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Universal Medical Services Card

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Abstract - *Medical records are crucial in the health sector since they detail a person's overall health and medical condition. Maintaining these records in a physical form can often be a difficult task for the patient. Unfortunately, these sometimes even get misplaced, losing vital medical data in the process.*

The suggested approach is to build a portal that would allow users to securely save all of their medical information and that would be available to them at all times. The data will be encrypted using the AES algorithm. The doctor can access this data when a patient visits them for consultation. Patients will find it convenient as they won't have to remember to keep track of their records. Also, it will be suitable for the doctor as all the patient data will be available in one place. The system will also allow the patient to look for doctors to help them diagnose their illness.

Key Words: **AES algorithm, Health data storage, QR code, OTP, Data encryption.**

1. INTRODUCTION

Historically, medical records have been documented in the form of bulky sheets. Storing medical records has been a tedious task, and it's difficult to properly document them. There are multiple types of medical documents that need to be maintained. With each visit to the doctor, the documents keep on piling up and there are chances of losing these documents, which can be critical in diagnosing chronic disease.

This project aims to solve this problem in a simplistic manner. The proposed solution is to provide an efficient way to digitally store the records. With each visit, the doctor will be able to link the documents like prescriptions and reports to the patient's data and retrieve the information whenever required.

All the patient data will be stored in one place, and the doctor can easily access it. The records will be stored securely using encryption. Along with secure data storage, the platform will also have additional features like searching for and rating of a doctor.

2. LITERATURE SURVEY

2.1 Electronic Health Records (EHR)

An EHR is an electronic version of a patient's health record that was historically created, used, and stored in a paper chart. A healthcare organization develops, oversees, and maintains a patient EHR. An electronic health record can only be accessed and used by healthcare providers who are directly involved in the patient's care. A patient's controllable and editable health record is known as a Personal Health Record (PHR).

Digital version of a health record can be conveniently stored and adopted for better services of the patients. A health record usually contains prescriptions, various tests and scan reports. Digitisation of health records is slowly adopted but not yet fully working at its pace.

Adoption of the electronic health record will improve clinical documentation and make health records portable. The advantages of an electronic health record include increased healthcare efficiencies, improved personal health tracking, and effective use of health data to improve the existing healthcare system.

The hurdles for electronic health records include expensive software bundles, system security, patient confidentiality, and unknowable future governmental mandates. Radio-frequency identification, voice recognition, and bar coding are upcoming technologies for electronic health records.[1][2]

2.2 Advanced Encryption Standard (AES)

Ako Muhamad Abdullah describes the AES algorithm published by the NIST (National Institute of Standards and Technology) in 2000. AES is a symmetric block cipher algorithm which can deal with different key sizes such as 128, 192 and 256 bits. The key sizes decide the number of rounds: AES uses 10 rounds for 128-bit keys, 12 rounds for 192-bit keys and 14 rounds for 256-bit keys.

Each round of encryption consists of 4 steps.

- Byte Substitution
- Shift Rows

- Mix Columns
- Add Round key

Each round of decryption consists of

- Inverse Shift Rows
- Inverse Byte Substitution
- Add Round key
- Inverse Mix Columns

Advanced encryption standard (AES) algorithm is one of the efficient algorithms and it is widely supported and adopted on hardware and software. AES is fast, secure and is used in many areas. Implementation areas include SSL and transport layer protocol, social media for secure communication, routers etc. [3][4]

2.3 QR CODE

A QR code is a kind of two-dimensional or matrix bar code that can contain data and is made to be read by smartphones. The abbreviation "QR" stands for "Quick Response," meaning that the contents of the code should be deciphered at a fast rate of speed. On a white background, the code is composed of square-shaped black modules. The encoded data may consist of text, a URL, or other types of data.

Characteristics of QR Code:

- High-Capacity encoding data

  The greatest number of digits that can be stored in a normal bar code is around 20, whereas a QR Code can handle dozens to hundreds of times more data.

- Small print out size

  A QR Code can encode the same amount of data in around one-tenth the space of a standard barcode. This is possible because a QR Code may carry information both horizontally and vertically.

- Damage and dirt resistant

  Error rectification is possible with QR codes. Even if the symbol is partially soiled or damaged, data can still be recovered.

- Readable from any 360-degree angle

  A high-speed, omnidirectional 360-degree reading is possible with a QR code. This duty is carried out by QR Code using position detection patterns found at the symbol's three corners. These location detecting patterns ensure steady high-speed reading while avoiding background interference's harmful impacts.[5][6]

3. PROPOSED SYSTEM

The main idea of the project is to store data digitally at one place. Keeping the data at one place has advantages like:

- All the data is stored at one place
- No need to maintain hardcopy of document
- It is safely stored in encrypted format
- Easily accessible for doctor and the patient
- Access the data anywhere and anytime

To achieve this purpose, a health card is issued to the patient upon verification of the personal details provided during the registration process. The health ID consists of basic information and a QR code. By scanning this QR code, a doctor can get access to the patient's medical record. The doctor also has to be registered on the portal to be able to access this data.

3.1 OVERVIEW OF SYSTEM

The proposed workflow is as follows:

- Patients and doctors get themselves registered with the administrator. The patient's personal details are verified and they are issued an appropriate health card with a QR code, which would help in uniquely identifying them.

- When the patient visits a doctor for consultation, the doctor scans the QR code on the patient's card and is able to access the patient's previous medical history, prescriptions, reports, etc. and also add new medical information about that patient after examining them. As a security mechanism, accessing the patient's sensitive medical health information requires the patient's consent, which can be acknowledged by means of an OTP received on the patient's mobile phone. The patient will also be provided with an option to provide his/her consent using a PIN code (decided during registration) as a backup mechanism to the primary method.

- The patient gives OTP to the doctor, after which the session start time is recorded and the consultation begins. The doctor can view the past medical history of the patient and add prescriptions or reports related to the patient's case.

- Patients can login to the portal using their mobile number and OTP/PIN and access their medical history, prescriptions, reports, etc. Patients can

also search for doctors based on their location, expertise, rating, etc.

- After the consultation has ended, the patient can login and rate the doctor based on their experience with him/her during their recent consultation. Additionally, the patient can leave their review / feedback on the online portal.

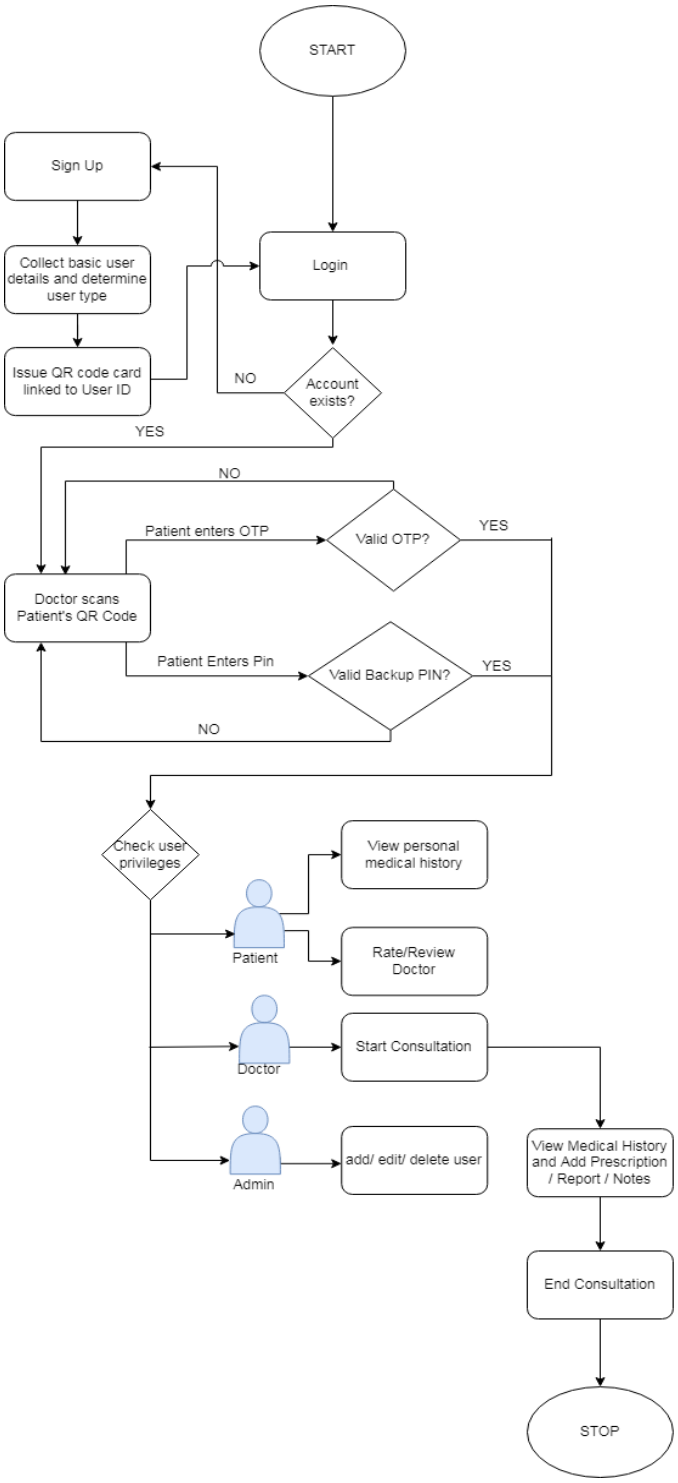


Fig -1: Block Diagram of the workflow

3.2 IMPLEMENTATION AND OVERALL LOOK

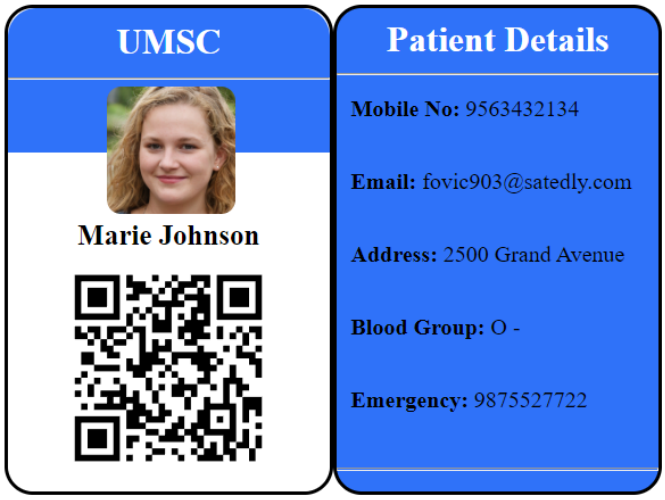


Fig -2: Patient's UMSC Card

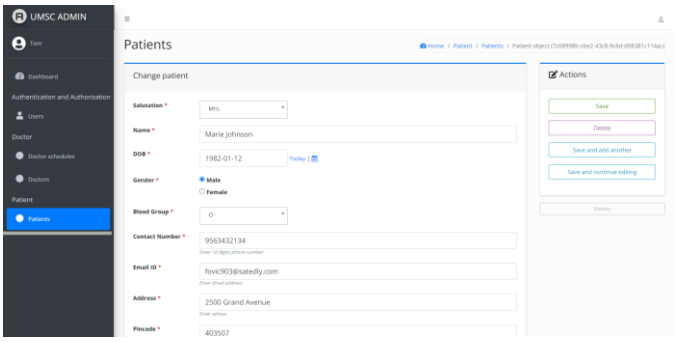


Fig -3: Admin managing registered doctors and patients

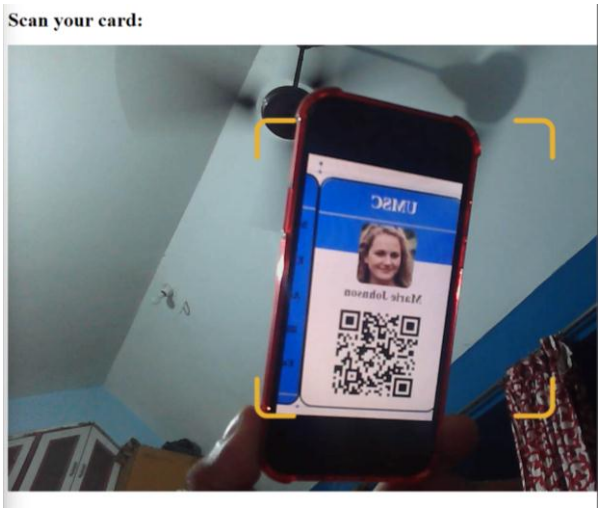


Fig -4: Scanning the UMSC Card at the start of a consultation

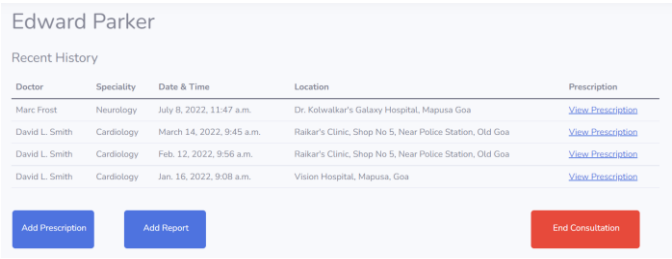


Fig -5: Doctor checks patient's medical case history

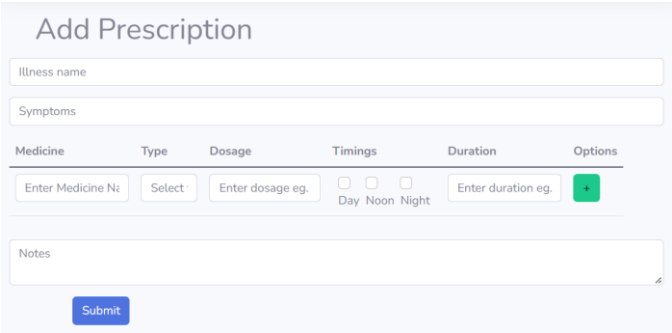


Fig -6: Doctor prescribes medication for the patient

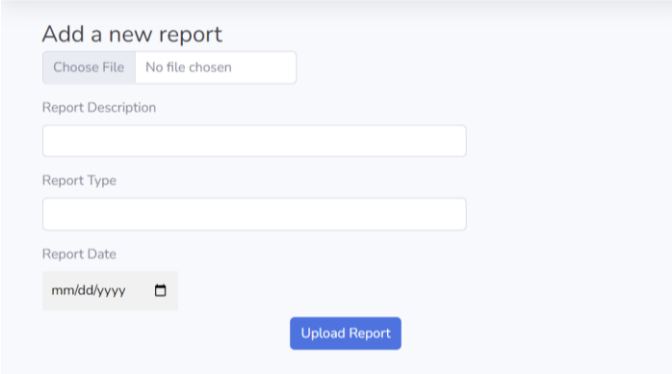


Fig -7: Doctor uploads patient medical scans and reports

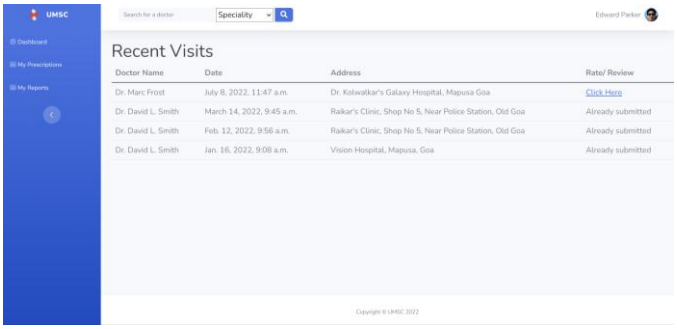


Fig -8: Patient dashboard

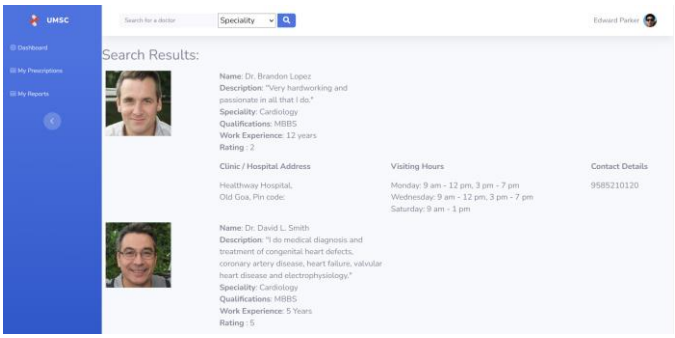


Fig -9: Patient searches for a doctor

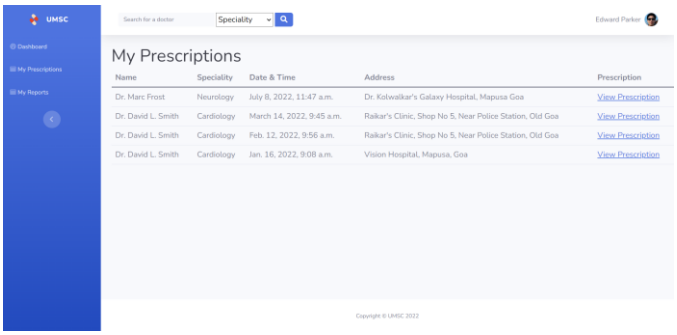


Fig -10: Patients has access to their prescriptions

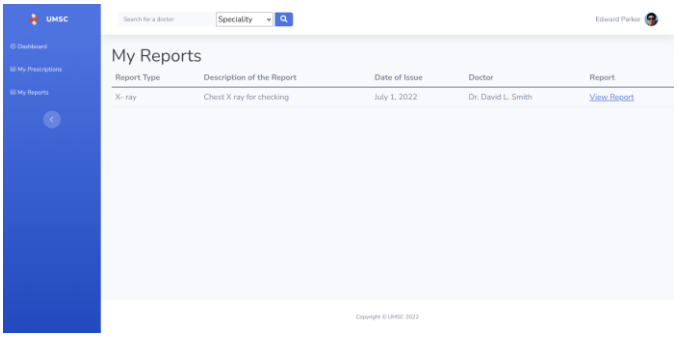


Fig -11: Patient has access to their reports

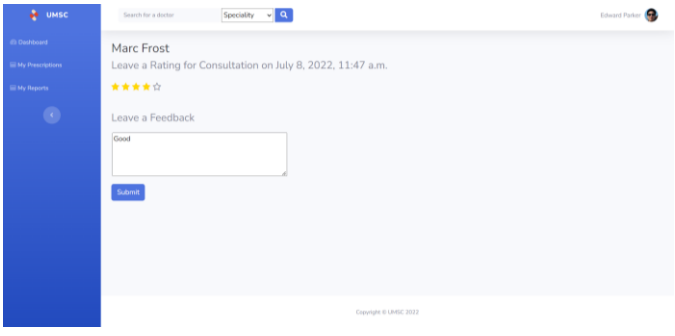
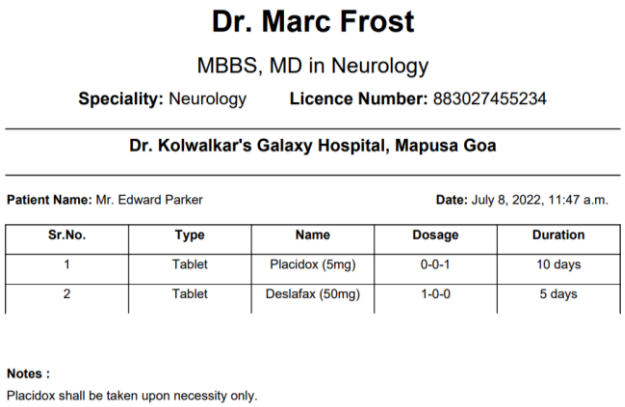


Fig -12: Patient rates and reviews a doctor based on their service



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Patient Name: Mr. Edward Parker **Date:** July 8, 2022, 11:47 a.m.

Sr.No.	Type	Name	Dosage	Duration
1	Tablet	Placidox (5mg)	0-0-1	10 days
2	Tablet	Deslafax (50mg)	1-0-0	5 days

Notes :

Placidox shall be taken upon necessity only.

Fig -13: Patient can view prescription

4. CONCLUSIONS

The motivating insight of this research is that managing medical data like prescriptions and reports can be a tedious task. There are chances of misplacing the medical records. Also recognizing the prescriptions/notes by doctors can be difficult for the patient.

By the means of software development this task can be simplified for the patient and the doctor. With this project the medical data can be easily and efficiently stored and accessed while maintaining security and user confidentiality.

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