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School of Information Technology and Engineering

Department of Software and Systems Engineering

OCTOBER 2019

VASCULAR DISEASE PREDICTION

AN INDUSTRIAL INTERNSHIP REPORT

Submitted in partial fulfilment for the award of the degree of

MTech

in

Software Engineering

by

DIVAKAR .R 16MIS0069

School of Information Technology and Engineering

Department of Software and Systems Engineering

DECLARATION BY THE CANDIDATE

I hereby declare that the Industrial Internship report entitled **"VASCULAR DISEASE PREDICTION"** submitted by **DIVAKAR .R 16MIS0069** to VIT, Vellore, in partial fulfillment of the requirement for the award of the degree of **MTech (Software Engineering)** is a record of bonafide **Industrial Internship -SWE3099** carried out by me under the guidance of **ESHWARAN, TEAM LEADER in Live Stream Technologies**. I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full, for the award of any other degree in this institute or any other institute or university.

Place: Vellore

Date: 16/10/19 **Signature of the Candidate**

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BONAFIDE CERTIFICATE

This is to certify that the Industrial Internship report entitled **VASCULAR DISEASE PREDICTION** by **DIVAKAR .R 16MIS0069** to VIT Vellore, in partial fulfillment of the requirement for the award of the degree of **MTech (Software Engineering)** is a record of bonafide work carried out by him /her under my guidance. The project fulfills the requirements as per the regulations of this Institute and in my opinion meets the necessary standards for submission. The contents of this report have not been submitted and will not be submitted either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Signature of Internal Guide

Examiner(s) Signature

1.
2.

LIVE STREAM TECHNOLOGIES
<<Consume I/P & Produce O/P>>

DATE: 06/07/2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. R.DIVAKAR** student of **M.Tech(SOFTWARE ENGINEERING) [RegNo:16MIS0069],**THIRD YEAR, **VELLORE INSTITUTE OF TECHNOLOGY, VELLORE** has successfully completed **INTERNSHIP** in **WEB DEVELOPMENT USING PYTHON TECHNOLOGY** in our Organization during the period from 07/06/2019 to 06/07/2019.

During this Internship period he has involved in developing an application module of the company's project and supported our technical team.

For **LIVE STREAM TECHNOLOGIES**

LIVE STREAM TECHNOLOGIES

Authorized Signatory

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ABSTRACT

Vascular disease prediction system is a web based disease prediction system that helps the users to analyse the user's condition of the veins in their body by providing the details like blood pressure, cholesterol levels and other medical related variables in order to come to a decisive approach to predict the result.

Sensor based vascular prediction systems, retinal based vascular prediction systems are the newest technologies that are used in predicting the disease other than the conventional approach where we enter the details manually each time. Normally patients would stand in a large queues to get their body scan and then they wait for hours to get their results and then consult a doctor with it but by using vascular prediction systems in minutes we can get the desired results and then consult the doctor accordingly with the results.

Vascular predictions may or may-not always be correct always the time that's the main reason its termed as prediction rather than a decisive system to go for so it's considered to be in second in the line of preferences, but with the increasing population and new innovational ideas makes the vascular prediction system more stream lined and trustable than the conventional day to day hospital processes which requires constant presence of clients and require a considerable amount of time.

ACKNOWLEDGEMENT

I wish to express our heartfelt gratitude to **Dr.G.Viswanathan**, Chancellor, VIT, Vellore, for providing facilities for the Industrial Internship. I am highly grateful to our Vice President, **Dr.G. Sekar Viswanathan**, Vice chancellor **Dr. Anand A. Samuel,** and Pro-Vice Chancellor **Dr.S.Narayanan,** for providing the necessary resources.

My sincere gratitude to **Dr. Balakrushna Tripathy**, Dean, School of Information Technology and Engineering, for giving me the opportunity to undertake the project.

I wish to express my sincere gratitude to **Dr. S. Sree Dharinya**, Head of the Department, Software and Systems Engineering, **Prof. P.Ushapreethi & Prof. Ramaprabha KP**, Industrial Internship Coordinators, M.Tech (Software Engineering), School of Information Technology and engineering for providing me continuous support to do my project work**.**

I would like to express my special gratitude and thanks to my external guide **Mr Eshwaran.** Live stream technologies and internal guide **Prof. Nadesh R.K.** , SITE for their esteemed guidance, immense support and encouragement to complete the internship successfully.

I thank the management of VIT, Vellore for permitting me to use the library resources. I also thank all the faculty members of VIT, Vellore for giving me the courage and strength I needed to complete my goals. This acknowledgement would be incomplete without expressing my whole hearted thanks to my family and friends who motivated me during the course of the work.

Place: Vellore

Date: 16/10/19 DIVAKAR .R

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LIST OF ABBREVIATIONS

ACRONYM	EXPANSION
HTML	Hypertext Mark-up Language
CSS	Cascading style sheet
JS	JavaScript
.PY	Python files
BP	Blood pressure
BMI	Body mass index

HRPM	Heart rate per minute
CVD	Cardio vascular disease

INTRODUCTION:

1.1 PROBLEM STATEMENT:

The vascular disease prediction system is a modern and creative approach to solve the problem of analysing the cardio vascular and other arteries in the human body rather than the pre-existing body scan approach. The main aim is to predict the cardio vascular disease based on the given user data, we can collect the data in three ways either by using an IOT based sensor or by retinal scan of the user or through pre-recorded data that can be entered by the user.

- Existing methods takes much longer time to get scan results.
- People should get into a lab facility or a hospital to get their bodies scanned.
- Scanning machines may sometimes be down while in web based vascular prediction systems.

1.2 Motivation:

The main focus of shifting from manual based vascular disease identification to web based prediction system is to reduce the above mentioned problems of requiring more time and manual errors and that may occur in the existing process.

Digitalisation is also the main motivation behind vascular prediction system as all the operations performed on the system will be recorded as digital data and then can be used for future aspects. IOT enabled devices and the ability to store large amount

of data and then able to successfully process it can also be said as a motivation for this project.

1.3 OBJECTIVES:

- Vascular disease prediction system aims to predict the users vascular conditions based on scans and given user data.
- Vascular disease prediction analyses the user's condition by collecting their symptoms and then processing it and then produces what are the diseases that users might have in their body.
- Vascular prediction system gives a clear view of each vascular disease and the effective methods to maintain their body.
- After displaying results vascular disease prediction suggest the specialized doctors that are practicing near the user's locality and then they may make an appointment
- Vascular disease prediction system may access the hospitals patient records and then use it produce better results if integrated with hospital database management

1.3.1 PROPOSED SYSTEM:

The vascular disease prediction system's workflow, entirely depends upon users and their provided data like blood pressure, BMI value and cholesterol count and then analyses the data for verification process and then calculates it by k means clustering method and then produces the result by using the nearest neighbour algorithm to display the vascular disease that users may have in them. The vascular prediction system is a stream lined version of existing manual version of hospital system so it should focus on the every aspect of manual hospital procedures like collecting user data and then analysing and then producing a result based on the given inputs, the vascular prediction system should feature an

1) Simple and elegant user interface.
2) General information about vascular system
3) Vascular disease predictor

4) Doctor suggestion list for vascular diseases.

1.3.2 Advantages of proposed system

The vascular disease predication system primarily helps its users as its only aim is to ease the process of conventional hospital based vascular disease identification process

- Vascular disease prediction system promotes in digitalizing user's health records
- Vascular disease prediction helps the users to save their time by making the process more simple
- Since the proposed system primarily functions with internet users can access the website anytime and they can know their results.
- Vascular prediction system is reliable and ready-to-go system that we can use at any time of the day.
- Accuracy of the vascular prediction system can be improved based on the new innovative technologies so it's set on a constant growth and success rate.

2) Technologies learnt

The technologies we learnt by doing the following project are

1) Python django
2) Html &CSS
3) JavaScript

2.1) Python django:

Python django is a server side open source framework used to develop web based projects which accounts in its scalability and accessibility also it promotes the security of the web page. It's a high level python based development which focuses on modules of high level design and it makes the development easier by its simple commands and its features.

Advantages of using python django:

1) Django works on dev-ops based development program
2) Django focuses on security features and it's constantly cleared of bugs.
3) Django framework is based on design so it makes the development process much easier.
4) Django framework works smoothly with many operating systems and its compatibility is good.
5) Django framework can be easily integrated with databases.
6) Changes can be easily applied and reverted back by using django framework.

2.2) html &CSS:

Html and CSS can be integrated with django framework to build and construct the website properly and effectively, while these concepts focuses on the building the website and giving it a good outlook django framework integrates and strengthens its structure by providing security features.

Cascading style sheet provides the website a more organised and cleaner look which is magnified by connecting it with python django framework and its features.

The advantages of using HTML and CSS are:

1) The development of the website can be made easier and it will be secure wile integrating it with django framework.
2) CSS styling can give the website a clear cut professional look.
3) The CSS style sheets can be imported to django frame work along with html to make the process easier.
4) CSS reduces the file size which means the website can be swiftly loaded with minimum amount of data.
5) CSS makes it easier to change the design process of the website by applying the change only once and the rest is automatically changed.

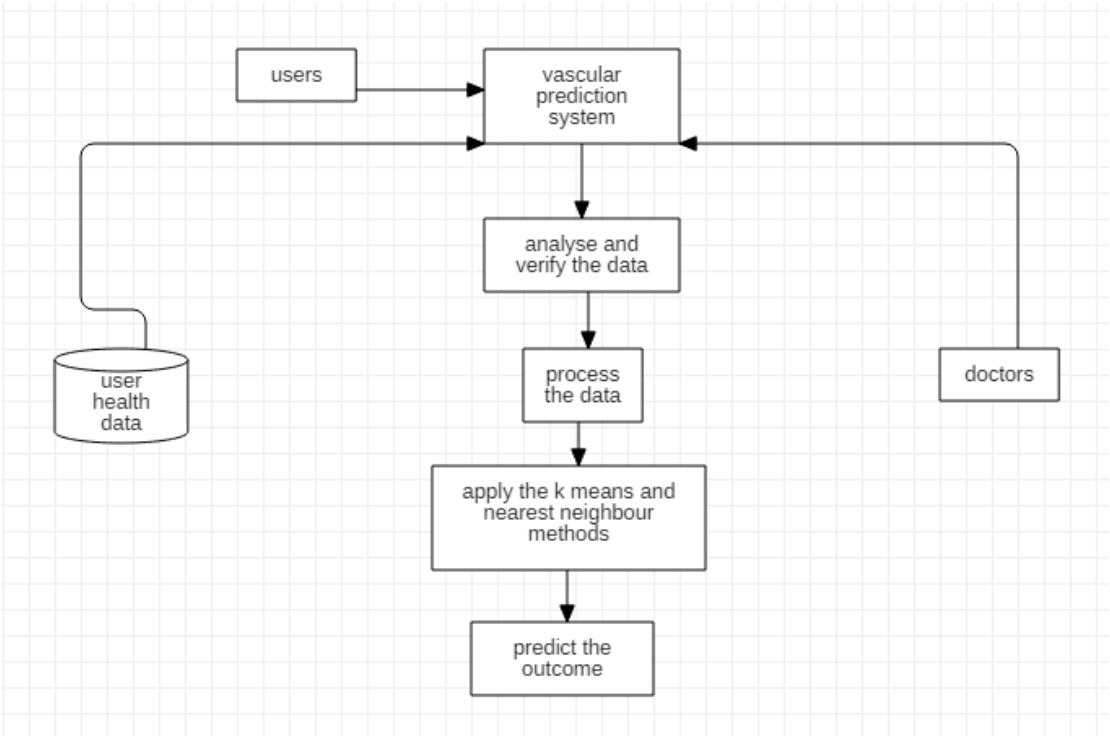
2.3) JavaScript:

JavaScript often abbreviated as **JS**, is a high-level, interpreted programming language. It is a language that is also characterized as dynamic, weakly typed, prototype-based and multi-paradigm alongside HTML and CSS, JavaScript is one of the three core technologies of the World Wide Web. JavaScript enables interactive web pages and thus is an essential part of web applications. The vast majority of websites use it, and all major web browsers have a dedicated JavaScript engine to execute it.

As a multi-paradigm language, JavaScript supports event-driven, functional, and imperative (including object-oriented and prototype-based) programming styles. It has APIs for working with text, arrays, dates, regular expressions, and the DOM, but the language itself does not include any I/O, such as networking, storage, or graphics facilities, relying for these upon the host environment in which it is embedded.

3) SYSTEM DESIGN:

3.1) System architecture:



3.2 SYSTEM SPECIFICATIONS:

HARDWARE SPECIFICATION:

Processor	:	Intel 3
Processor Speed	:	1.3GHZ or above
RAM	:	4GB or higher
Hard Disk	:	500GBs
Network Card	:	Ethernet Card

SOFTWARE SPECIFICATION:

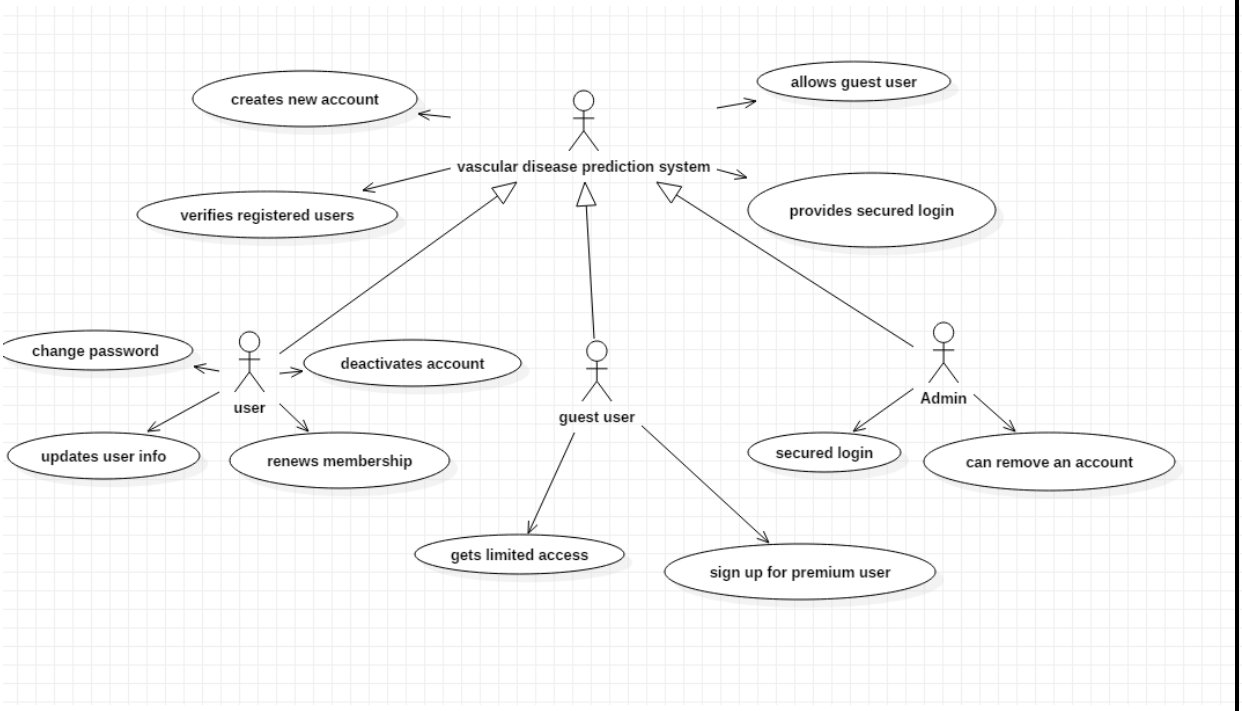
Operating System	:	Windows 7 or above

Web Server	:	Apache
Web Browser	:	Mozilla Fire fox
Front-End Tool	:	HTML
Client side Script	:	JavaScript
Server side Script	:	PYTHON

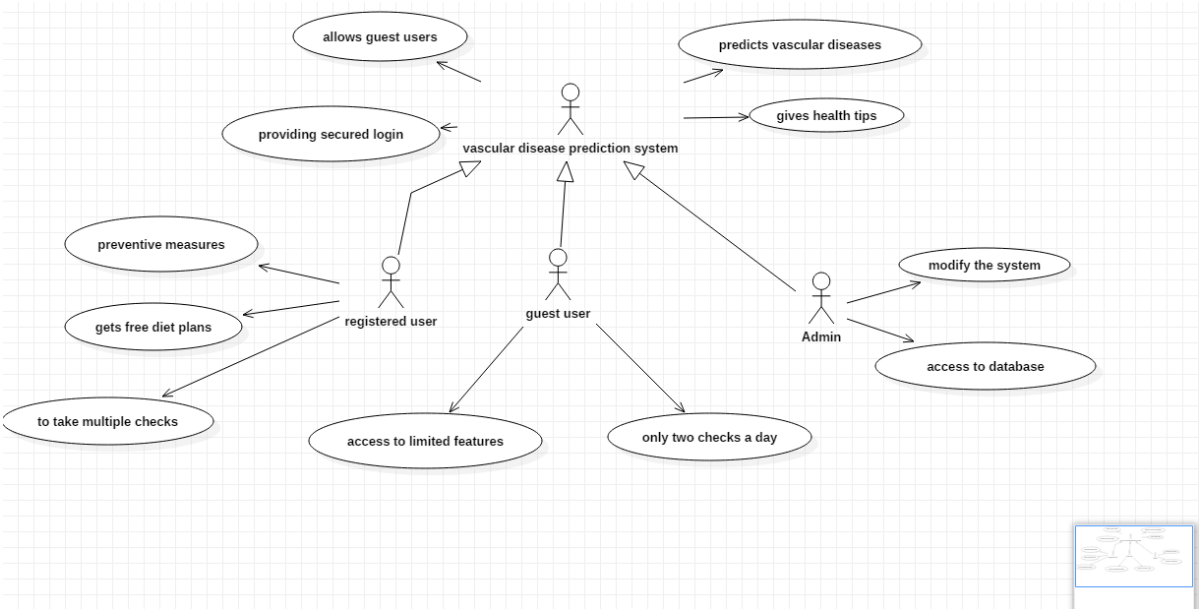
3.3) DETAILED DESIGN

Use case diagram:

Login module:

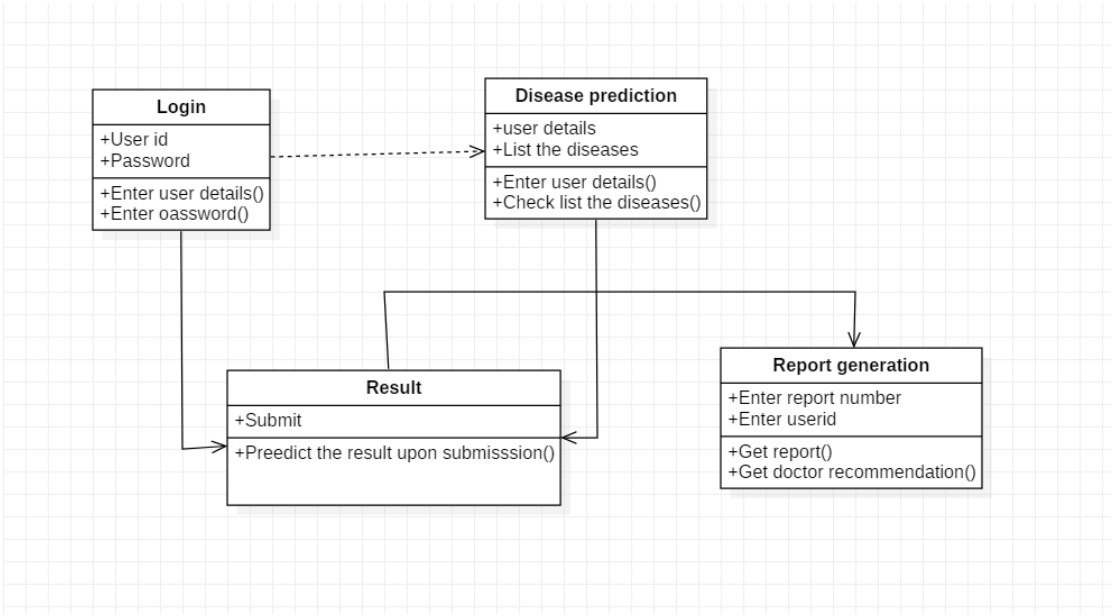


Disease prediction module:

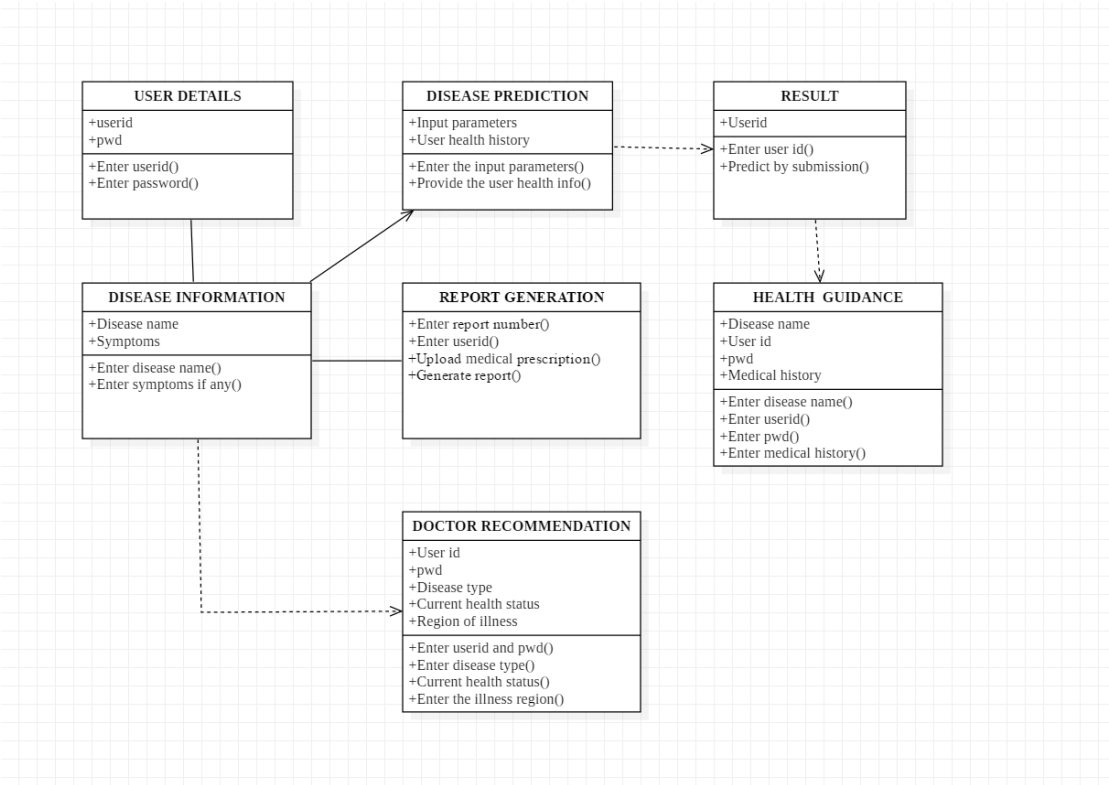


Class diagrams:

Login module:

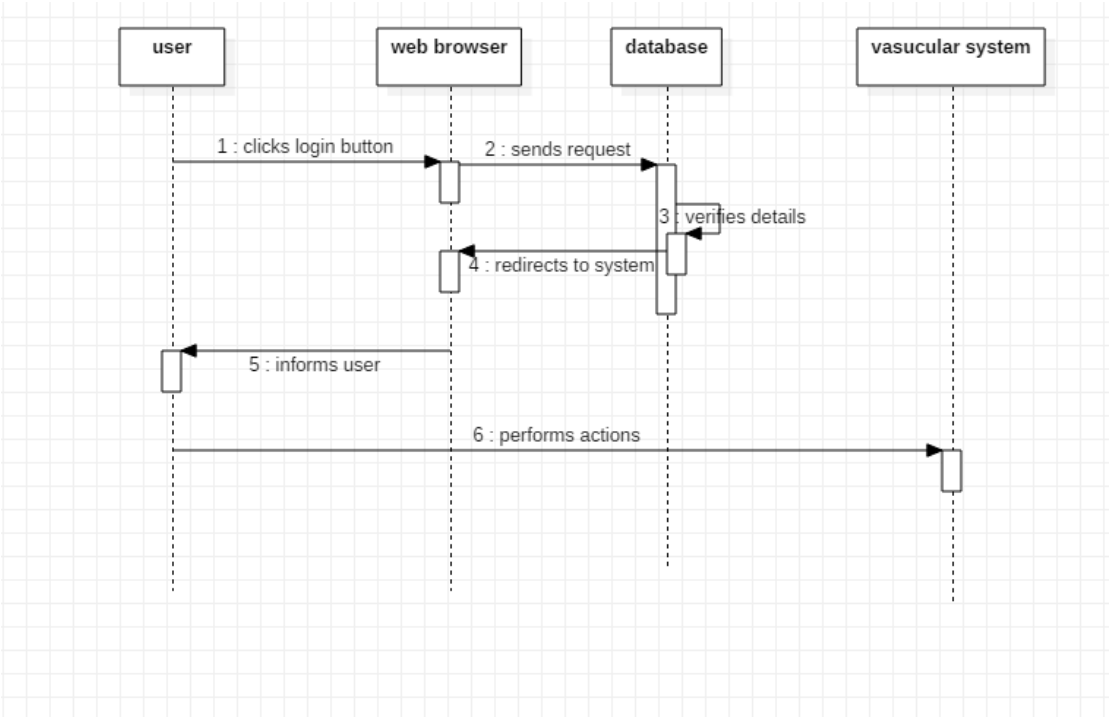


Vascular Disease prediction module:

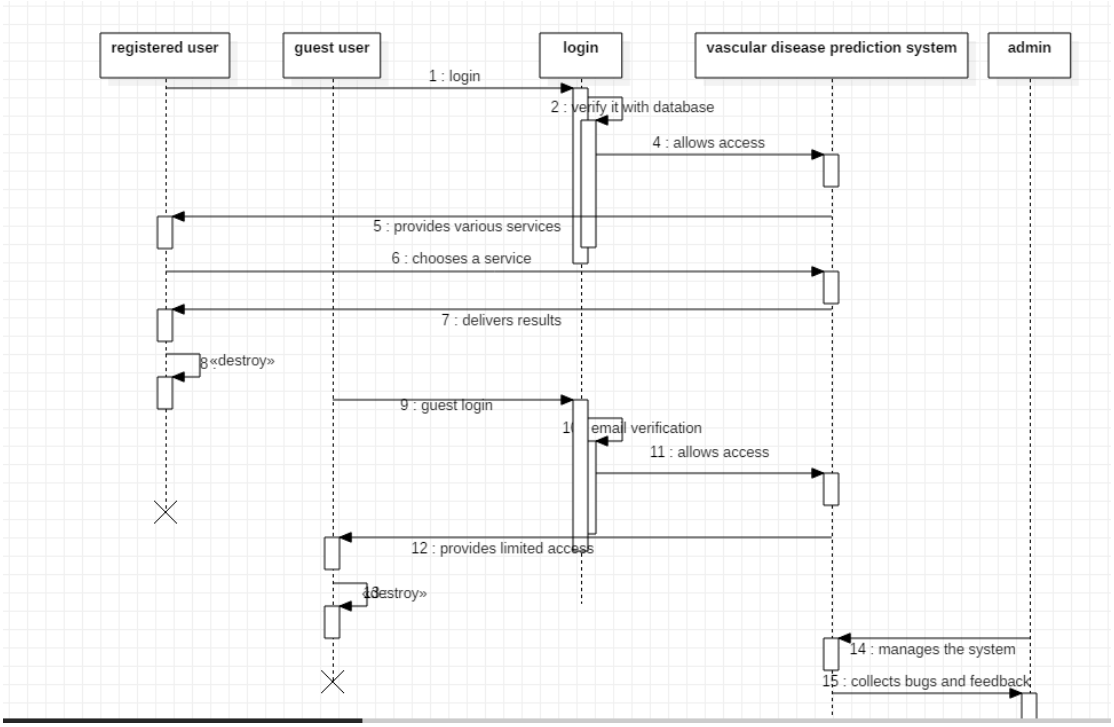


Sequence diagram:

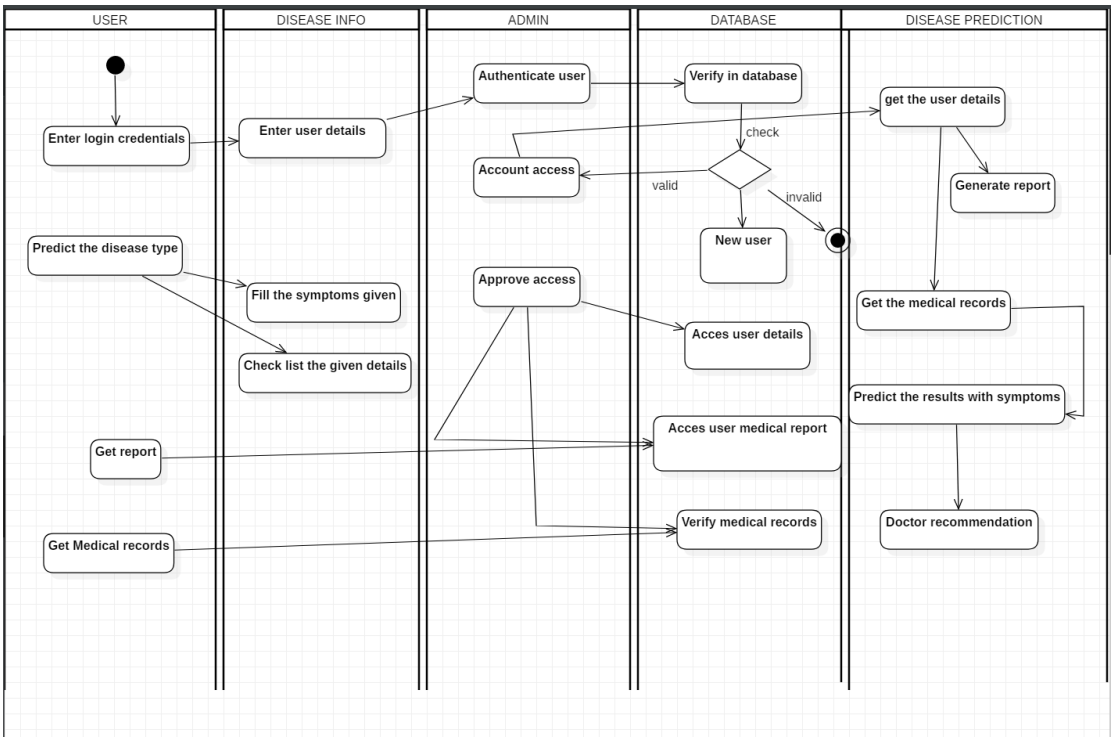
Login module:



Vascular prediction module:

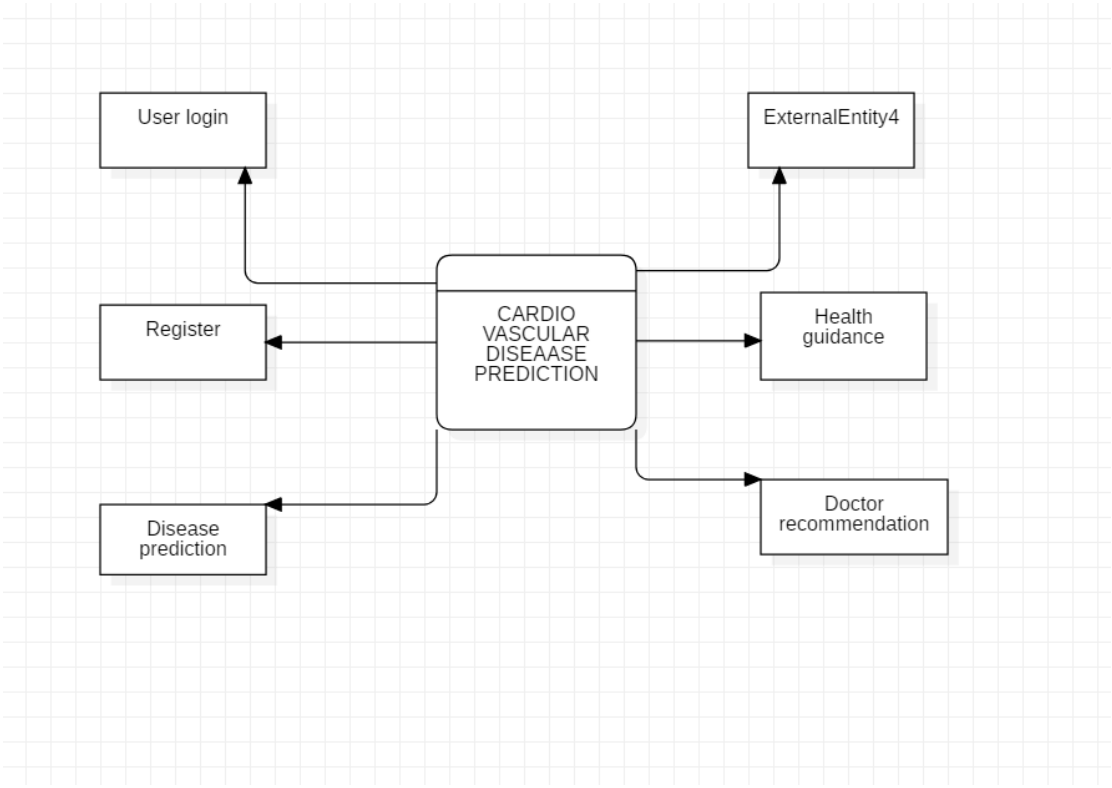


Activity diagram:

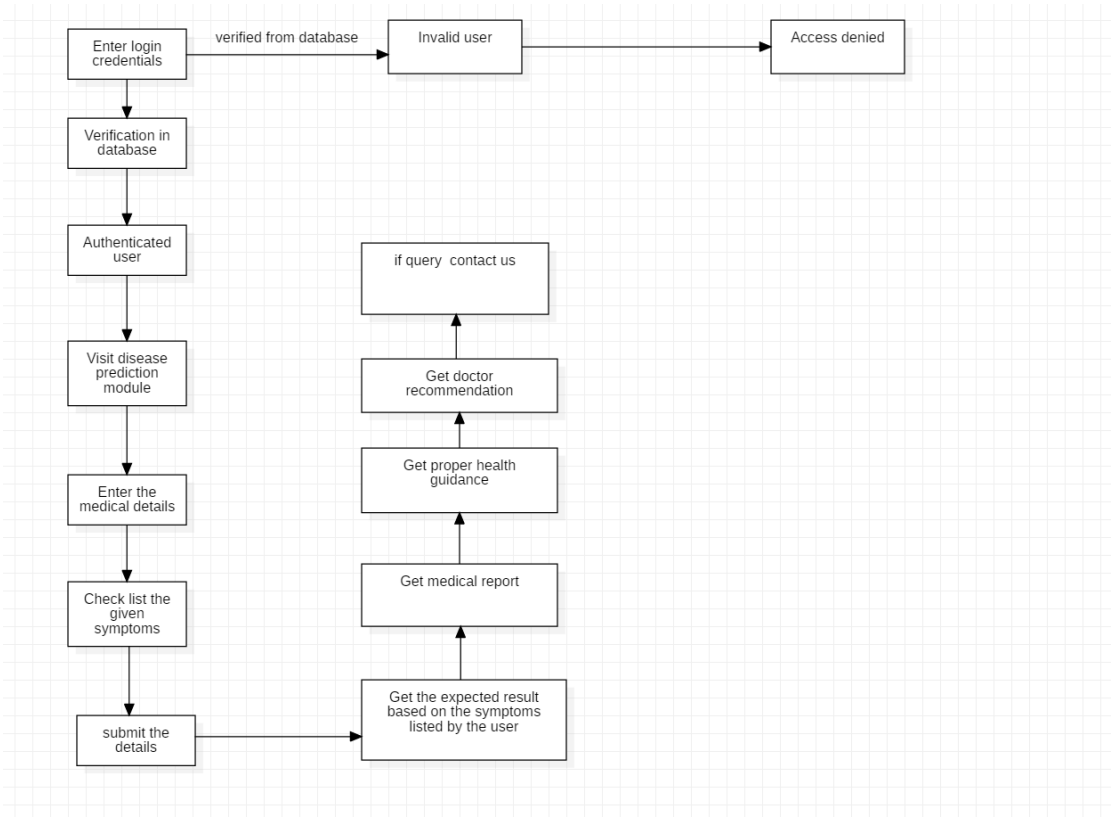


Data Flow diagram:

DFD-0:

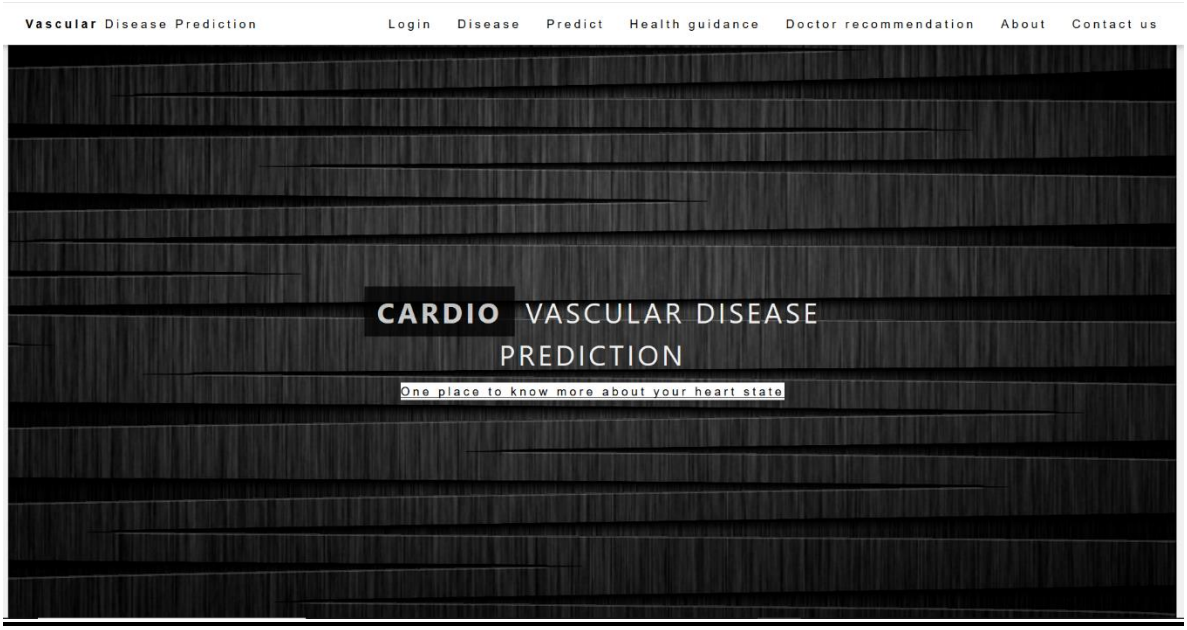

User login
ExternalEntity4
Register
CARDIO VASCULAR DISEAASE PREDICTION
Health guidance
Disease prediction
Doctor recommendation

DFD-1

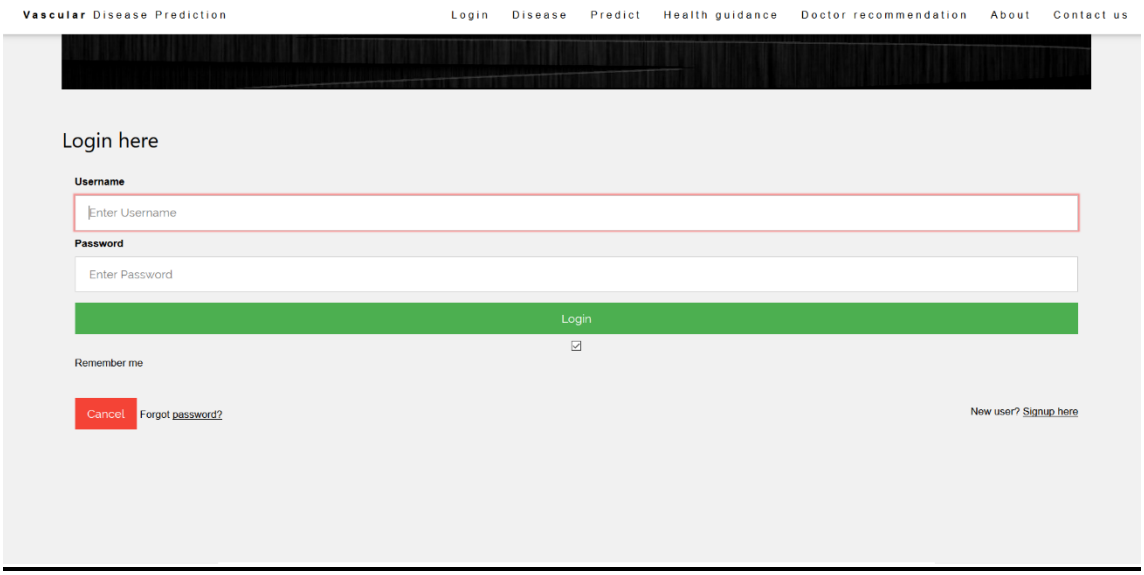

Enter login credentials
verified from database
Invalid user
Access denied
Verification in database
Authenticated user
Visit disease prediction module
Enter the medical details
Check list the given symptoms
submit the details
Get the expected result based on the symptoms listed by the user
Get medical report
Get proper health guidance
Get doctor recommendation
if query contact us

4) IMPLEMENTATION

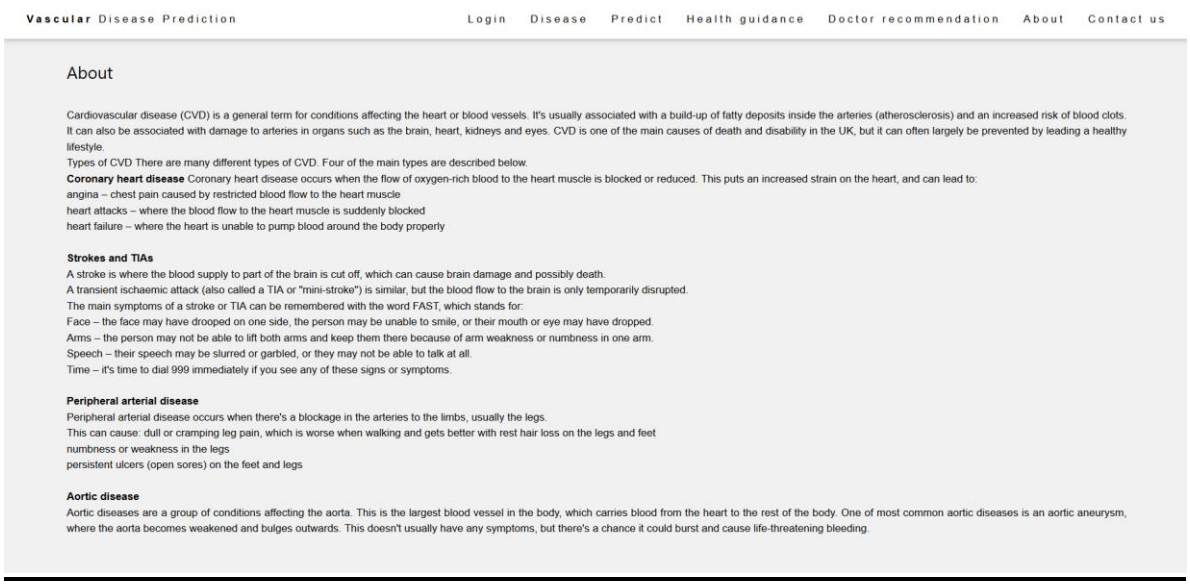
4.1 IMPLEMENTATION DETAILS



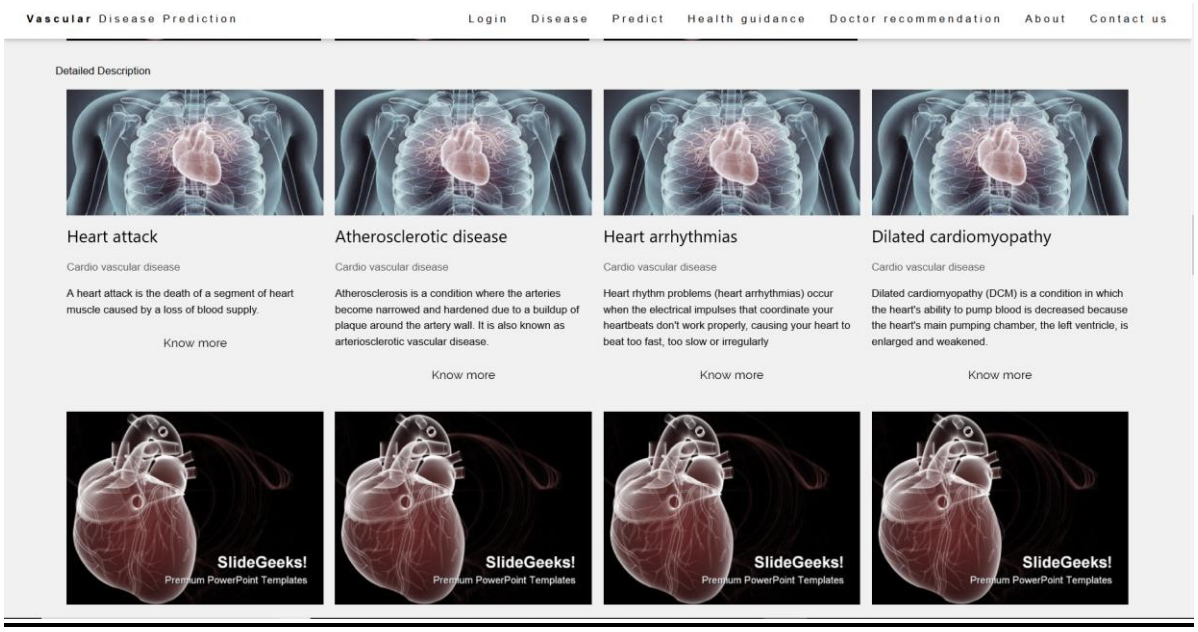
HOMEPAGE



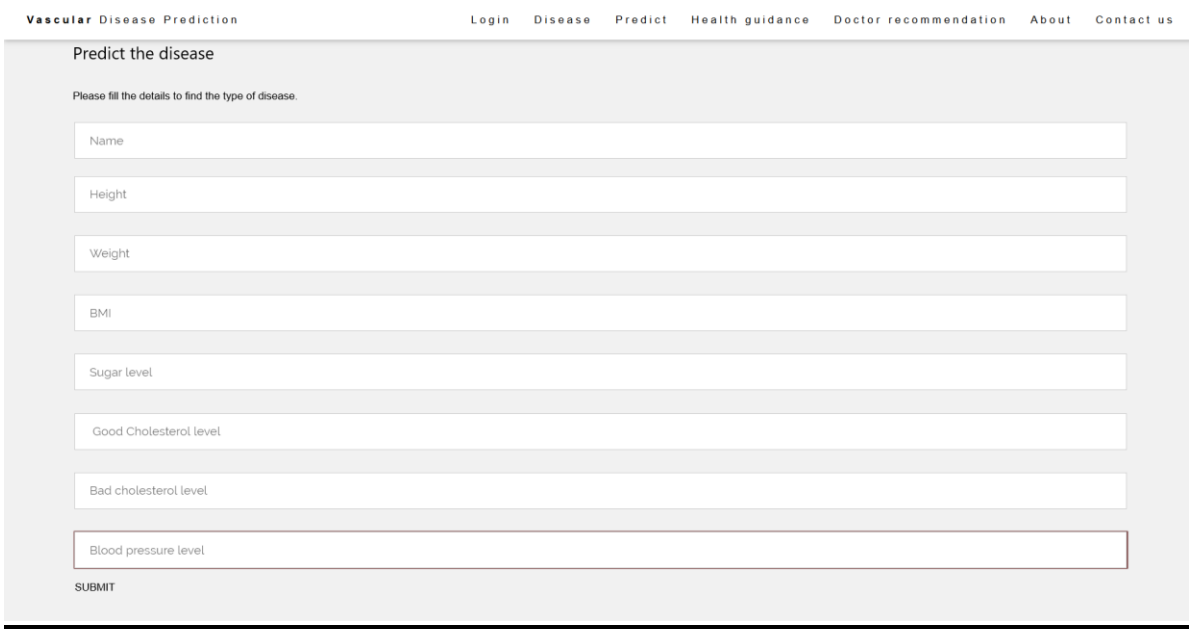
LOGIN PAGE



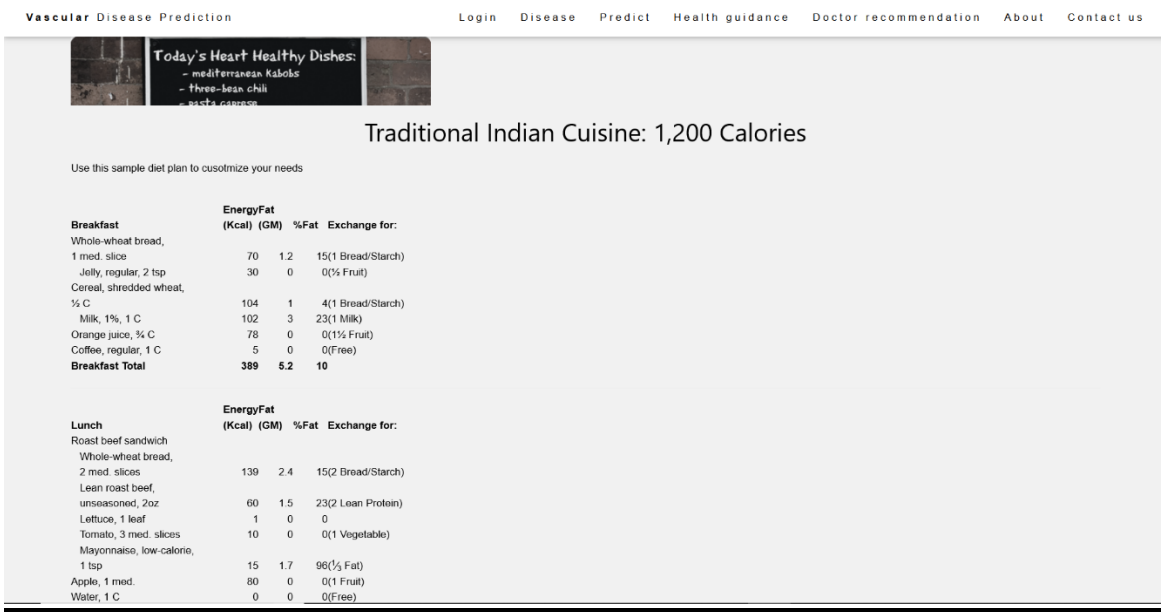
GENERAL INFORMATION



TYPES OF VASCULAR DISEASES



DISEASE PREDICTOR



Breakfast	Energy (Kcal)	Fat (GM)	%Fat	Exchange for:
Whole-wheat bread, 1 med. slice	70	1.2		1 5(1 Bread/Starch)
Jelly, regular, 2 tsp	30	0		0(½ Fruit)
Cereal, shredded wheat, ½ C	104	1		4(1 Bread/Starch)
Milk, 1%, 1 C	102	3		23(1 Milk)
Orange juice, ¾ C	78	0		0(1½ Fruit)
Coffee, regular, 1 C	5	0		0(Free)
Breakfast Total	**389**	**5.2**		**10**

Lunch	Energy (Kcal)	Fat (GM)	%Fat	Exchange for:
Roast beef sandwich				
Whole-wheat bread, 2 med. slices	139	2.4		15(2 Bread/Starch)
Lean roast beef, unseasoned, 2oz	60	1.5		23(2 Lean Protein)
Lettuce, 1 leaf	1	0		0
Tomato, 3 med. slices	10	0		0(1 Vegetable)
Mayonnaise, low-calorie, 1 tsp	15	1.7		96(⅓ Fat)
Apple, 1 med.	80	0		0(1 Fruit)
Water, 1 C	0	0		0(Free)

DIET TIPS

5) TEST RESULTS

The test results will display the final outcome of the project that I whetеher a person's healthy or if they are having a vascular disease if so then the system will assist them to contacts page where the specialized doctors information will be given and also users can avail the health diets according to their specific outcomes.the users can also have a forum to discuss and ask about their conditions and interact with specialized handlers and with other users to share the experience and expertise of both doctors and common users alike.

5.1) TEST CASES

- By entering minimum or no information the system will prompt a dialog box displaying to enter the essential details and reuqests to try again.
- When every information is properly entered then the syetm will display one or more vascular diseases based on the suers helath condition
- If a user as high cholestrol content but rest all common variables then the user may have atery block which can be caused by fats
- If the user has high sugar content in his body they can have diabetic retinopathy and are advised to practice their advised diet.

6) RESULTS AND DISCUSSIONS

The results produced by the vascular prediction system may be coincide with the normal hospital procedures and outcomes and the accuracy of the outcomes can be highly improvised and optmised by using various front end technologies, the users may be advised to not to seriously believe the vascular prediction system as a sole option as every outcome maynot be a complete sureshot but the system will be trustworthy for most of the scenarios.

If the users are diagnosed to have a vascular disease they may consult a doctor for more accurate information and then reconsider their dietary and medictaional choices and improve their lifestyle accordingly by following healthy, planned diets nad excersies to maintain a heathy vascular system.

7)CONCLUSION AND FUTURE WORK

7.1)CONCLUSION

The vascular predition system will be more effective than the existing methods if its integrated with futusitic technologies like high resolution scanners and IOT based sensors and then genarte the variables rather than getting it directly from the user furthermore, this will be a powerful tool for analyzing vasculature for better management of a wide spectrum of vascular-related diseases. This automated system is compared to the preface of this approach with other recently proposed methods, and concluded that it is achieving better results

7.1) FUTURE WORK:

This project is designed in such a way that it is flexible for changes in future user requirements. Further extensions can be made to provide more reports.

- The existing system has good scope for further development to predict all the diseases using user data other than cardiovascular diseases.
- In the future enhancement, all other diseases can be predicted by accuracy and loss of data.
- It provides better facility regarding to security purpose. It can have an enhancement in the future according to the user's requirements on predicting all diseases.
- By applying various means advanced technolgies like sensors and high resolution scanners and cameras available in portable devices the vascular prediction system may have a higher accuracy rate and can equally stand with normal hospital procedures.