A Project Report

on

DISEASE PREDICTION USING MACHINE LEARNING

Submitted in partial fulfillment of the
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CANDIDATE'S DECLARATION

I/We hereby certify that the work which is being presented in the project/, entitled **"DISEASE PREDICTION USING MACHINE LEARNING"** in partial fulfillment of the requirements for the award of the BACHELOR OF TECHNOLOGY submitted in the School of Computing Science and Engineering of Galgotias University, Greater Noida, is an original work carried out during the period of month, 2021 July to 2022 May, under the supervision of Dr.Shrddha Sagar Professor, Department of Computer Science and Engineering/Computer Application and Information and Science, of School of Computing Science and Engineering , Galgotias University, Greater Noida

The matter presented in the thesis/project/dissertation has not been submitted by me/us for the award of any other degree of this or any other places.

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This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Dr.Shrddha Sagar

Professor

CERTIFICATE

The Final Project Dissertation Viva-Voce examination of Adarsh Anubhav (18SCSE1010214) Ankit kr. Upadhyay (18SCSE1010670)–has been held on May 2022 and his work is recommended for the award of BACHELOR OF TECHNOLOGY

Signature of Examiner(s)   **Signature of Supervisor(s)**

Signature of Project Coordinator   **Signature of Dean**

Date: May, 2022

Place: Greater Noida

ABSTRACT

In such a fast-booming world of technologies there are diseases that are growing along. With the increasing population around the world. Health service have become one of the most challenging aspects that is greatly affecting people a lot so, our team have decided to build a website using which people across the entire world can get to know the severity of the disease they are suffering from by simple accessing through internet. The proposed method shows promising results both for the distinction of recordings between healthy subjects and patients and for the detection of different disease phases using image processing. It may lead to the easier identification of new disease in patients and the development of home-based monitors for avoiding hospitalizations. It aims at finding significant features by applying machine learning techniques resulting in improving the accuracy in the prediction of disease. The prediction model is introduced with different combinations of features and several known classification techniques. It makes use of artificial Intelligence, machine learning and database management techniques to extract new patterns from large data sets and the knowledge associated with these patterns. By using this technique data can be extracted automatically or semi automatically. The different parameters included in data mining include clustering, forecasting, path analysis and predictive analysis.

Keywords: Machine learning, Deep learning, medical image processing, Data Mining, clinical predictions, artificial intelligence, clustering, predictive analysis, forecasting.

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Chapter 1: Introduction

1. Data mining:

The process of distinguishing commercially helpful patterns or relationship in databases or different laptop repositories through the employment of advanced applied math tools square measure called data processing. it's a comparatively new and promising technology. knowledge is analysing from completely different views and summarizing it into helpful info- information which may be used to discovering vital new correlation, patterns and trends by creating by removal into massive amounts of information hold on in warehouse; exploitation applied math, machine learning.

Fig.1: Applications of Data Mining
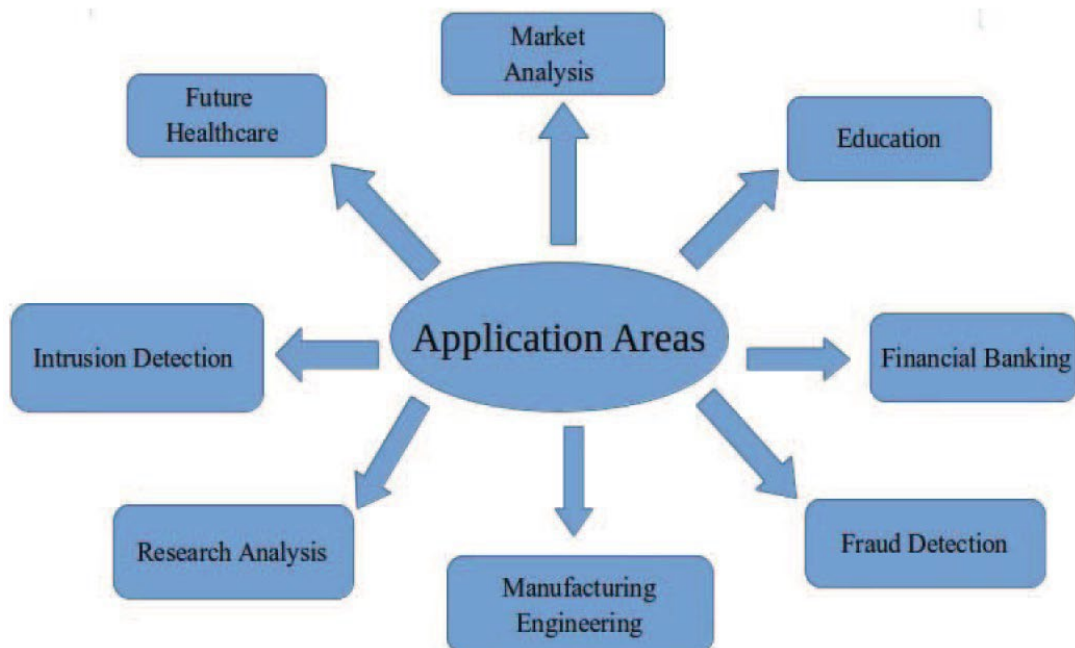
2. Artificial Intelligence:

An artificial intelligence & knowledge visual image technique. Industries like medical, producing, aerospace, chemical etc that square measure already taking profit of knowledge mining. The experience typically consent that in-depth call support needs new technology. This new technology ought to modify the innovation of trends and prophetic patterns in knowledge the creation and testing of hypothesis and generation of insight-provoking visualizations. The

idea of knowledge mining helps the finish users to extract helpful info from massive databases. These massive knowledgebases square measure gift in data warehouses, i.e., "Data Mountain," that square measure bestowed to knowledge mining tools. In short knowledge deposition permits one to construct the info mountain. data processing is that the nontrivial removal of implicit, antecedent unidentified and doubtless helpful info from the knowledge mountain. This knowledge mining is not precise to any business – it needs intellectual technologies and the avidness to explore the chance of hidden information that resides within the knowledge. additionally, data processing is thought as information discovery in databases (KDD). knowledge mining is involved to finding hidden relationships gift in business knowledge to permit businesses to create predictions for Future use. it's the method of data- driven removal of not therefore clear however helpful info from massive databases.

3. Machine Learning:

We square measure coming into era of massive knowledge. for instance, there square measure regarding one trillion internet pages; one hour of video is uploaded to YouTube every second amounting to 10 years of content each day; the genomes of thousands of individuals every of that has a length of 3.8x109 base pairs have been sequences by a selection of labs. Wal-Mart handles additional than 1Milion transactions each hour and has databases containing larger than two.5 x 1015 of info Cukier 2010 and then on. thus, this overflow knowledge of information} calls for planned ways of data analysis that is what machine learning provides. we have a tendency to outline cc as a group of ways that may mechanically determine patterns in information and then use the uncovered patterns to forecast future information or to perform different sorts of call creating beneath uncertainty.

Some of the most styles of machine learning are:
a) supervised Learning: during this learning the coaching knowledge is labelled with the correct answers as an example spam or ham the 2 commonest styles of supervised learning area unit classification and regression.
b) unsupervised learning:

In this we have a tendency to area unit given a set of unlabelled knowledge, that we have a tendency to would like to investigate & discover patterns among. the 2 most significant examples area unit dimension

reduction and agglomeration.

c) Reinforcement learning:

In this associate degree agent as an example, a automaton or controller seeks to be told the best actions to require based mostly the results of past actions. There area unit varied alternative styles of

ML for example:

i). Semi-supervised learning, during which solely a set of

the coaching knowledge is labelled within the system.

ii). Time-series prediction, like in monetary markets within the system.

iii). Anomaly detection like used for fault-detection in factories and in police investigation method.

iv). Active learning that getting {the knowledge the information} is additional expensive so associate degree rule should establish that coaching data to get and lots of others.

Based on a recent study by the Registrar General of Bharat or RGI and also the Indian Council of Medical analysis within the cohort of twenty-five-69 years regarding 25 you look after deaths occur due to heart diseases. it's the one largest reason behind death within the globe. many researcher's area unit victimization applied mathematics & data processing tools within the diagnosing of heart condition. There area unit varied complex data processing techniques and algorithms that area unit utilized in varied areas for forecast. a number of the applying area

Fig. 2: Projected number of deaths worldwide by 2030
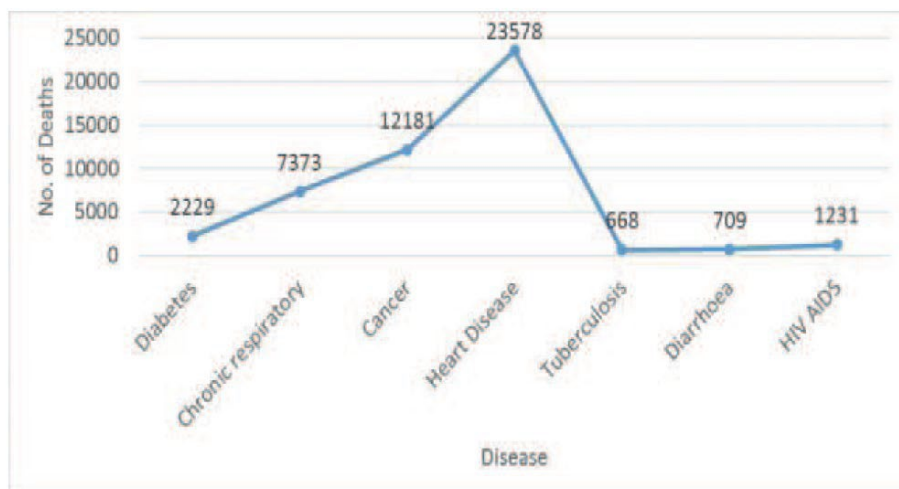
unit as of information mining are given in Figure two. data processing is an important step of data discovery. It combines applied mathematics analysis, millilitre & info technology to extract hidden patterns and relationships from databases. data processing uses strategies: 1) supervised learning and 2) unsupervised learning.

DM shows a technique developed to examine vast amounts of information often gathered. usually, the term additionally refers to a set of tools want to perform the method. one among the constructive applications within the field of medication is that the incurable chronic malady polygenic disorder. DM rule is employed for confirmative the accuracy in predicting diabetic standing.

Classification is one among the foremost repeatedly studied issues by DM and metric capacity unit researchers. Classification consists of predicting an exact result supported a given input. so as to predict the result the rule processes a coaching set as well as a group of attributes and therefore the individual results usually referred to as goal or prediction attribute within the system. Here the rule tries to see relationships between the attributes that will build it attainable to predict the results. Then the rule is given a knowledge set not seen before referred to as coaching set

which includes an equivalent set of attributes rather than the category label not however renowned. Here, the rule determines the input and provides a prediction within the method.

4. Literature reviews/comparative study:

Present study is concentrated on to understand the severity of the malady that individuals are stricken by easy accessing through net. Intensive efforts are created to search out the relevant studies to assist to create simpler and correct means.

For the analysis purpose, studies from Indian and foreign countries are going to be reviewed. Studies in Machine learning, Deep learning, medical image process, data processing, clinical predictions, computing, clustering, prophetical analysis, statement have additionally been thought-about for the analysis purpose.

Dan A. Simovici (1999) projected that association rules represent data in information sets as results and are directly associated with calculation of frequent item sets.

> Gitanjali J, et.al (2011) projected study of big datasets from varied angles and getting gist of helpful info. These strategies are helpful in police investigation diseases and providing correct remedy for an equivalent.

- Krishnaiahet.al. (2014) aims to calculate varied strategies of information mining in applications to develop choices and additionally to supply a close discussion regarding medical. data processing techniques will improve varied angles of clinical predictions.
- Mohammed Abdul Khaleel (2014) states data processing as a plan that studies great deal {data of information} and extracts patterns that may be born-again to helpful knowledge.

Chapter 2: Requirements, Feasibility and Scope/Objective

2.1 Existing Systems: Existing Systems: we want nice medical facility as everyone sooner or later gets at risk of some illness. we have a tendency to settle for that specialist's square measure altogether therapeutic consultants which there's nice analysis behind all their selections. That cannot be the case all the time. they cannot presumably target memory all the information they need for every circumstance. downside of a current framework would be that the patients ought to visit the specialist face to face and still doesn't get acceptable treatment, because the specialists square measure unfit to foresee the correct illness. Human mistake is often dodged with the help of laptop helped quality basic leadership. it's poor once their square measure stupendous measures of knowledge to be classified. Also, proficiency and exactitude of selections can diminish once folks square measure place into pressure and monstrous work. Even a specialist UN agency must check out 5 patient records. during this paper, we have a tendency to come into being to spot economical rule for mining results. we are able to produce versatile applications for drugs sector thus on fulfil by mistreatment of these prophetic analytics and data processing techniques.

• This tells however Naïve Byes rule is employed to seek out frequent knowledge things and compares them with the present algorithms.

• data processing techniques is employed to use on medical knowledge that has voluminous scope for rising health solutions.

• Electronic health records and different historical medical knowledge will prove miracles if used a right purpose.

• Brobdingnagian amounts of complicated knowledge generated by health care sector includes details concerning diseases, patients, identification strategies, electronic patient's details hospitals resources.

2.2 Proposed System: To beat the drawback of existing framework we've created illness Analysis System. we've engineered up a specialist framework referred to as illness Prediction framework, that is used for rising the task of specialists. A framework checks a patient at initial level and proposes the attainable diseases. It begins with obtaining some info concerning manifestations to the patient, within the event that the framework will distinguish the fitting illness, at that time it proposes a specialist accessible to the patient within the nearest conceivable territory. On the off likelihood that the framework is not sufficiently positive, it asks few inquiries to the patients, still on the off likelihood that the framework is not sure; at that time, it'll show a number of tests to the patient. In light-weight of accessible total knowledge, the framework can demonstrate the result. we've utilised some intelligent mining strategies to work the foremost precise disorder that would be related to patient's appearances and hooked in to the info of a few of patient's restorative record, calculation (Sklearn) for mapping the aspect effects with conceivable diseases. If the system is unable to produce solutions, it informs the user concerning probable illness they need. If the user symptoms don't precisely match with any illness in our info, shows the diseases user might most likely have decision making the input symptoms. this method tends to interchange the present system for about to the doctor for obtaining identification on ill health you're littered with to a wise resolution wherever you get instant identification on getting into symptoms within the system. the most options of this method are going to be giving instant identification on the user entered symptoms and obtaining tips for remaining work. within the projected system, we have a tendency to square measure use the info mining technique within which the symptoms entered by user's square measure cross checked within the info and from that the frequent item sets square measure mined out of that the present datasets. The projected system is incredibly economical rule enforced.

2.3 Feasibility analysis: A feasibility analysis in attention is an element of a strategic arrange designed to handle a medical, acute, or long run care, in or patient service growth or new development. The attention practicableness study and strategic designing method encompasses many parts. First, the market study distinguishing wherever the shoppers are and the way they get connected to your service. Second, a money practicableness analysis, generally encompassing 3 to 5 years of professional forma money statements. the ultimate step within the completion of the attention strategic designing method is the business arranges parts

specifying the execution arrange for creating the project a reality. Experience: we have a tendency to are up with each passing day in attention operations. Our knowledgeable models embrace algorithms that are nearly as good as operations executives within the attention business, overseeing multiple acquisitions, facility building comes, and new program developments in acute care, long care, and patient MD apply settings, to call a number of. They've additionally been liable for the continuing operations of those developments. So, rest assured, we have a tendency to perceive that a high-quality practicableness study isn't an instructional exercise. Rather, it's the inspiration upon that organizations develop triple-crown programs and growth.

Outcomes: we have a tendency to is also considering the addition of a replacement baseline, a replacement piece of medical instrumentality, or a wholly new medical facility. no matter it's, our success is supported several things, and proper, thorough designing for the institution of the growth associate degreed diversification of an existing one, provides a solid foundation upon that core objectives may be met. we have a tendency to perceive that principle, and the way to assess the factors to be known and analysed in order that the queries a practicableness analysis ought to answer can alter well-vetted selections.

2.4 Project Scope

• The malady prediction system has three users like doctor, patient and

• admin.

• Each user of the system is documented by the system.

• There may be a role primarily based access to the system.

• The system allows the patient to provide symptoms and consistent with those

• symptoms the system can predict a malady.

• The system suggests doctors for expected diseases.

• The system permits on-line consultation for patients.

• The system helps the patients to consult the doctor at their convenience by

• sitting reception.

Chapter 3: Analysis, Activity Time Schedule (PERT)

3.1 Technology used

Front end: HTML, CSS , Bootstrap, Javascript, Jquery

Back end: Django (python based web framework)

Database: PostgreSQL

Tools: PgMyadmin, Orange

3.2 Complete work plan layout:

The project that our team have decided to work on is disease analysis test which as briefly mentioned above will detect the disease of the person either through image processing or from the data with which it is trained. We divided our work into two phases (i.e. phase 1 and phase 2).

PHASE I: In this phase, we are firstly acquiring all the available knowledge about these diseases so that we come up with one of the best products in the present time. We will build models for seven disease (the diseases are listed below) using data mining and machine learning with the help of python libraries. Then to deploy the webapp we are using django framework to deploy these machine learning models to an interactive webapp.

PHASE II: In this phase, we will build a website which will deploy all the models of different diseases into a combined single website. The languages that we are going to use HTML5, CSS, JavaScript and bootstrap. We look to build a completely website which can prediction the diseases correctly of people at most accuracy. And we will keep on updating the site with many more diseases in the future as well.
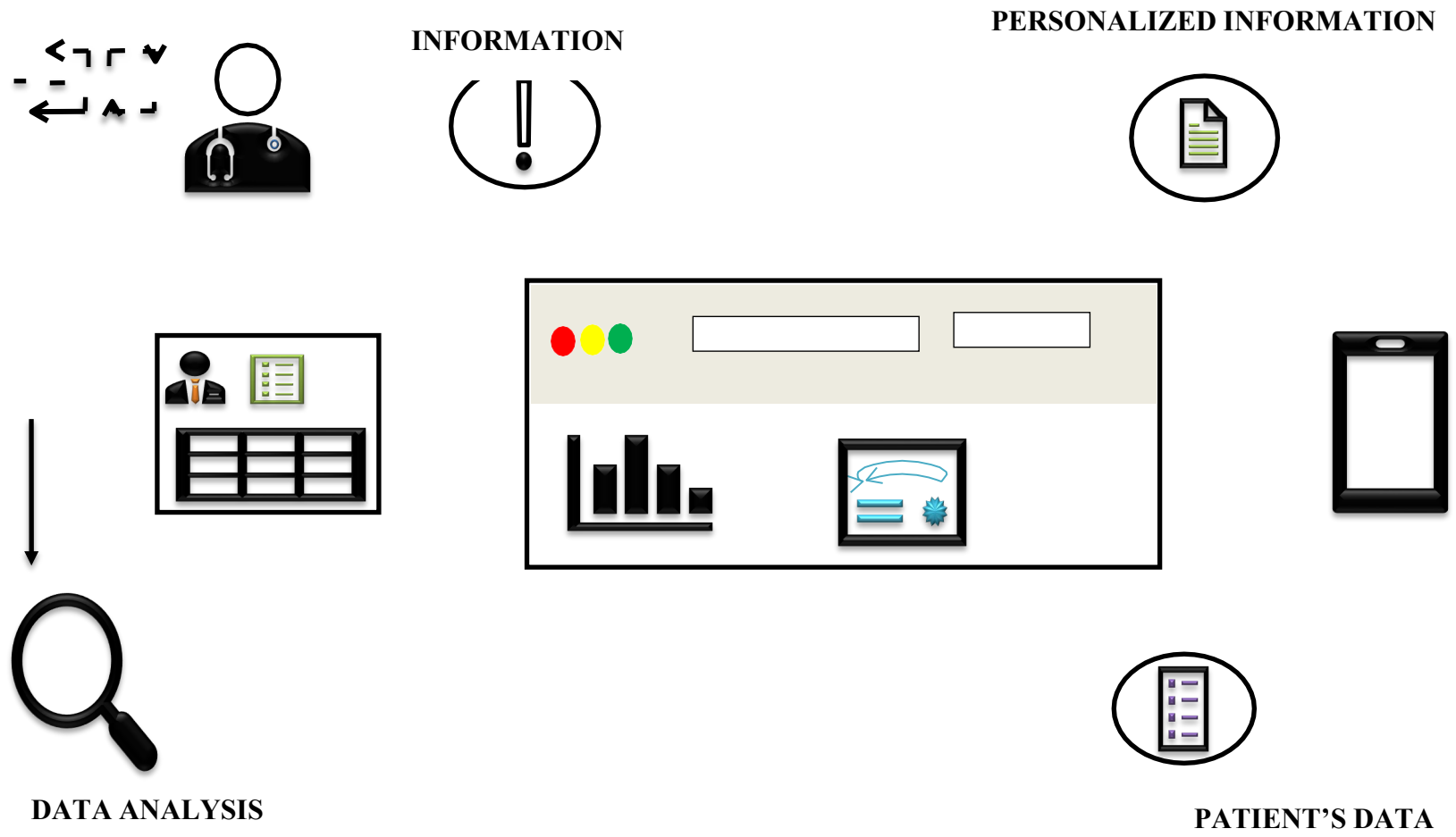
Chapter 4: Design

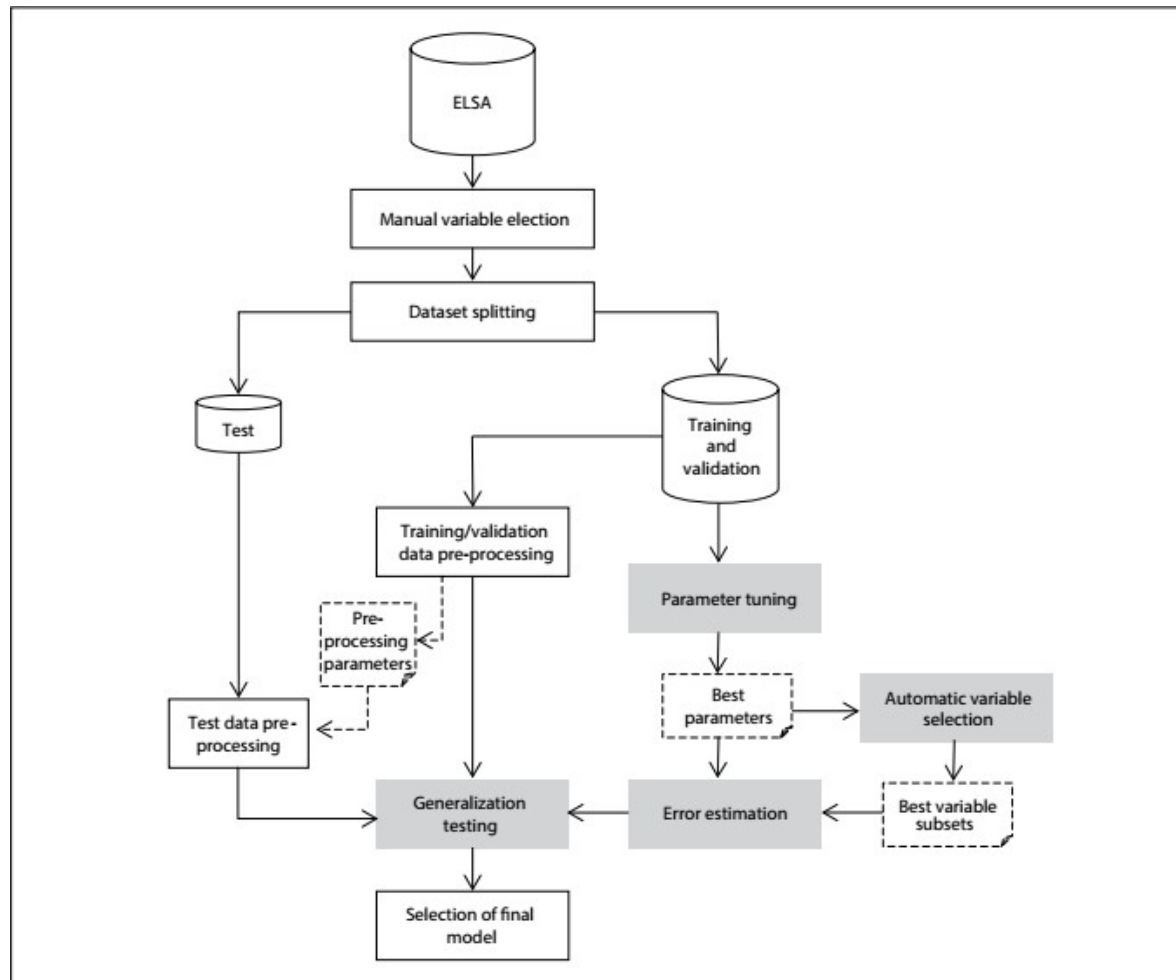**ARCHITECTURE DIAGRAM FOR EXISTING SYSTEM**
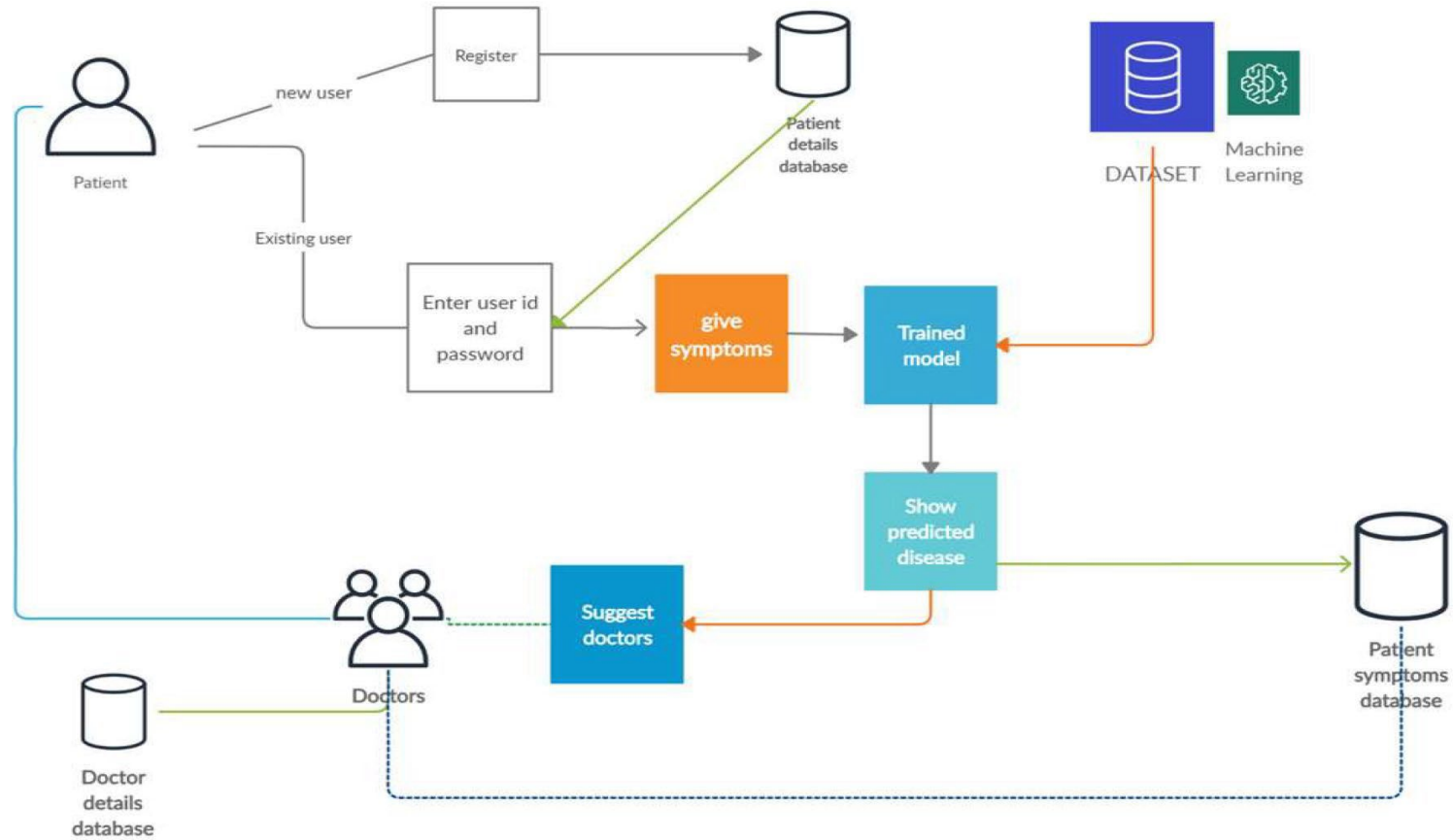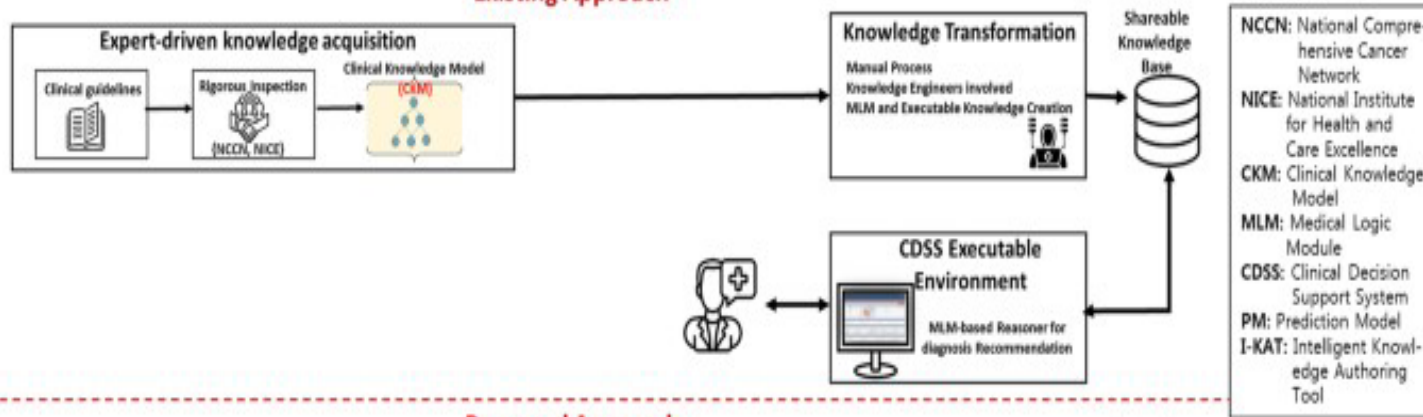
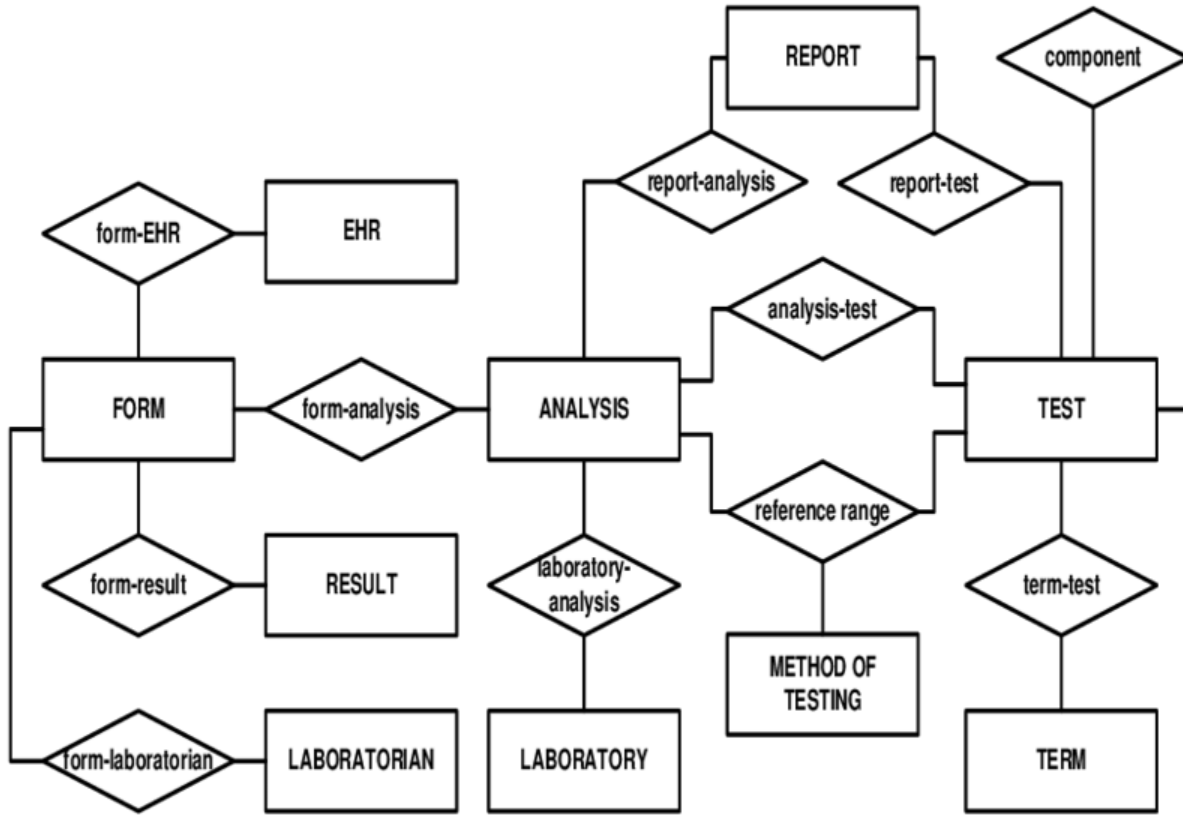# Architecture Of The System
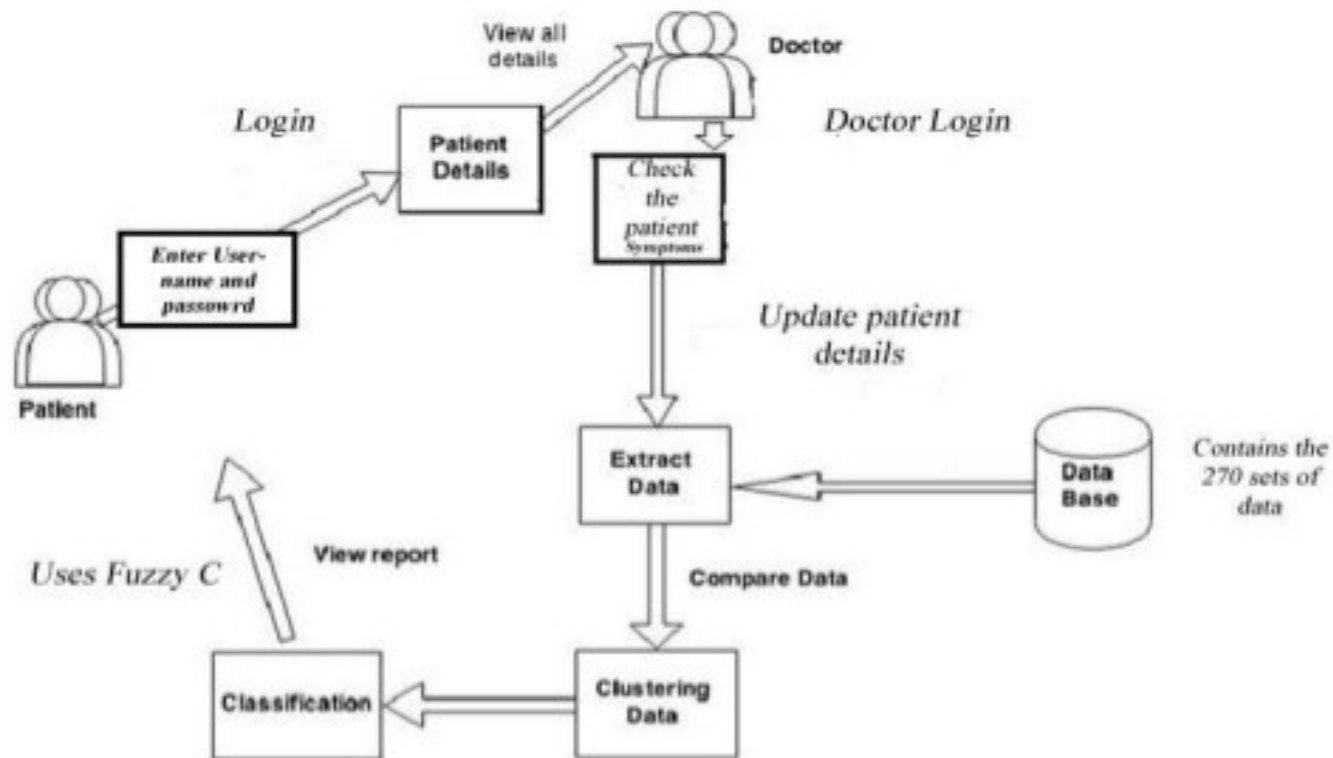
ARCHITECTURE DIAGRAM FOR PROPOSED METHOD

INFORMATION

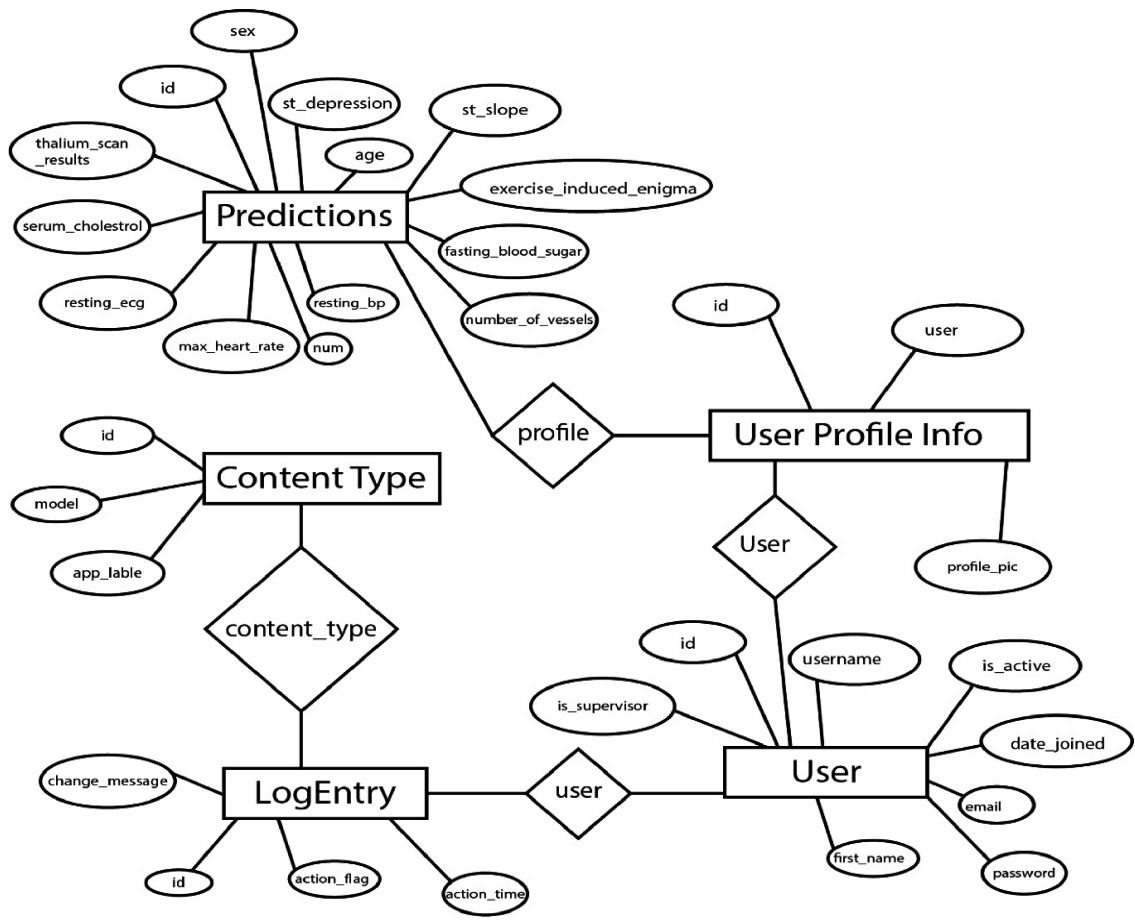PERSONALIZED INFORMATION

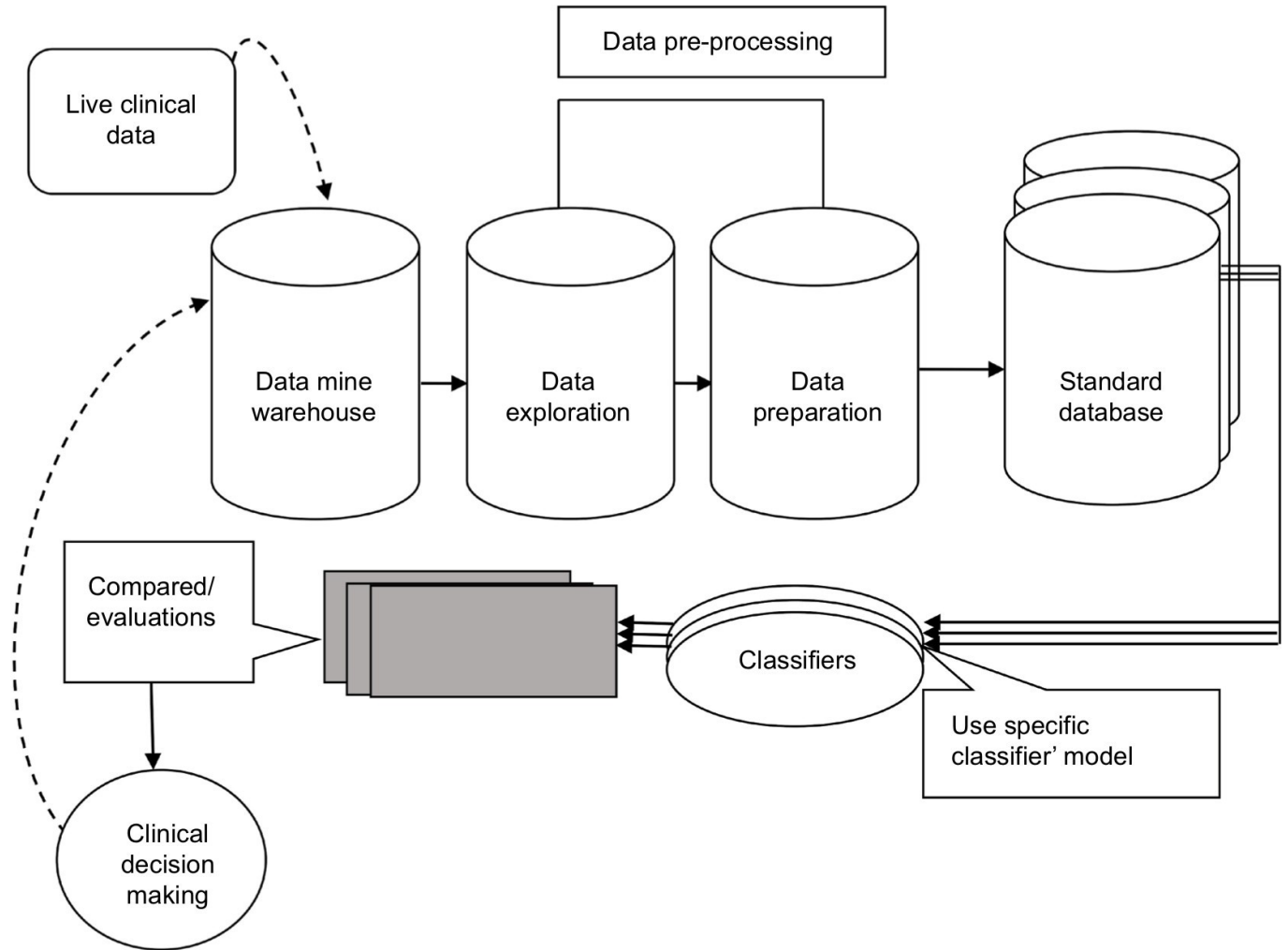DATA ANALYSIS

PATIENT'S DATA
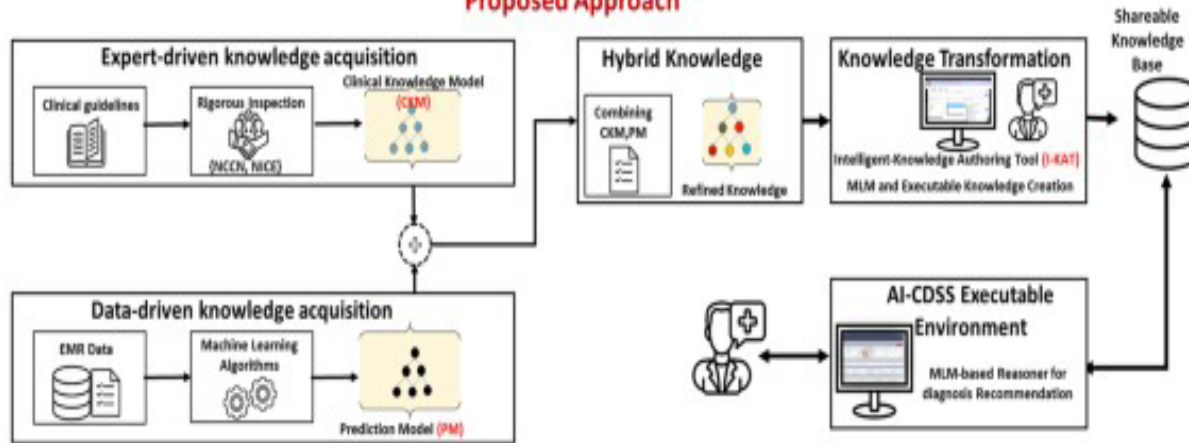
ER Diagram

OTHER DBMS DIAGRAM

Chapter 5: Implementation & Testing

5.1 Phases and modules division

Phase I: In this phase, we are firstly acquiring all the available knowledge about these diseasesso that we come up with one of the best products in the present time. We are building models for seven disease (the diseases are listed below) using data mining and machine learning with the help of python libraries. Then to deploy the webapp we are using django framework to deploy these machine learning models to an interactive webapp.

Some of the most efficient and accurate algorithm/technologies to find a particular disease listed below;

1. Skin Disease
   - Gradient Boosting Decision Trees (GBDTs)
   - Data Pre-processing
   - Dataset Analysis
   - Gradient Boosting Machine (GBM)
   - Random Forest (RF)
   - Decision Tree (DT)
   - Support Vector Machine (SVM)
   - Classification and Regression Trees (CART

2. Heart Disease
   - Logistic Regression
   - K-NN (K-Nearest Neighbours)
   - SVM (Support Vector Machine)
   - Naive Bayes Classifier
   - Decision Trees
   - Random Forest
   - XGBoost

3. Thyroid Disease
   - Decision trees
   - Random forest
   - Support vector machine
   - Artificial Neural Network
   - Logistic regression

- ➤ support vector machine (SVM)
- ➤ k-nearest neighbour (kNN)

4. Breast Disease
    - ➤ BCRAT
    - ➤ BOADICEA
    - ➤ computer aided detection (CADe)
    - ➤ computer aided diagnosis (CADx)
    - ➤ Support Vector Machine (SVM)
    - ➤ Logistic Regression
    - ➤ Naive Bayes

5. Diabetes
    - ➤ Logistic Regression
    - ➤ Gradient Boosting Machine (GBM)
    - ➤ area under the receiver operating characteristic curve (AROC)
    - ➤ k-Nearest Neighbours
    - ➤ Logistic regression

Phase II: In this phase we divided the whole project into multiple modules.

Admin: This is the module of Administrator which is created by django by default. It includes admin's sign-in page and admin's dashboard.

Homepage: This is the front page of our web application where user can sign-up/sign-in as a doctor or patient.

Doctor Dashboard: Doctor's homepage after successfully sign-in. Here doctor can see their patients.

Patients Homepage: Patient's homepage after successfully sign-in. Here patient can enter their symptoms from the given options and the application predict their disease and refer to respective doctor.

Chat: Here doctor and patient can communicate each other through text messages.

Phase III: In this module, we are building a we "WEBSITE" which will deploy all the models of different diseases into a combined single website. The languages/technologies that we are going to use are HTML5,CSS, JavaScript and bootstrap. We look to build a completely website which can prediction correctly the diseases of people at most accuracy. And we are kept on updating the site with many more diseases in the future as well.

5.1 Data collection

Data collection has been done from the internet to identify the disease here the real symptoms of the disease are collected i.e. no dummy values are entered.

The symptoms of the disease are collected from kaggle.com and different health related websites. This csv file contain 5000 rows of record of the patients with their symptoms (132 types of different symptoms) and their corresponding disease (40 class of general disease).
Some rows of disease with their corresponding symptoms in the dataset are-

|	Disease	Symptoms
0	Malaria	[chills, vomiting, high_fever, sweating, heada…
1	Allergy	[continuous_sneezing, shivering, chills, water…
2	Fungal infection	[skin_rash, nodal_skin_eruptions, dischromic _…
3	Gastroenteritis	[vomiting, sunken_eyes, dehydration, diarrhoea]
4	arthritis	[muscle_weakness, stiff_neck, swelling_joints,…
5	Typhoid	[chills, vomiting, fatigue, high_fever, headac…
6	Hypertension	[muscle_weakness, stiff_neck, swelling_joints,…

5.3 webapp:

Homepage:
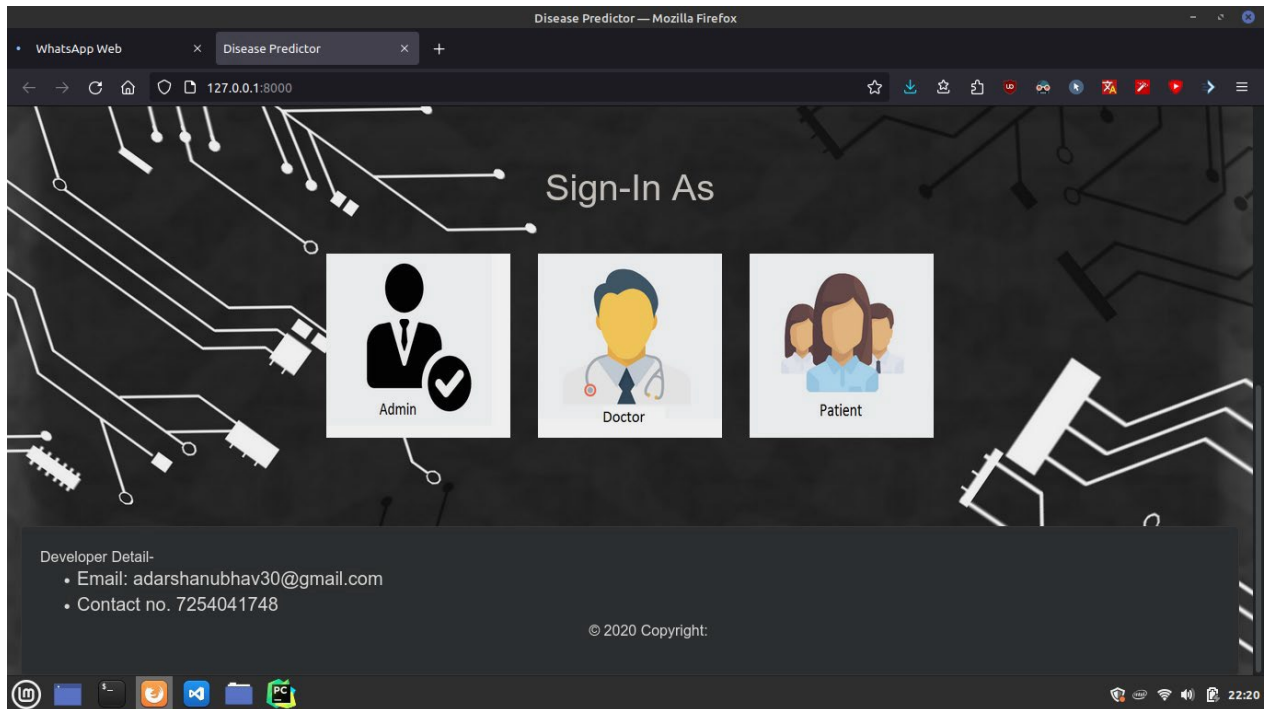
Login Modal:

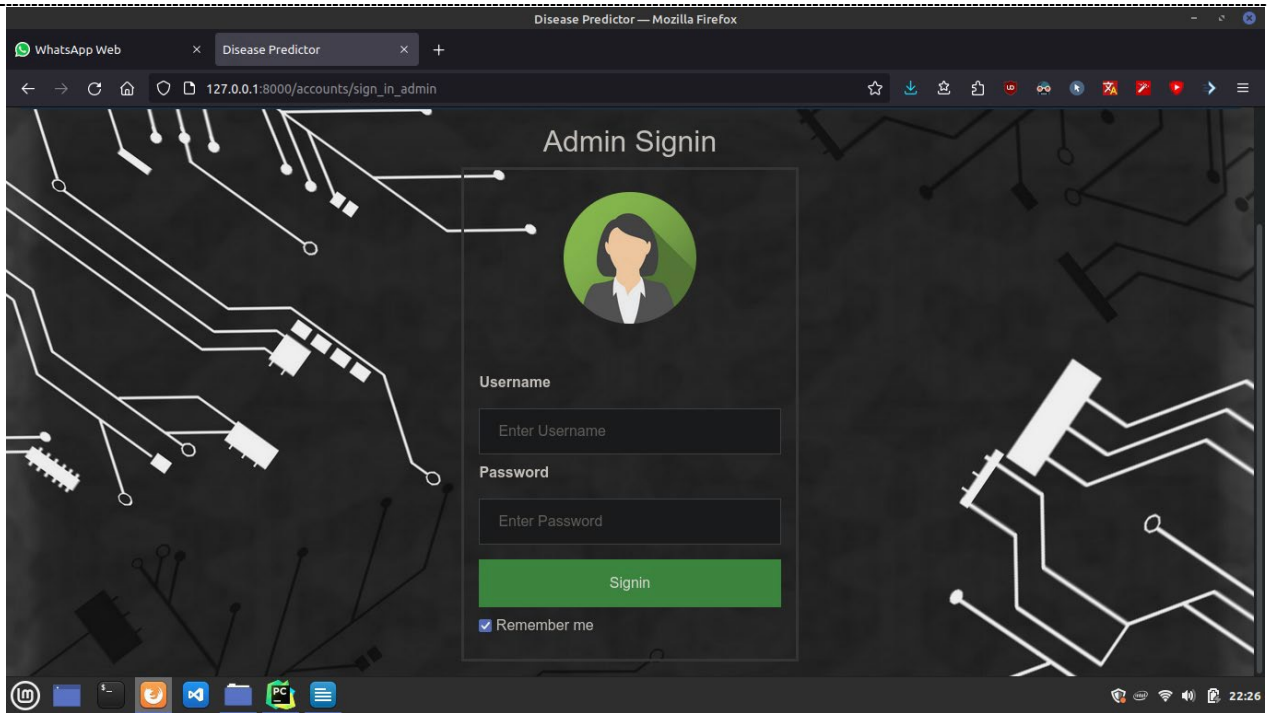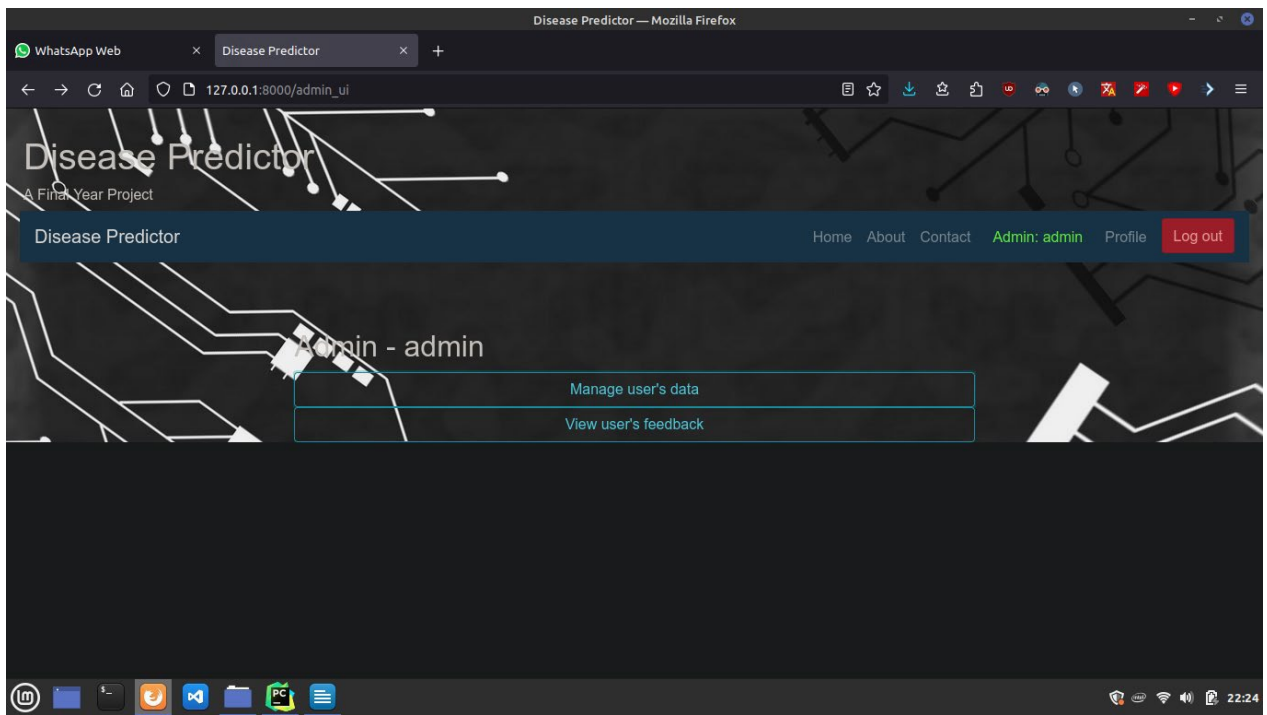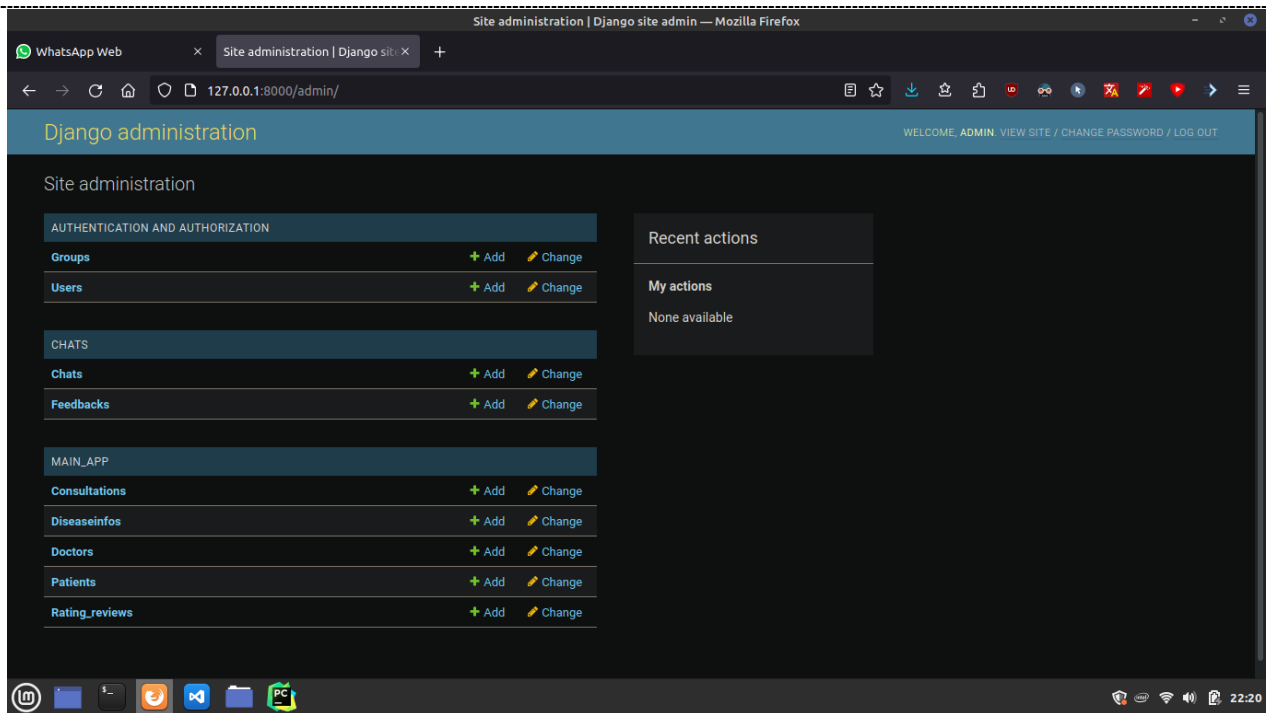Login as Patient-
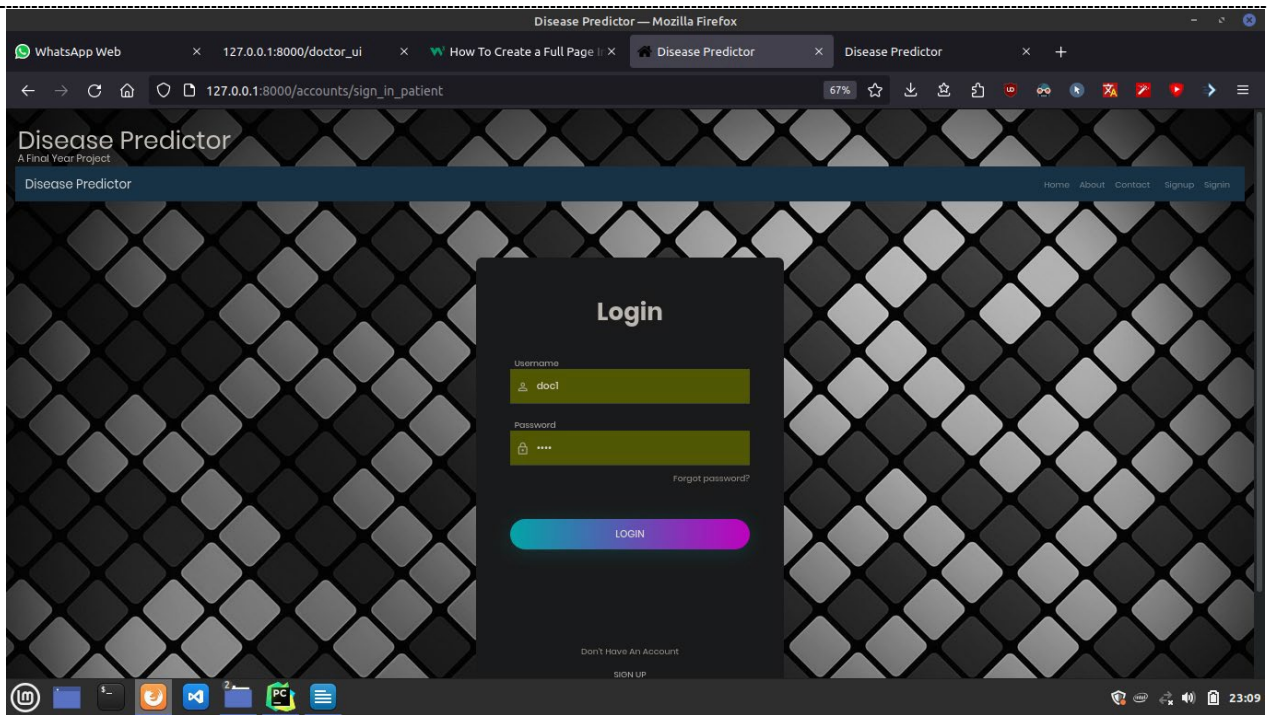
Predictions-
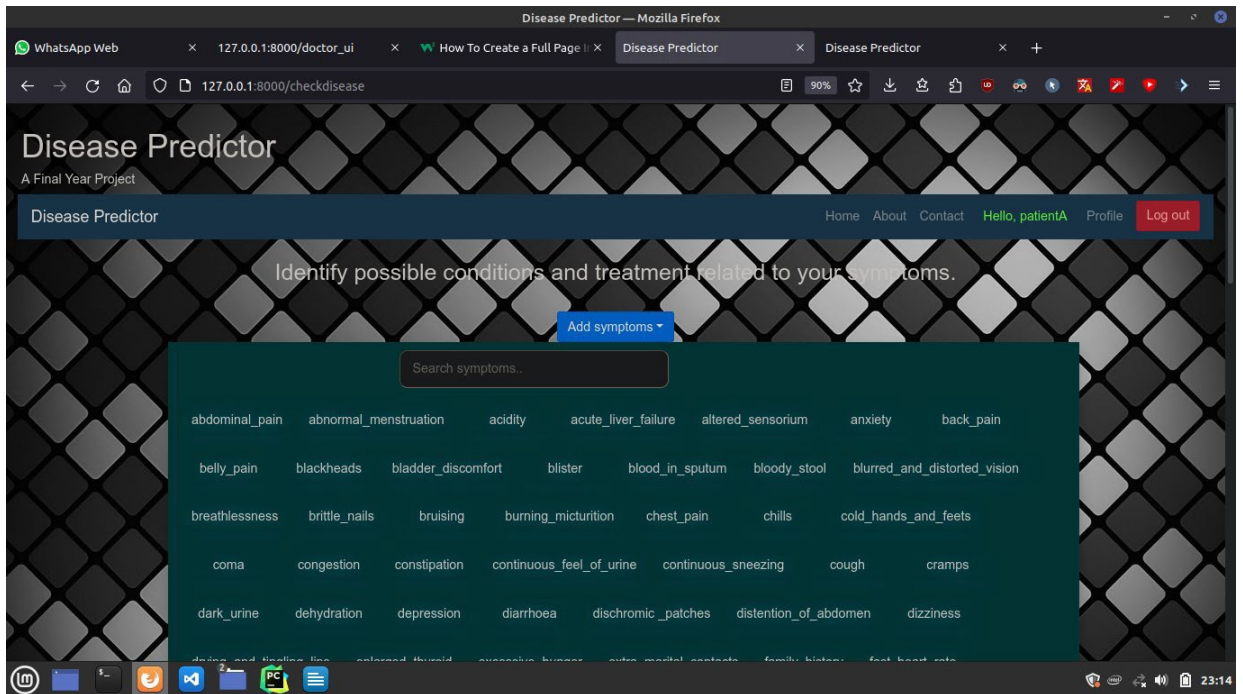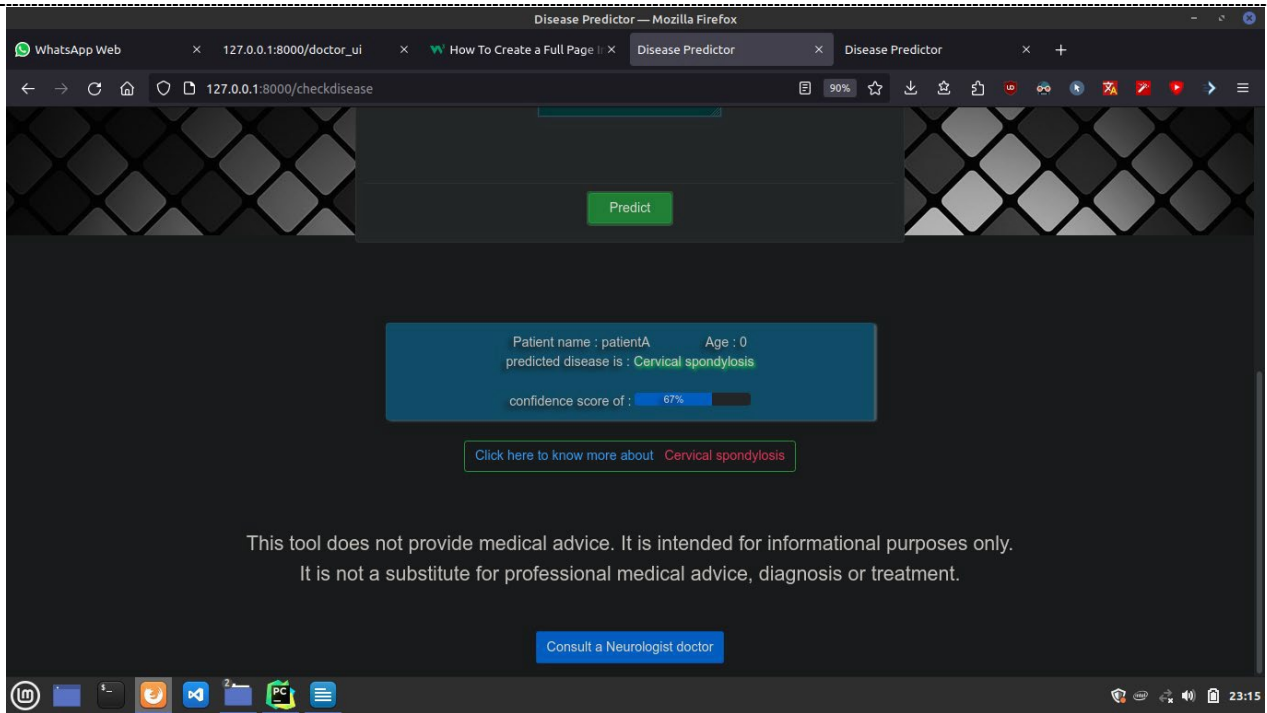
Consult a Doctor:
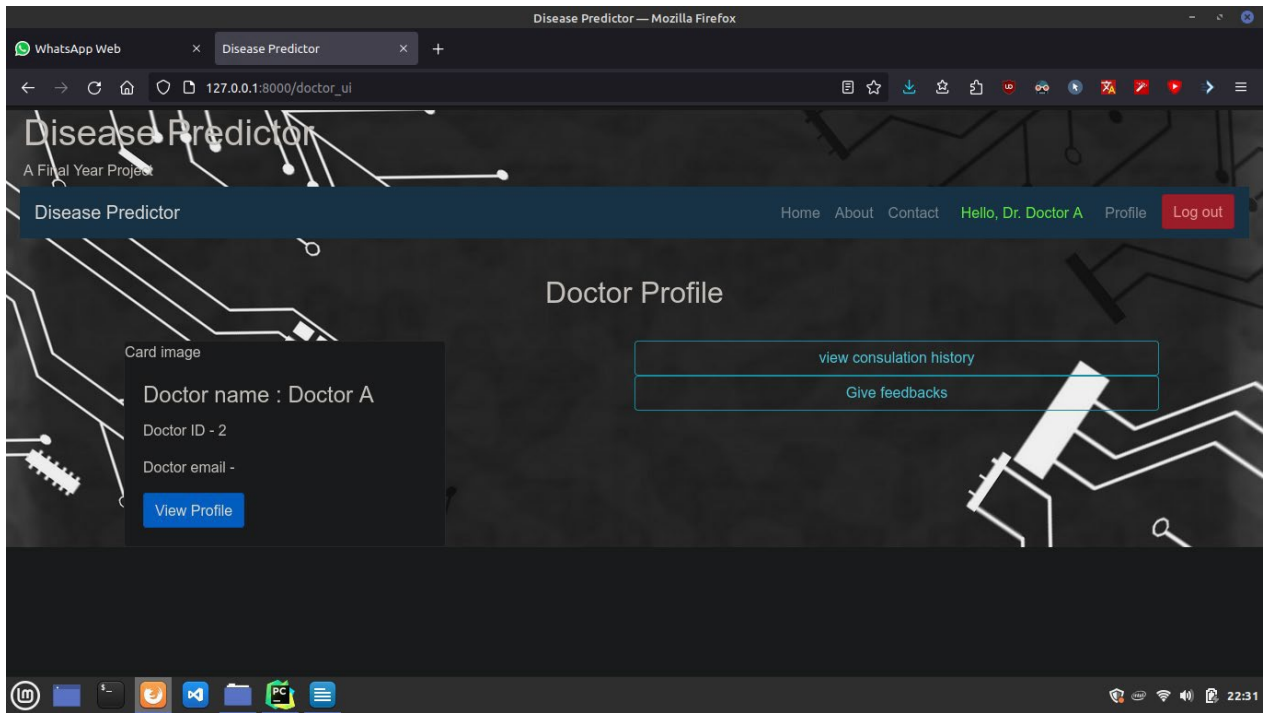
Admin Signup:

Admin Interface:

admin dashboard:

Chapter 6: Limitations and Future Scope of the Project

6.1 Limitations

1.A lack of private involvement: AI instruments will operate with minor errors which will not have an effect on the diagnosis method or operation significantly. not like computers, physicians will violate some rules to try to their utmost to avoid wasting a person's life.

2. an increase in state rates among aid workers: Since AI has been enforced throughout the full system of aid on a grander scale, several activities that were historically performed by humans will be done by machines today. Chatbots and robots will give psychological state facilitate, analyse the condition of patient's health, and foresee some issues like seizures, sepsis, pathology, etc.

3. chance of a Defective Diagnosis: The correct diagnosing for a definite unwellness depends on numerous knowledge collected from several people that have intimate similar symptoms and conditions. to urge the suitable comparison, the AI info ought to contain decent info regarding the patients of the actual cluster. Therefore, if there's a scarcity of data a few persons from a definite background, AI will give AN inaccurate diagnosing.

4. Social Prejudices: AI-based machines cannot totally perceive attribute and also the background that creates them biased against the patients being diagnosed.

6.2 Future work

Everyone people would love to own sensible an honest a decent medical aid system and physician's area unit expected to be health workers and take good selections all the time. however, it's extremely unlikely to learn all the information, patient history, records required for each state of affairs. though they need all the huge quantity of knowledge and information; it's troublesome to match and analyse the symptoms of all the diseases and predict the end result. So, integration info into patient's customized profile and performing arts an in-depth analysis is on the far side the scope a doctor. So, the answer is ever detected of a personalised aid set up – solely crafted for a private. prognosticative analytics is that the method to create predictions regarding the longer term by analysing historical knowledge. For health care, it might be convenient to create best selections just in case of each individual. prognosticative modelling uses computer science to form a prediction from past records, trends, people, diseases and also the model is deployed so that a brand-new individual will get a prediction instantly. Health and health care units will use these prognosticative models to accurately assess once a patient will safely be discharged.

6.3 Future Scope of the Project

In future, we have a tendency to area unit attending to introduce AN economical unwellness prediction system to predict the unwellness with higher accuracy utilizing totally different data processing classification techniques like call Tree, Naïve Bayes, and Support Vector Machine (SVM). As a future work, we've got planned to perform extra experiments with additional dataset and algorithms to enhance the classification accuracy and to create a model that may predict specific cardiovascular disease varieties. In future AN intelligent system could also be developed that may result in choice of correct treatment strategies for a patient diagnosed with totally different diseases. heaps of labour have been done already in creating models that may predict whether or not a patient is probably going to develop a unwellness or not. The area unit many treatment strategies for a patient once diagnosed with a specific style of unwellness. knowledge mining and analysis will be of superb facilitate when deciding the line of treatment to be followed by extracting information from such appropriate databases.

6.4 Conclusions

Diseases is one in all the leading causes of death worldwide and the early prediction of diseases is necessary. the pc motor-assisted unwellness prediction system helps the medical practitioner as a tool for disease identification. Some Diseases organisation is reviewed during this system. From the analysis it's all over that, information mining plays a serious role in unwellness classification. Neural Network with offline coaching is a smart for unwellness prediction in early stage and the smart performance of the system is obtained by pre-processed and normalized dataset. The classification accuracy is improved by reduction in options.

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