

# “MedRec” - Server Based, Universal System to Store Medical Records and Manage Health Data of Patients

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**Abstract**– The HealthCare sector in India lacks an organized data storage and management. Doctors have the inability to view past health data, medications, complications and diagnosis of any patient. Lack of medical history may lead to wrong treatment or misinterpretation of any condition/disease of the patient. Hospitals continue to use age-old data management systems for patient data, which is manual documentation, hence more chances that they get mismanaged or misplaced often. Today, technology is transforming the way healthcare is delivered, managed, and assessed with a continued shift from record management to data management so Medical Records are moving from surveillance and archival functions to prospective functions and process intervention. Balancing medical privacy with ease of access for healthcare professionals is a challenge, but technology could provide the solution.

## I. INTRODUCTION

Health & Medical Record is a storehouse of knowledge concerning patients. Patient care includes a systematic and chronological record of care and treatment which necessitates the establishment of a medical records department in hospitals or clinics.

'MedRec' offers a technology-based, universal and systematic platform to store medical records of patients, that means electronic health records would give doctors and nurses control over the flow of information from a single, trusted platform; so that medical teams can trust

that what they learn about a patient is both accurate and up to date. Prediction of serious diseases/conditions will become easy through the MedRec Platform.

The objectives of this work are below:

- To collect patient's basic health data:  
Parameters like age, sex, height, weight, lifestyle habits, prevalent conditions etc. will be collected during the registration.
- To record patient's medical history and data:  
Details of a patient's previous medical conditions, surgeries, complications if any, will be recorded and stored for future reference of medical teams
- Store patient's prescriptions and diagnostic reports:  
Soft copies of test reports, prescriptions, and diagnostic reports like X-ray, MRI, CT scans can be uploaded by medical teams of hospitals and be stored online.
- Study and analyze patient's health index:  
With body parameters like height, weight, age, Blood Pressure, Sugar levels etc. the patient's health index is analyzed.
- Predict common and fatal conditions with health parameters:  
Diseases or conditions like Breast Cancer, COVID 19, Diabetes, Cholera, Heart Disease, HIV and Chronic Kidney are predicted using Artificial Intelligence on demand of patients, which helps to pre-diagnose their condition.

- Hospital Management:

Medical Teams of hospitals can admit/discharge patients, assign medical staff to the patient and upload diagnostic reports of the patient.

Our system will improve the ease of access to medical history to doctors & nurses. Existing system is manual documentation, which leads to errors and misplacement. Our system will offer online records. The process will be seamless with no need of searching. Our system will not compromise on security and privacy of patients' medical history, while the existing system does.

## II. LITERATURE REVIEW

This section provides the details of the important works that have been performed in the field of storing medical records and predicting the diseases at early stages based on our health parameters.

1) Dr. Abdullah Albeyatti, Chief Executive Officer (CEO) and Mo Tayeb, Chief Operating Officer (COO), both of them founded “MedicalChain”, which is used to store medical records of patients. The aim is to put the patient in control of their medical data, giving them the power to share the single, most comprehensive version of their record, with every organization in their medical network. Online. MedicalChain provides the user, being the owner of their own medical records, full access and control over their data. It also provides security to your records as it is the most important.

2) “Map My Health” is another website where you can store your medical records like your health reports, X-rays, test reports and other relevant documents. In our website “MedRec” also you will be able to store your medical records and other health reports. We also have a verification system which helps us to keep your records safe similar to MedicalChain and Map My Health. MedRec also gives the user the full control and access of their own medical records, which helps them in sharing with their respective doctors.

3) A disease prediction system is an important aspect of a developing nation as part of strong healthcare infrastructure. With this notion, the present research proposes a machine learning equipped web-based disease prediction system. With deep insight into the existing e-healthcare system, it is evident that there are few disease specific solutions available; but a diverse

disease prediction system considering all common diseases is still missing (to the best of our knowledge).

4) Kumar et al. Has focused on the prediction of cancer while Bashir et al. Proposed a solution to predict heart disease for a patient. In similar approach, Dutta et al. Proposed an approach for hepatitis disease prediction, 5) Rao et al. developed a Parkinson’s prediction approach and Pathirage et al. Offered a diabetic prediction system. All these methods are algorithmic approaches and do not offer user interfaces for end users. The absence of a GUI creates a gap between the system and the user. Following this, the present research focuses on the common disease symptom (including rare) to cater to the needs of a large group of people and offers a user friendly web application. For disease prediction the present research uses the classification models: K-NN, naive Bayes and random forest, and fuses the results using an ensemble approach with a novel voting scheme to ensure accurate prediction.

6) There are various tools for data mining machine learning algorithms to identify and predict the various diseases in terms of regression, decision tree and Bayesian network. Finding a disease, needed different test results in a variety of scenarios with respect to the particular patient. By applying data mining, the concept for data analysis will be reduced. It plays a vital role in data analysis to improve the performance and time saving. Variety of classification and clustering algorithms plays a significant role for prediction and diagnosis of different types of diseases. Bayesian network classifiers and random forest classifiers are used to diagnose the risk for diabetes. The prediction accuracy of the k-means algorithm is enhanced using both class and cluster method and making it adapt to different datasets. A group of classification algorithms excluding random forest algorithms is applied on diabetes data to diagnose the risk. On comparing the performance of each method, the outcome shows that Random Forest was performed well in both accuracy and ROC curve.

## III. PROBLEM ANALYSIS

Hospitals continue to use age-old data management systems for patient data, which is manual documentation. The HealthCare sector in our country lacks an organized data storage and management. Our proposed project offers a technology-based, universal and systematic method to store medical records of patients, that means electronic health records would give doctors and nurses

control over the flow of information from a single, trusted platform. This means that medical teams can trust that what they learn about a patient is both accurate and up to date.

As mentioned in the above paragraph, nowadays it is difficult to maintain or safeguard all the medical documents of our various tests, check ups and prescriptions. As there is a high possibility of misplacing them, these documents may be useful in future to cure any future diagnosis. This is the main idea of this project i.e, to store the Medical history and health records of the patients online. Which will decrease the risk of misplacing the medical records. Doctors have the inability to view past health data, medications, complications and diagnosis of any patient as it will affect the doctor from understanding the core of the problem. Our website keeps track of all the previous medical records which will help the doctors in understanding the current diagnosis effectively and provide the medications accordingly.

It is a very important study for the project to move forward as it basically determines the possibility of this idea to be successful or not. Our project has higher chances to succeed as it stores the medical records of the people which will be useful to them in future and it also decreases the possibility of losing them. Our project is unique from previous ideas similar to our idea in different ways, as we added many unique features to our project which you cannot find in the already existing websites. Our system will improve the ease of access to medical history to doctors & nurses. The process will be seamless with no need of searching. Existing system is manual documentation, which leads to errors and misplacement. Our system will offer online records. Possibility of medical frauds/insurance frauds in the present system. Our system will not compromise on security and privacy of patients' medical history, while the existing system does. We have also added the Predictions like Diabetes, Heart diseases, cholera etc..Hospital medical teams can also use the system easily, to admit/discharge patients, assign medical staff to patients and upload their diagnostic reports. These are some of the features which we have implemented in our project. These features give us the belief to go forward with this idea. Our website is the first one with a feature to predict the possibilities of some dangerous diseases in

advance so that we can take precautions beforehand. As there is a saying "Precaution is better than Cure".

#### IV. PROPOSED PROJECT

##### A. Product Definition

Our proposed project 'MedRec' offers a technology-based, universal and systematic platform to store medical records of patients.

##### B. Methodology of proposed work

###### 1) Project Plan:

Project plan of our project is very simple, as we divided our project into tasks and started working on them accordingly.

- Data Collection and Research:

It is the first step of our project and we basically researched about our idea and came to know the importance of this idea and collected the required data which will be helpful to start the project and also in the later stages of the project.

- Building a website:

Website is a very important part of the project as it is the way to display our ideas. The frontend part of this project is done using the Html, CSS and Javascript languages. The backend part of the project is done using PHP, Python and Flask.

- Designing UI and UX:

User Interface and User Experience are one of the important steps of the project as we can make our website and user dashboard more interactive and engaging and improve the overall experience of the user.

- Programming Disease Prediction Algorithms using AI & ML:

In this module we used Artificial Intelligence and Machine learning to code disease prediction algorithms like Diabetes, Heart diseases etc..

● Testing :

Testing is the penultimate step as we test everything we implemented till now and check whether everything is working fine or not.

● Deploying on Online Servers:

It is the final step of our project as we deploy it on online servers and make our website operational.

2) Data Flow Diagram (DFD):

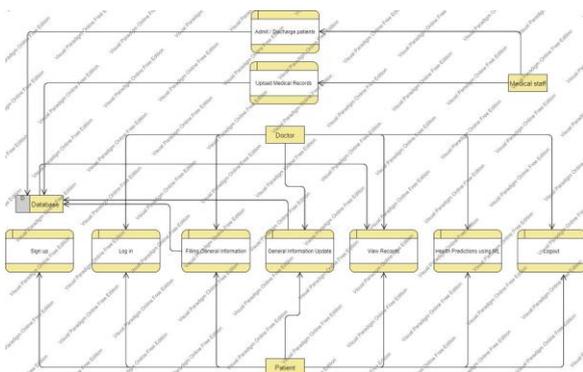


Fig. 1 Data Flow Diagram

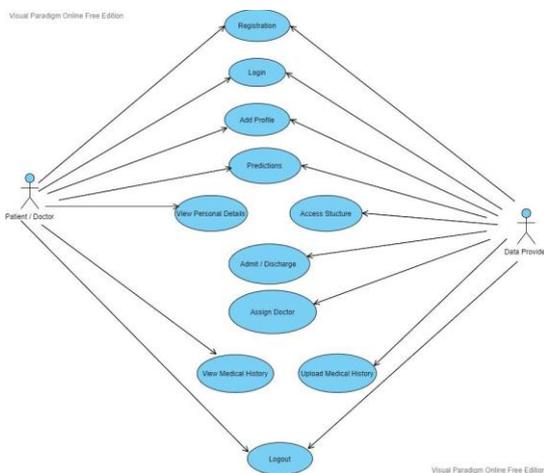


Fig. 3 Use Case Diagram

3) Modules Description:

Registration:

- Signup / Login:  
Users will have a secure first-time sign up with OTP authentication. Login will require just Email ID and Password.
- Patient General information  
Parameters like age, sex, height, weight, lifestyle habits, prevalent conditions, and brief medical history. will be collected after successful sign up.

● Dashboard

Users will be redirected to their dashboard after login. Dashboard will provide a view of all features like BMI, Health parameters, Disease Prediction, View Reports, View Medical History, Update Profile, View Hospital records and admission status.

Health Prediction:

- Covid-19 Prediction:  
It is used to predict HIV using parameters like Age, Gender, Sore Throat, Breath Shortage and Headache etc. We are using Gradient Boosting Classifier Algorithm For Prediction. After Predicting it, it also gives us the Stage of Health.

● Diabetes Prediction:

It is used to predict Diabetes using parameters like Insulin Level, BMI and Glucose Level. After Predicting it, it also gives us the Stage of Disease. We are using the K Neighbours Classifier Algorithm For Prediction.

● Cholera Prediction:

It is used to predict Cholera using Time Period of Food Poisoning, Infection Vomiting, Diarrhea. We are using Gaussian Naive Bayes Algorithm For Prediction. After Predicting it, it also gives us the Stage of Disease.

● Heart Disease Prediction:

It is used to predict Heart related Diseases using parameters like Serum Cholesterol, Fasting Blood Pressure and Resting Blood Pressure . We are using

Random Forest Classifier Algorithm For Prediction. After Predicting it, it also gives us the Stage of Disease.

- **Chronic Kidney Disease Prediction:**

It is used to predict Kidney Disease using parameters like Blood Pressure, Blood Glucose Random, Blood Urea, Hemoglobin, WBC Count and RBC Count. We are using Support Vector Machine Algorithm For Prediction. After Predicting it, it also gives us the Stage of Disease.

- **Lung Cancer Disease Prediction:**

It is used to predict Lung Cancer using parameters like Dust Allergy, Genetic Risk, Obesity and Chest Pain etc. We are using Naive Bayes Classifier Algorithm For Prediction. After Predicting it, it also gives us the Stage of Disease.

- **Breast Cancer Prediction:**

It is used to predict Breast Cancer using parameters like Texture, Concavity, Compactness and Fractal Dimension etc. We are using a Logistic Regression Algorithm For Prediction. After Predicting it, it also gives us the Stage of Disease.

- **HIV Prediction:**

It is used to predict HIV using parameters like T-helper cells, Viral Load and Reverse Transcriptase. We are using Gaussian Naive Bayes Algorithm For Prediction. After Predicting it, it also gives us the Stage of Disease.

- **Fetal Health Prediction:**

It is used to predict HIV using parameters like Fetal Heart rate, Accelerations, Decelerations, Fetal Movements, Contractions and FHR Histogram Measurements etc. We are using the Decision Tree Classifier Algorithm For Prediction. After Predicting it, it also gives us the Stage of Health.

- **BMI (Body Mass Index) Prediction:**

It is used to predict BMI using Gender, Weight and Height. We are using Random Forest Classifier Algorithm For Prediction.

Hospital Medical Team Dashboard:

- Medical teams will have their own login IDs unique to each hospital.
- After successful Login, the Medical team will be redirected to their dashboard.

- Medical Teams will have access to features like Current Status of Patients/Doctors, Admitting/Discharging a patient, Uploading Patient's Diagnostic reports, Assigning Medical Staff to Patient and Setting up Login profile for Doctors.

Doctor Dashboard:

- Doctors will have their own login IDs provided by medical teams of their hospital.
- After successful Login, Doctors will be redirected to their dashboard.
- Doctors can view assigned patients, their test reports, and medical history.
- Doctors can prescribe treatment, tests, medication to the patient currently treated by them.

## V. CONCLUSION

In the presented paper, we reviewed the prevalent methods of how a patient's medical records and health data is managed in our country. We also thought about the adverse effects of mismanaged data in Hospitals. We presented the details of existing systems, working on the concept of storing medical records and chalked down their limitations. Finally, we proposed 'MedRec', our best possible solution to the given problems and a brief plan of the proposed project.

## REFERENCES

- [1] "About the Epidemic." U.S. Department of Health & Human Services. [Online] Available: <http://www.hhs.gov/opioids/about-the-epidemic/>
- [2] "Precision Medicine Initiative Cohort Program." National Institutes of Health. [Online] Available: <https://www.nih.gov/precision-medicine-initiative-cohort-program>
- [3] U.S. Department of Health and Human Services, Office of Civil Rights. (2013). 45 CFR Parts 160, 162, and 164. "HIPAA Administrative Simplification." [Online] Available: <http://www.hhs.gov/sites/default/files/hipaa-simplification-201303.pdf>
- [4] Office of the National Coordinator for Health Information Technology. (2015). Report to Congress. "Report on Health Information Blocking." [Online] Available: [https://www.healthit.gov/sites/default/files/reports/info\\_blocking\\_040915.pdf](https://www.healthit.gov/sites/default/files/reports/info_blocking_040915.pdf)
- [5] [https://www.researchgate.net/publication/22251152\\_0](https://www.researchgate.net/publication/22251152_0)
- [6] "Research We Support." Patient-Centered



Outcomes Research Institute (pcori). [Online] Available:

<http://www.pcori.org/research-results/research-we-support>

[7]Health Analysis System Using Machine Learning

[https://ijcsit.com/docs/Volume%205/vol5issue03/ijcsit20140503280.p](https://ijcsit.com/docs/Volume%205/vol5issue03/ijcsit20140503280.pdf)

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