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Disease Prediction using data mining and Remote treatment by using QR Code Strategy

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Abstract
In this project, we present the techniques and applications of data mining technology in medicinal field. In health care department, a huge amount of information is taking place into accessible due to availability of computers. Such a large amount of information can't be processed to make health predictions in the early stage and make treatment schedules to diagnose. The goal is to fetch the techniques of data processing in the fields of health care to develop correct choices for disease prediction. Data mining technique is a most recent powerful technology that has a high interest in the computer world. It uses already existed data in several databases to re-work it into new researches and results. From available data sets, to extract new patterns and the information related to these patterns data mining uses machine learning and database management. This system will supports an end user and online consultation. Here, we suggest a framework that allows clients to get moment direction on their medical problems by using a smart health prediction system.

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I. INTRODUCTION

Medical data is an extreme growth source of information produced from hospitals contains patient records in the form of hard copies which can be made easier and convenient by using QR code of the patient details. To create a E-Healthcare system which will generate QR code for every patient as per their updated disease information, and having features like clinical management, patient records, disease prediction is our goal. Disease is being guessed by KNN algorithm and doctor's suggestions by Apriori algorithm. Keeping record of all the activities are very error-prone for the hospital authorities. It is also very unsuitable and takes a lot of time for processing. Maintaining the records are highly unreliable. It is also not economically and technically suitable to maintain the records on hard copies. The main aim of project is to provide paper-less up to 90at 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 interesting ways of digitally connecting consumers to the internet through mobile phones. Patient's personal health information and the predicted disease can be directly sent to the doctor in the form of QR code. Thus, the doctor scans the QR code on his/her mobile and generates prescribes which is then mailed back to respective patient in the form of QR code. The pharmacist can scan the prescriptions QR code shown by the patient and gives medicines properly.

II. Literature Survey

Interaction with medical data using QR-codes. Authors: Krzysztof Czuszynski, Jacek Ruminski

Here the author describes of an application of QR codes to interchange the laboratory results that are presented. The secured data exchange is proposed between a patient and laboratory, between Electronic Health Records and patient. Advanced Encryption Standard was used to provide security of data encapsulated within a QR-code. The experimental setup, named labseq is described. So, in this paper 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.[11]

Amplification of Hospital Healthcare and Data Management using QR codes Authors: Paschou Mersini, Evangelos Sakkopoulos, Athanasios Tsakalidis

In this work, they have described an integrated system developed for the use by the healthcare workers within healthcare facilities, adapted to smart phones, tablets and handheld devices. Key goal is to facilitate doctors, nurses and the involved faculties throughout the facility, regardless of the existence of network

connection in the area using a typical smart phone. The QR code significantly improves interoperability cases for legacy and non-inter-related systems based on HL7 and XML transformation of the HL7 patient referrals. Disease prediction and medicine prescriptions by specific doctor is not being implemented.[6]

Design and Implementation of Doctor-Patient Interaction System Based on Android. Authors: Ran Wei, Zhimin Yang

It is the presentation of doctor-patient's interaction system based on Android. Its outstanding performance on mobile terminals makes it potential that patients are able to access the hospital server to get the required 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. 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.[9]

Secure Transference of Medical Data for general Healthcare System using Android. Authors: Sudha.G and Ganesan.R

It is created for accessing the medical data of patients when the user is in mobility. The mobile have less 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 using server program. It makes sure authentication and security in accessing database. The mobile app can be developed with context aware, adaptability, delay should be decreased.[10]

Planning and Development of an Electronic Health Record Client based on the Android Platform Authors: Dimitris Tychalas, Athanasios Kakarountas

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. The system is based on the well-known Google's Android open platform, that offers easy networking procedures and low design complexity. If any part of network fails a lot of disruption occurs, Network manager is needed.[5]

Data Hiding Using LSB with QR Code Data Pattern Image Authors: D. Antony Praveen Kumar, M. Baskaran, J. Jocin, Mr. G.Diju Daniel

To improve the steganography methodology using QR-code 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. The research can be expanded by analyze of steganography process of other tools. Identifying the most capability of data that may be hidden in a picture employing an explicit steganographic tool must be modelled.[2]

A Healthcare Management App with QR Code Input and Rule conclusion Authors: Hui-Huang Hsu, Min-Ho Chang, Neil Y. Yen

They have proposed QR code as the input for recording our daily food in- takes. QR-Codes with calorie and nutrition knowledge can be attached to the food package, the restaurant menu, the recipe or along a dish. A diet recommendation expert system is also built to perform analysis on the recorded nutrition data. Disease is being predicted by KNN algorithm and doctor recommendation by Apriori algorithm. The QR-codes are generated by using LSB algorithm. Doctor Suggestion, medicine prescription and feedback are not implemented.[1]

III. Existing System

- Due to the rapid development of information technologies and huge demand for medical services, it is increasingly popular to deliver health services through the internet.
- Existing healthcare system includes the process where patients have to visit the hospital & consult with doctor personally and discuss about the symptoms. Based on symptoms doctor would identify the disease and provide the prescription. And in today's situation where we have covid-19, it is very risky to visit the hospitals.
- An existing system, which does not have the advanced technique and not even secure so that we can easily share or record the patient's personal details which is not user friendly as well.
- Hence there is need to develop the system that is more secure and user friendly

IV. Proposed System Architecture

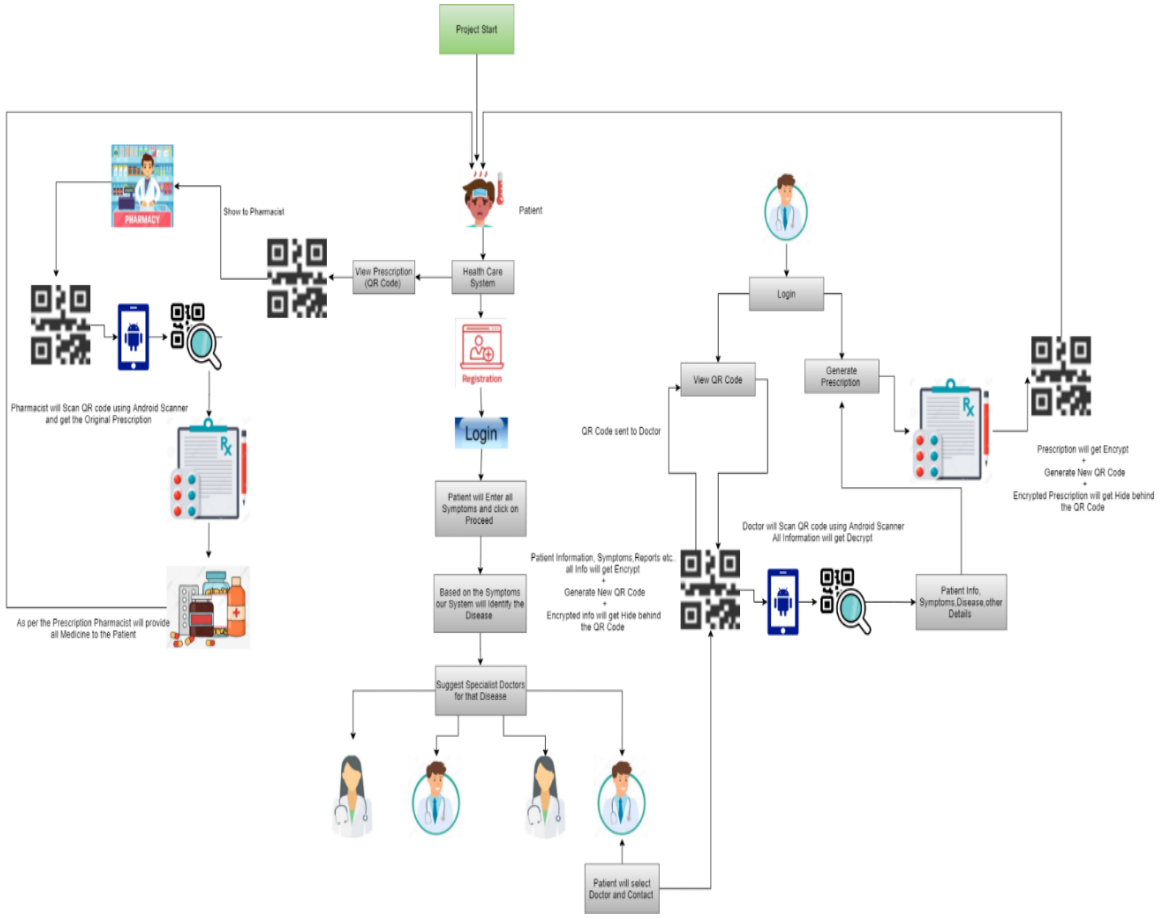

Fig. No. 1

V. Proposed System

The proposed system is QR code-based online healthcare system that include three modules – Patients, Doctor, and Pharmacist.

1. **Patients Module:** Patient will Login and provide the symptoms in system. Based on symptoms, the system will analyze and identifies the disease. And suggest the list of specialist doctor related to that disease. The patient has to select the specialist doctor from the provided list. And at the same time system will create the QR code and send it to doctor.
2. **Doctor Module:** Doctor will Login to the system and will be able to see the available QR codes in his application. By using QR code scanner (Android Application), the doctor will decrypt the data and will be able to see all the details related to patient info, symptom, disease, and other details.
3. **Pharmacist Module:** The pharmacist will login to the system with valid credentials. There will be list of patients QR-code. The pharmacist has to scan the QR-code of prescription send by the patient. Provide the medicines accordingly and then logout.

VI. Module Description

In our proposed system there are three modules patient module, doctor module and pharmacist module.

➢ Module 1(Patient)

The first module is patient's module. The required process are as follows:

- Logins to the system and provide the symptom.
- Based on symptoms, the system identifies the disease.
- And suggest the list of specialists related to that disease.
- The patient has to select the doctor from the list. And at the same time system will generate the QR code and send it to doctor

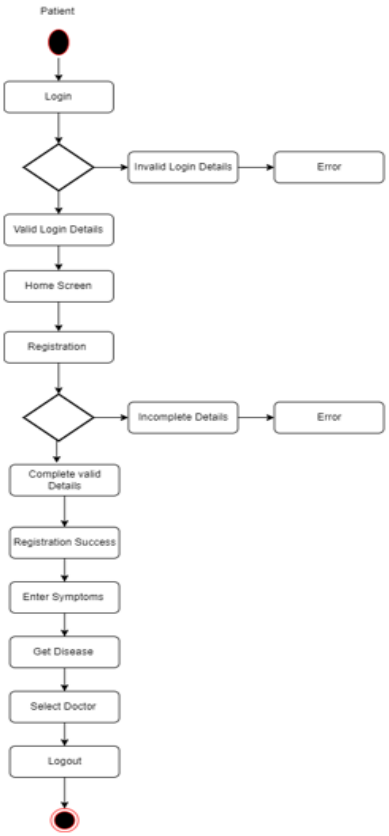

Fig. No. 2

➢ Module 2 (Doctor)

The second module is doctor's module, the process is as follow:

- In doctor's module, the doctor the has login into the page.
- Once login details are valid then it will open home page, it shows a list of patients who send their details for treatment in encrypted format.
- Then the doctor will view the QR-code and scan the QR-code.
- After viewing the details or symptoms of a particular patient then the doctor will generate the prescription.
- That prescription is again to the patient in encrypted format and logout.

Fig. No. 3

➢ **Module 3(Pharmacist)**

The third module is pharmacist module and the process in which the pharmacist interact is as follow:

- In pharmacist module, the pharmacist has to login into the page with valis credentials.
- There will list be list of patients QR-code.
- The pharmacist has to scan the QR-code of prescription send by the patient.
- Provide the medicines accordingly and then logout

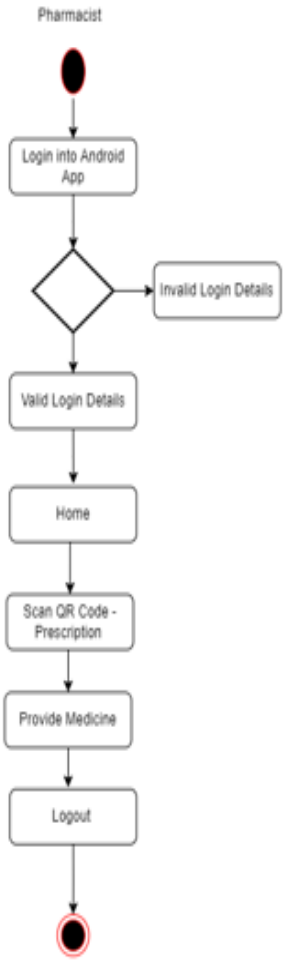

Fig. No. 4

VII. AES Algorithm

In proposed system of online healthcare, we used AES algorithm to secure the data. AES algorithm consumes less time to encrypt the data.The AES algorithm (also known as the Rijndael algorithm) is a symmetrical block cipher algorithm that takes plain text in blocks of 128 bits and converts them to ciphertext using keys of 128, 192, and 256 bits. The encryption process uses a set of specially derived keys called round keys. These are applied, along with other operations, on an array of data that holds exactly one block of data the data to be encrypted. This array we call the state array.

You take the following AES steps of encryption for a 128-bit block:

- Derive the set of round keys from the cipher key.
- Initialize the state array with the block data (plaintext).
- Add the initial round key to the starting state array.
- Perform nine rounds of state manipulation.
- Perform the tenth and final round of state manipulation.
- Copy the final state array out as the encrypted data (ciphertext).

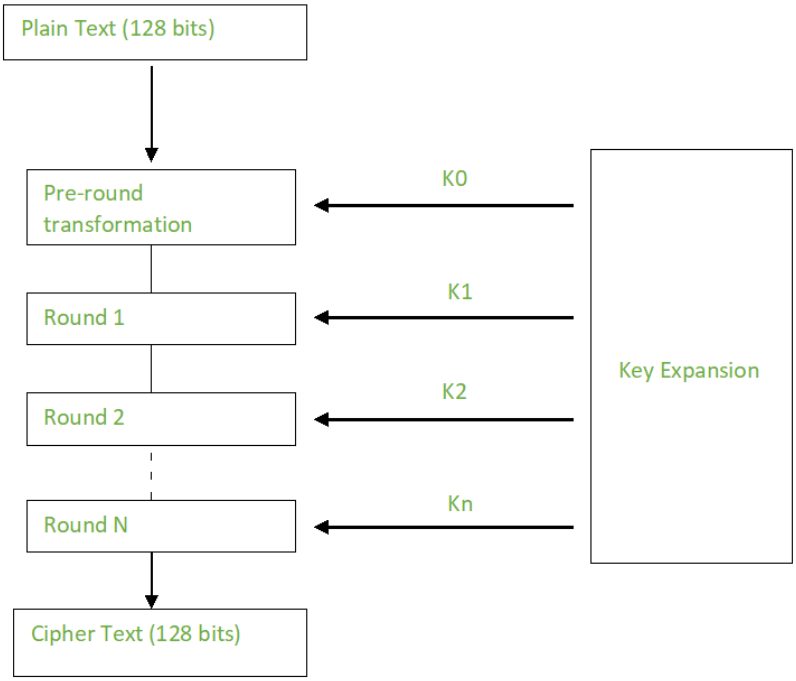

Fig. No. 5

VIII. Conclusion

In day-to-day life everyone is busy in their own work. Now-a-days people don't have much time to visit hospital personally. In this pandemic situation it is really very hard to visit any hospital personally. So, we proposed online health care system which will help patients to identify their disease. With our proposed scheme, patient can reduce the redundant process of writing paper, visiting hospital for diagnosis and even doctors can also manage patient's personal information efficiently. We also proposed and analyzed the system that has improved security and user friendliness. Here patients share the details with the particular doctor. All the data will get transfer in the form of a QR code using the AES algorithm. QR codes square measure a straightforward, effective way to distribute data. They are fast and convenient for mobile device users.

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