded data increases quickly which will cause the system efficiency decreases.

5. Secure Transmission Medical Data for Pervasive Healthcare System using Android

Authors: Sudha.G and Ganesan.R

Highlights: It is created for accessing the medical multimedia data of patients when the user is in mobility. The mobile have lesser memory to store a data. So to access the larger database with security, we use the My Sql database in server system. This connectivity is established with the help of server program. It ensures authentication and security in accessing database. Limitations: The mobile application can be developed with context aware, adaptability, delay should be decreased.

6. Planning and Development of an Electronic Health Record Client based on the Android Platform

Authors: Dimitris Tychalas, Athanasios Kakarountas

Highlights: The aim of this work is to present the system's client, which operates on a mobile device (Android based) and acquires data from the eHR connecting to a centralized Database offered by the Hospital or Clinic.

Limitations: Network manager is needed, if any part of network fails a lot of disruption occurs.

7. Data Hiding Using LSB with QR Code Data Pattern Image

Authors: D. Antony Praveen Kumar, M. Baskaran, J. Jocin, Mr. G.Diju Daniel

Highlights: To improve the steganography methodology using QR- data pattern image and LSB technique. Skillful techniques of code pattern style, unit block segmentation, pattern block classification, and so on, are planned for message information embedding and extraction.

Limitations: The research can be expanded by doing analysis of steganography process of other tools. Identifying the most capability of data that may be hidden in a picture employing a explicit steganographic tool must be modelled

8. A Health Management Application with QR- Code Input and Rule Inference

Authors: Hui-Huang Hsu, Min-Ho Chang, Neil Y. Yen

Highlights: They have proposed QR-Code as the input medium for recording our daily food intakes. QR-Codes with calorie and nutrition information can be attached to the food package, the restaurant menu, the recipe or along a dish. A dietary recommendation expert system is also built to perform analysis on the recorded nutrition data.

Limitations: Doctor Suggestion, medicine prescription and feedback is not implemented.

9. FASE: Fast Authentication System for E-health

Authors: Mungyu Bae, Suk Kyu Lee, Seungho Yoo, and Hwangnam Kim

Highlights: Proposed QR code authentication scheme for e-health, with this proposed scheme, patient can reduce the redundant process of writing paper for visiting hospital for diagnosis and a local hospital can manage patient's personal information cost-effectively.

Limitations: Disease is not predicted, so every time patient has to inform doctor about his/her symptoms.

10. Study of machine learning algorithms for special disease prediction using principal of component analysis

Authors: Mr. Mahale Kishor M, Prof. Dhomse Kanchan B

Highlights: In this paper, for heart disease prediction SVM, Naive Bayes and Decision tree has been applied with and without using PCA on the dataset. We used PCA to reduce the number of attributes. SVM outperforms Naive Bayes and Decision tree after size of the dataset is reduced. SVM can further be used to predict heart disease, the main aim of this paper is to predict diabetes disease using WEKA data mining tool. Our algorithms were implemented using WEKA data mining technique to analyze algorithm accuracy which was obtained after running these algorithms in the output window.

Limitations: Disease prediction is limited to Heart and Diabetics, we cannot predict other diseases and even doctors suggestion is not provided.

11. Research and Practice of Digital Fingerprinting Encryption Algorithm Based On QR Code

Authors: XU Guo-Juan Zhang, SA1 XU

Highlights: A new type of digital fingerprinting encryption algorithm based on QR code is put forward, and experiments prove that this algorithm has sound resistivity to conspiracy attack and could trace the conspiracy user effectively.

Limitations: No disease prediction is done.

12. Robust and Fast Decoding of High-Capacity Color QR Codes for Mobile Applications

Authors: Zhibo Yang, Huanle Xu, Jianyuan Deng, Chen Change Loy, Wing Cheong Lau

Highlights: Proposed two methods that jointly model different

types of chromatic distortion (cross-channel color interference and illumination variation) together with newly discovered chromatic distortion, cross-module color interference, for high-density color QR codes.

Limitations: In the future, as opposed to current design where error correction is performed layer by layer, a new mechanism will be developed to share correction capacity across layers by constructing error correction codes and performing correction for all layers as a whole, by which we think the robustness of our color QR code system will be further improved.

13. Applying QR Code and Mobile Application to Improve Service Process in Thai Hospital

Authors: Chayakrit Charoensiriwath, Navaporn Surasvadi, Suporn Pongnumkul, Thunyasit Pholprasit.

Highlights: A low-cost system was developed and tested in a public hospital with limited budget. The system utilized QR code and smartphone application to capture as-is hospital processes and the time spent on individual activities. With the available activity data, two algorithms were developed to identify two quantities that are valuable to conduct process improvement: the most congested time and bottleneck activities. The system was implemented in a public hospital and results were presented.

Limitations: We could infer the accessibility of the user interfaces from the usage statistics.

14. ScanMed: A Mobile Medicine Adherence Application With Intake Validation Using QR Code

Authors: Rizal Mohd Nor, Noor Azizah MohamadAli, Khairul Azmi, Ahmad Marzuki, Leilanie Mohd Nor and Mohar Yusof.

Highlights: We are proposing a system to create a mobile health medication adherence system that would help government and private hospitals to resolve some issues pertaining to medication adherence in Malaysia. The proposed solution is called ScanMed and it is a prototype based on the Android platform utilizing the use of a camera to capture QR code on a medication label.

Limitations: There is no scope for storing the previous medical history of the patient.

15. Wireless Body Area Network and Healthcare Monitoring System

Authors: Lamia CHAARI FOURATI

Highlights: The focus is on the WBAN in terms of emerging wireless technologies (supporting infrastructure and technology), HMS architecture and its applications (Continuous Monitoring and Assisted Living...) and challenge design issues related to WBAN (PHY, MAC and routing layers as well as security, mobility and patient localization..) and HMS (services).

Limitations: HMS faces many challenges, as it should be proactive, ensuring continuous remote patient monitoring and real-time feedback to the patient or medical personnel, reliable,

guarantying high levels of security, privacy, and confidentiality.

16. Efficient Heart Disease Prediction System using Decision Tree

Authors: Purushottam, Prof. (Dr.) Kanak Saxena, Richa Sharma.

Highlights: Designed a system that can efficiently discover the rules to predict the risk level of patients based on the given parameter about their health. The rules can be prioritized based on the user's requirement. The performance of the system is evaluated in terms of classification accuracy and therefore the results show that the system has nice potential in predicting the risk level of heart disease more accurately.

Limitations: The extraction of risk level from the heart disease data base is presented in this section. The database of heart disease contains the screening clinical data of heart patients. Initially, the database pre-processed to make the mining process more efficient.

17. An Improved Method for Disease Prediction using Fuzzy Approach.

Authors: Naganna Chetty, Kunwar Singh Vaisla, Nagamma Pati

Highlights: The first approach fuzzy c-means clustering algorithm is used to cluster the data. Finally, the classification is done using KNN. Similarly, in our second method fuzzy c-means clustering is followed by classification using fuzzy KNN. PIMA diabetes and liver disorder data sets are used to test our methods.

Limitations: In future we can tune our model to make more robust to work on other datasets.

18. Diabetes Disease Prediction Using Data Mining

Authors: Deeraj Shetty, Kishor Rit, Sohail Shaikh, Nikita Patil

Highlights: The primary target is to assemble Intelligent Diabetes Disease Prediction System that gives analysis of diabetes malady utilizing diabetes patient's database. In this system, use of algorithms like Bayesian and KNN is proposed to apply on diabetes patient's database and analyzing is done by taking various attributes of diabetes for prediction of diabetes disease.

Limitations: The proposed system can be developed in many different directions which have vast scope for improvements in the system.

These includes:

1. Increase the accuracy of the algorithms.
2. Improvising the algorithms to add more efficiency of the system and enhance its working.
3. Working on some more attributes so to tackle diabetes even more.
4. To make it as a complete healthcare diagnosis system to be used in hospitals.

3. Conclusion

We proposed health care system for hospital for this we are using Apriori algorithm and KNN algorithms. We generate QR code for every patient by LSB algorithm. QR codes square measure a straightforward, effective way to distribute data. They are fast and convenient for mobile device users. With our proposed scheme, patient can reduce the redundant process of writing paper for visiting hospital for diagnosis and doctors can manage patient's personal information cost-effectively. We also proposed and analyzed the use of user driven visualization to improve security and user-friendliness of authentication protocols. Proposed two of protocols that not only improve the user experience but also resist challenging attacks, such as the key logger. We believe that our proposed method can be utilized as a secure communication medium for the patient and the e-health system. As a future work, we will focus on elaborating secure scheme and integrate to the e-health system into a real test bed.

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