Stroke Prediction Capstone Project ISI 490

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Contents

Introduction

A stroke is a disease that affects the arteries and in turn, within the brain. It is the fifth highest cause of death in the United States and one of the leading causes of disability in the United States of America. One of the factors that greatly contribute to a stroke is having a high Body Mass Index (BMI).

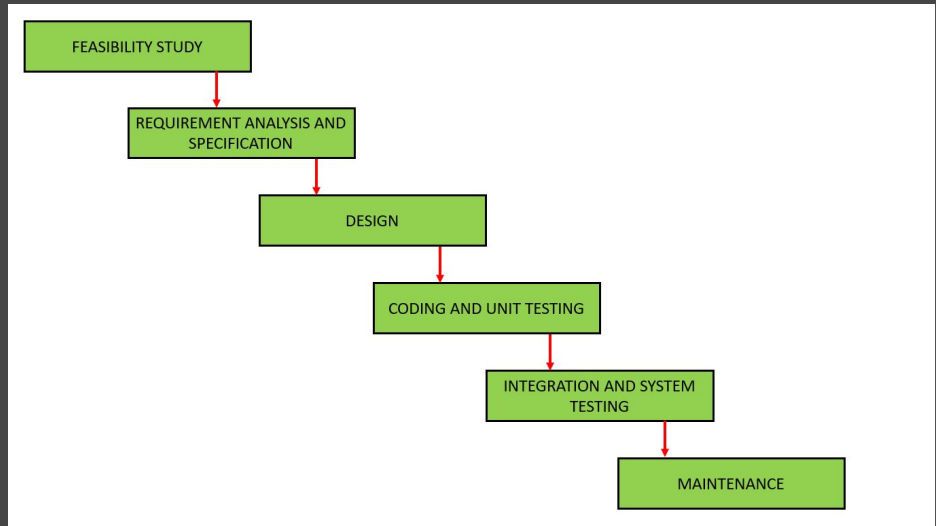
Individuals who are able to recognize symptoms of having a stroke have the ability to change their habits and thus prevent a stroke from occurring. This is the ultimate goal of the project; to assist those who are likely to have a stroke by developing a prediction analysis.

Project Scope

- Allow users to input their information to predict if they would have a stroke or not.
- Allow users to create an account and login to their account.
- Grant users the ability to redisplay their latest stroke prediction and save their stroke predictions.
- Show the user nearby resources if they are likely to have a stroke.
- Grant users permission to delete their account and customize it such as adding a profile picture.

Software Process Model

This project follows a traditional waterfall model. Prior to starting the project, we collected requirements to decide what we would want to accomplish with an idea of a Stroke Prediction. We followed this up with the design and the coding of the project, while receiving feedback to update the project as necessary. We were able to design a project that met our requirements and more.



Tools and Technologies

Software:

- Figma
- Visual Studio
- Google Docs Editors
- Microsoft Office Suite

Technologies:

- Python
- SQLAlchemy
- HTML

Libraries:

- Flask
- Httplib2
- Joblip2
- Numpy
- Pandas
- Requests
- Scikit_learn
- Flask-SQLAlchemy

Machine Learning Algorithm:

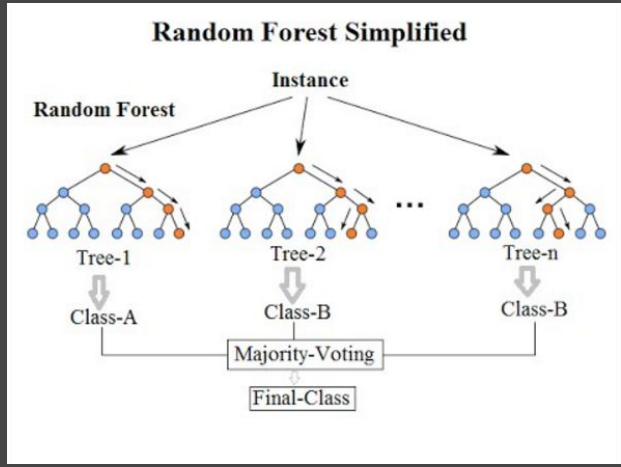
- Random Forest Classification
- Recon Approach

How Does the Algorithm Work?

We utilize the Random Decision Forest algorithm to help predict if the user would have a stroke or not. When the user inputs their information, their data is compared with an existing dataset of patients who have had a stroke and have not had a stroke based on their information.

The Random Forest conducts multiple decision trees for training time as a way to expand the multitude of factors as to why a patient had a stroke and if they are at risk of having a stroke.

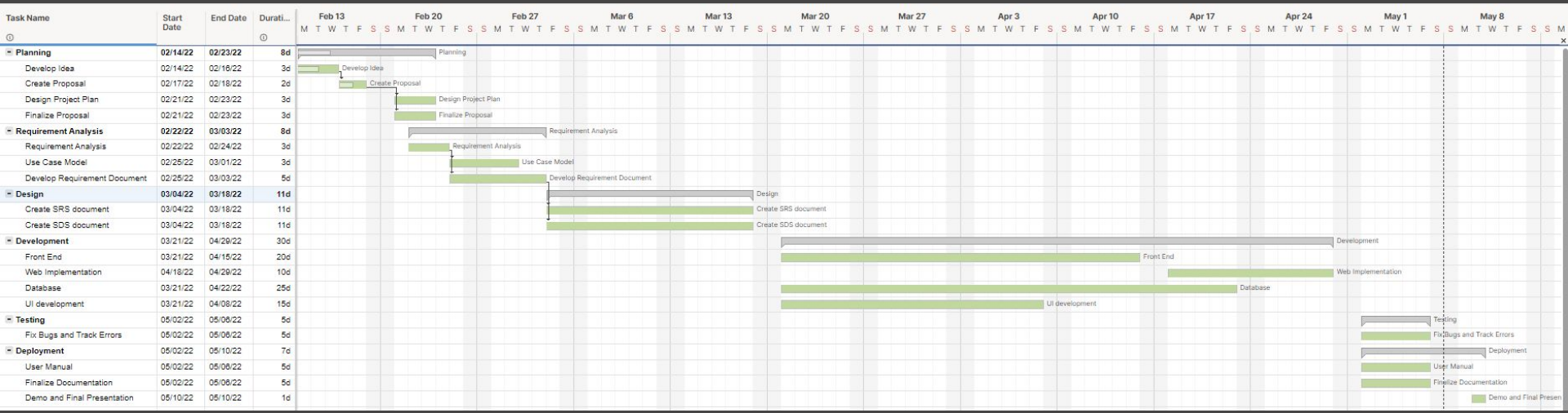
This algorithm also uses the Recon Approach in which the algorithm uses reconnaissance to cull through thousands of data points and demonstrate the factors that greatly influenced a patient having a stroke.



Requirement Specification

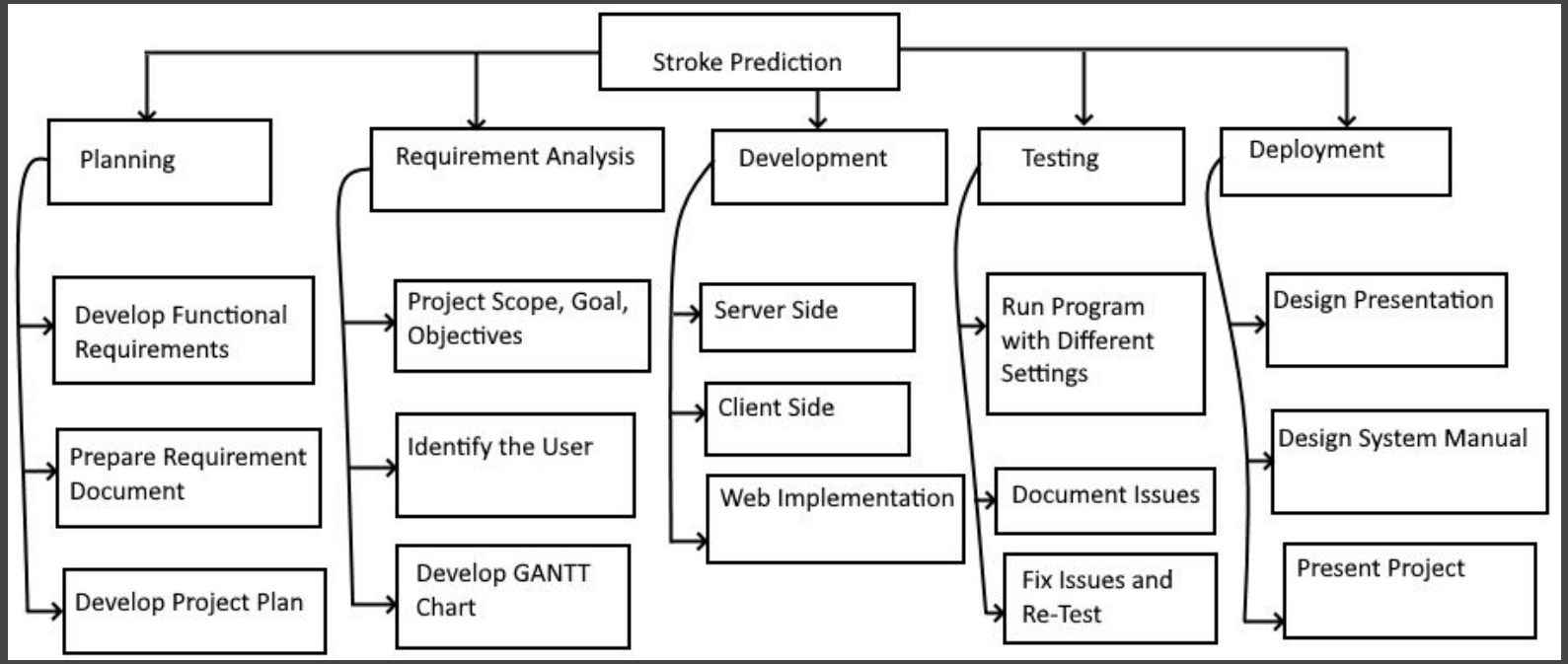
- Register new user account - the first time the user accesses the system, they are required to create a new account. Credentials include a username, first and last name, as well as a password.
- Login - login to the system with newly created credentials to verify the user.
- Fill in information - the user will fill in their information including BMI, job type, age, gender, etc.
- Receive stroke prediction - once the user fills out their information, they can submit the form, the system calculates if the user would have a stroke, and display the results to the user.

GANTT Chart

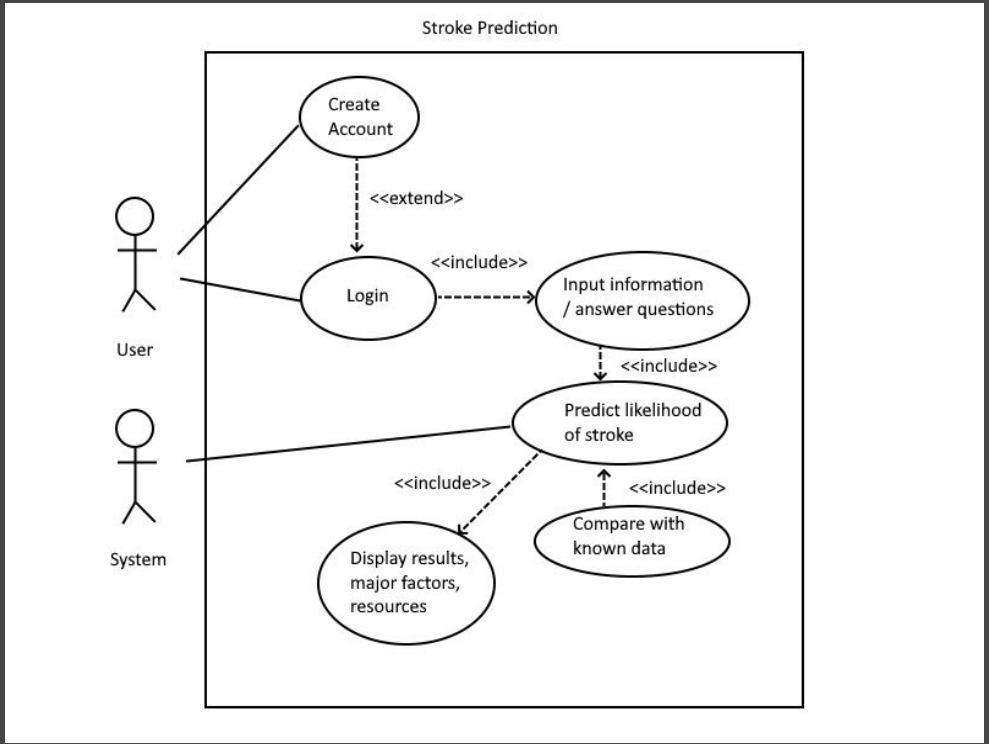


Task Name	Start Date	End Date	Durati...
Planning	**02/14/22**	**02/23/22**	**8d**
Develop Idea	02/14/22	02/16/22	3d
Create Proposal	02/17/22	02/18/22	2d
Design Project Plan	02/21/22	02/23/22	3d
Finalize Proposal	02/21/22	02/23/22	3d
Requirement Analysis	**02/22/22**	**03/03/22**	**8d**
Requirement Analysis	02/22/22	02/24/22	3d
Use Case Model	02/25/22	03/01/22	3d
Develop Requirement Document	02/25/22	03/03/22	5d
Design	**03/04/22**	**03/18/22**	**11d**
Create SRS document	03/04/22	03/18/22	11d
Create SDS document	03/04/22	03/18/22	11d
Development	03/21/22	04/29/22	30d
Front End	03/21/22	04/15/22	20d
Web Implementation	04/18/22	04/29/22	10d
Database	03/21/22	04/22/22	25d
UI development	03/21/22	04/08/22	15d
Testing	05/02/22	05/06/22	5d
Fix Bugs and Track Errors	05/02/22	05/06/22	5d
Deployment	05/02/22	05/10/22	7d
User Manual	05/02/22	05/06/22	5d
Finalize Documentation	05/02/22	05/06/22	5d
Demo and Final Presentation	05/10/22	05/10/22	1d

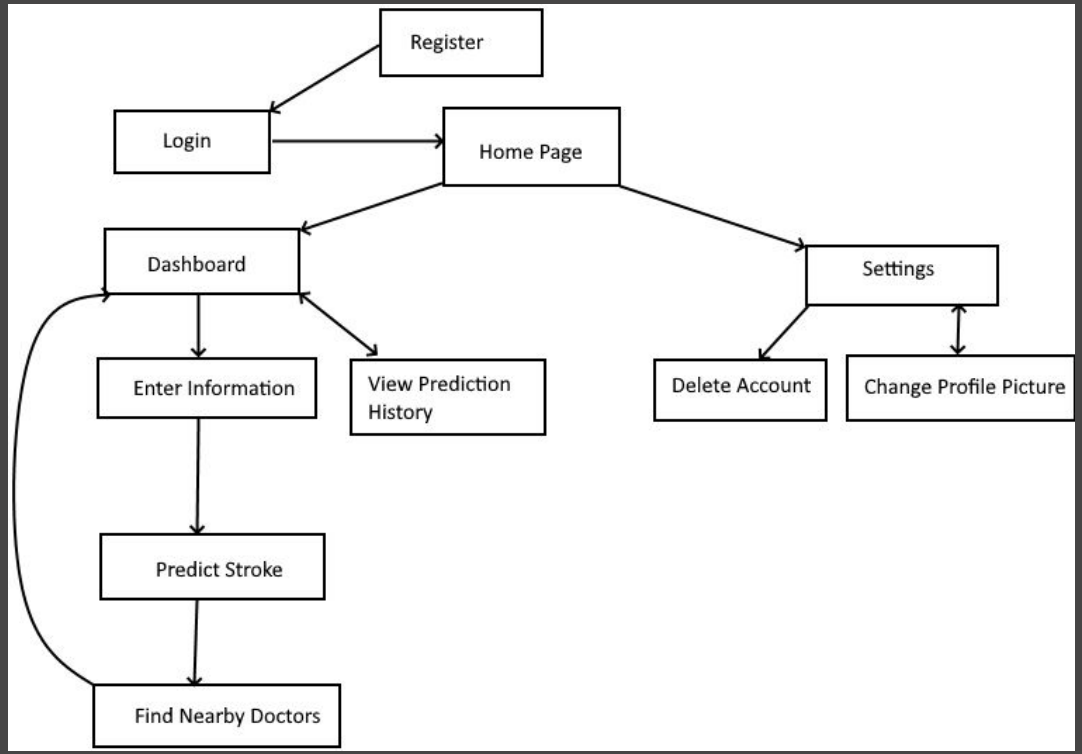
Work Breakdown Structure



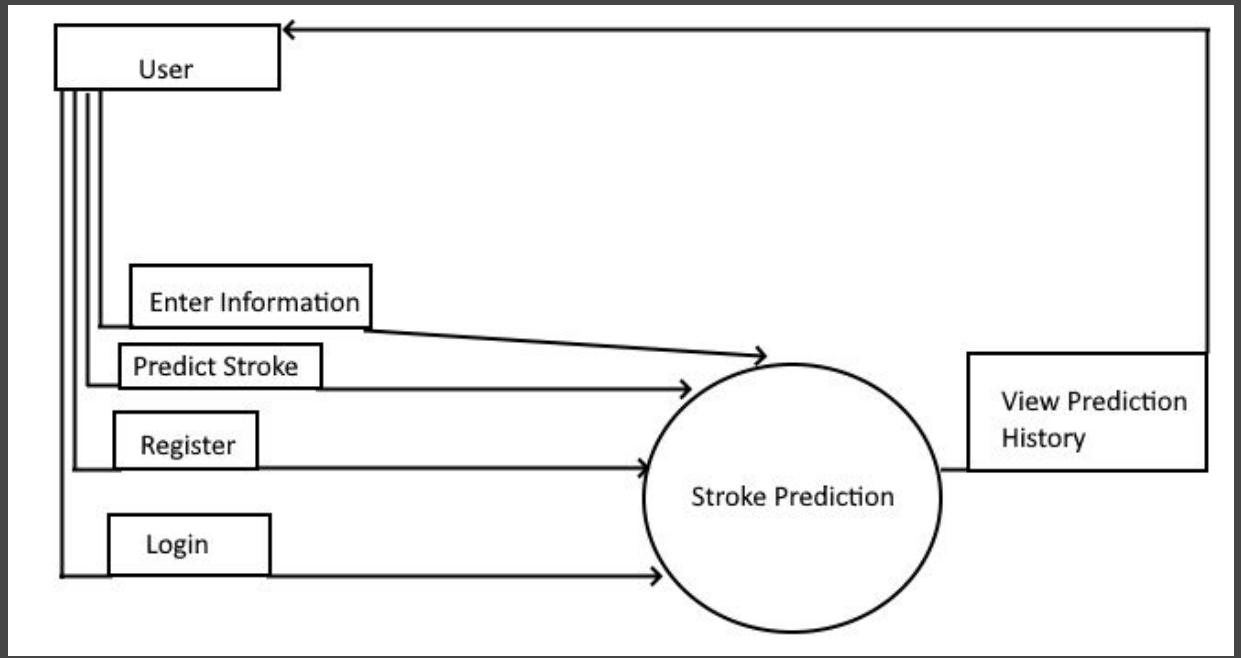
Use Case Diagram



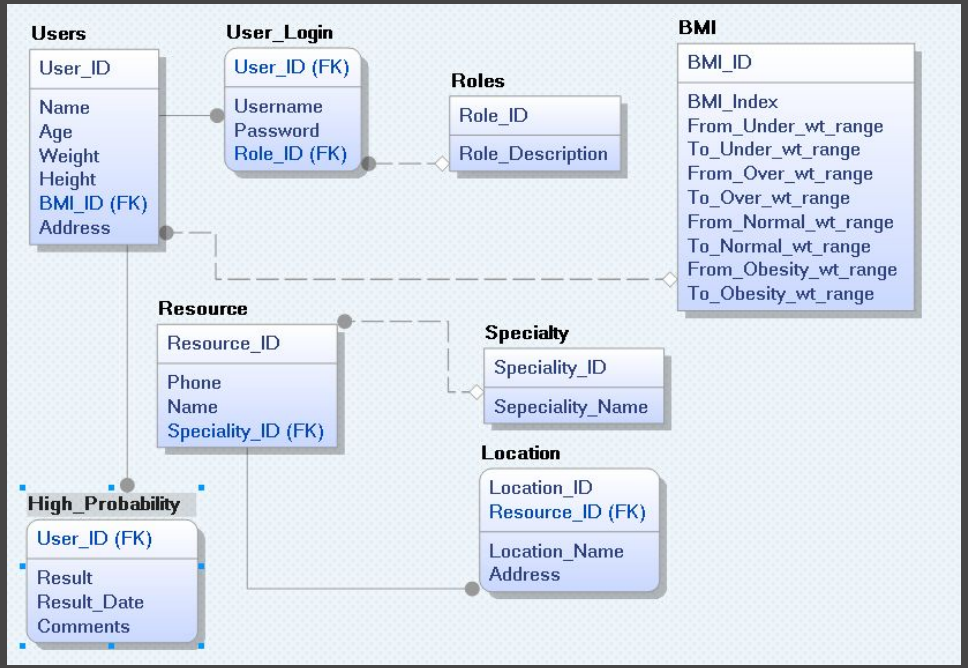
Process Flow Diagram



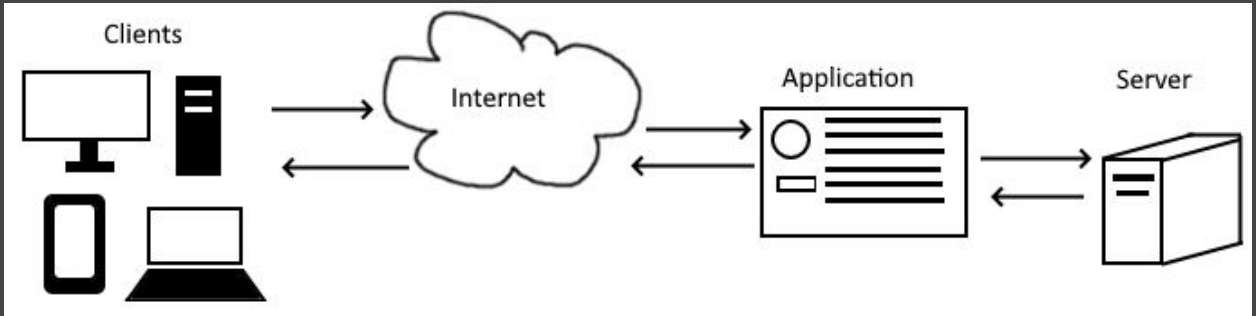
Class Diagram



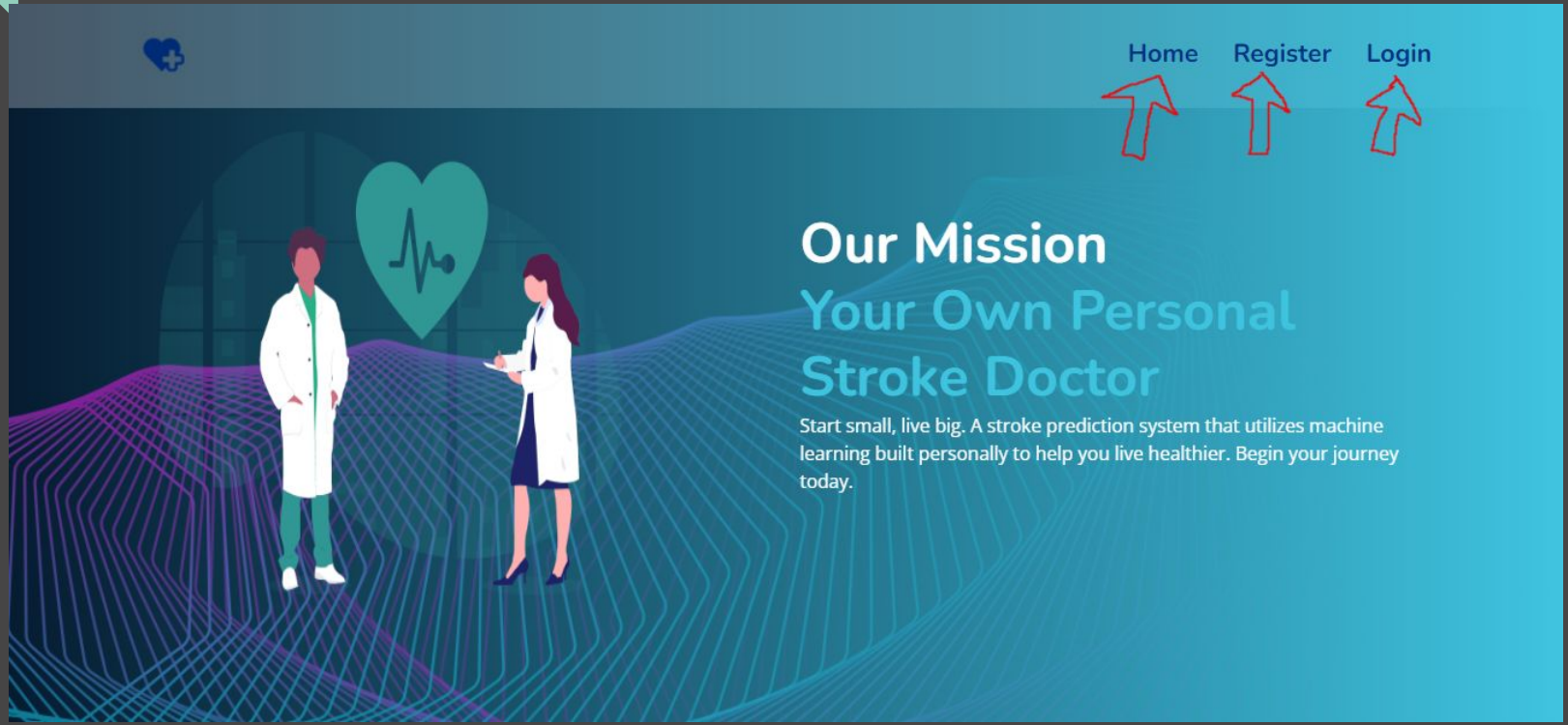
Entity Relationship Diagram



Software Architecture



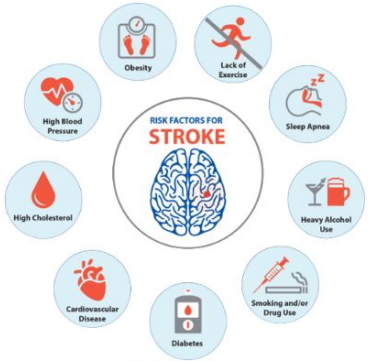
Landing Page 1/3



Landing Page 2/3

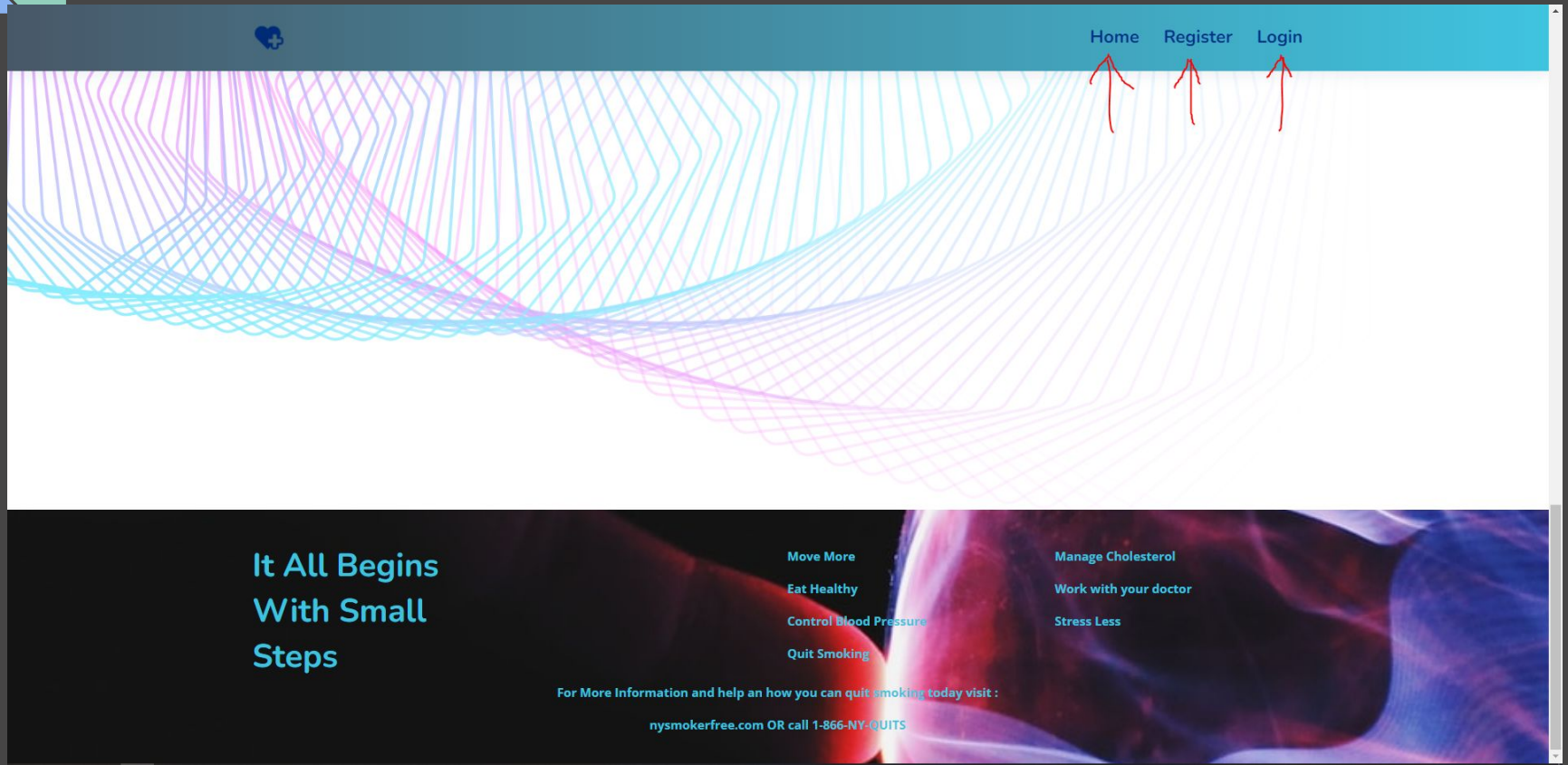
Home Register Login

Stroke Prevention-Know the Risk Factors

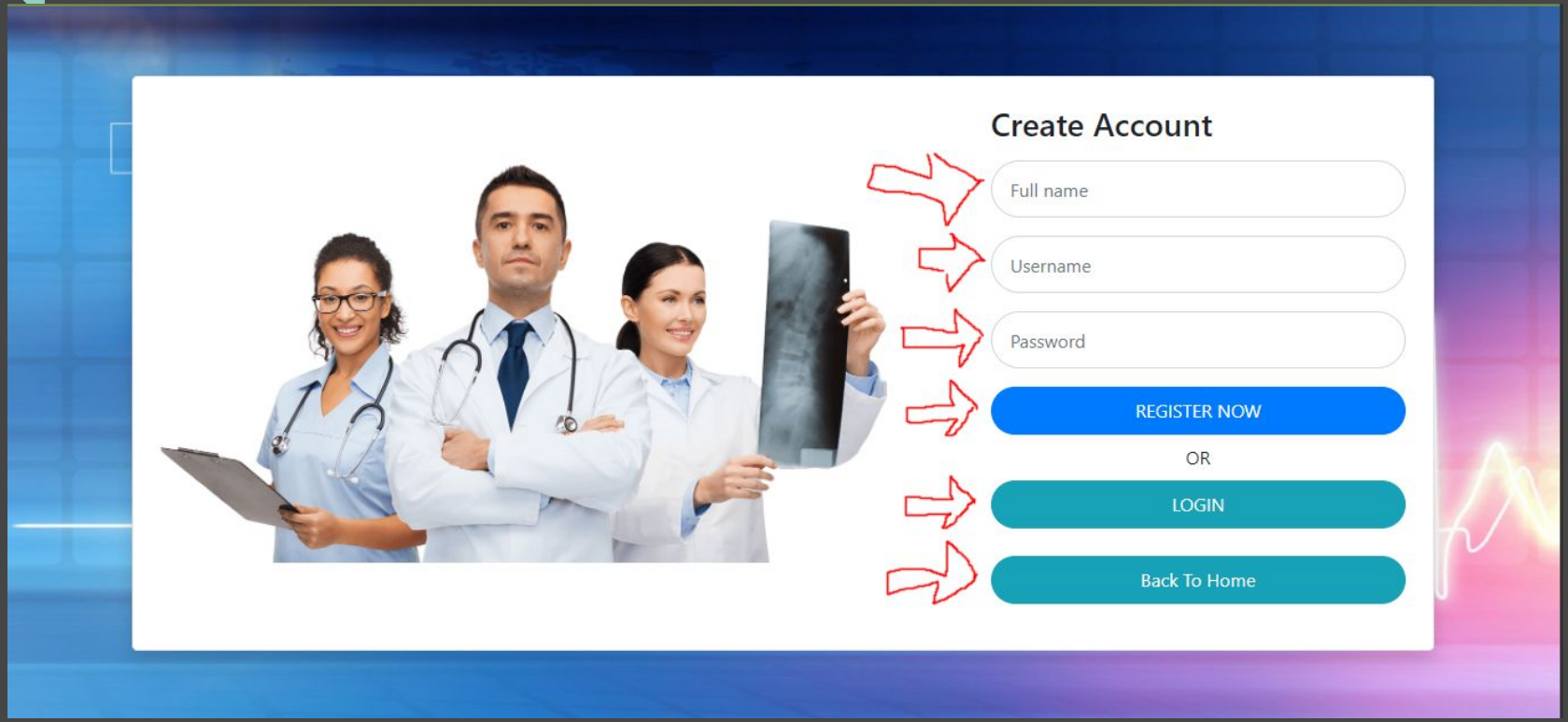


Dont wait until it's too late, begin your steps to a healthier journey today.

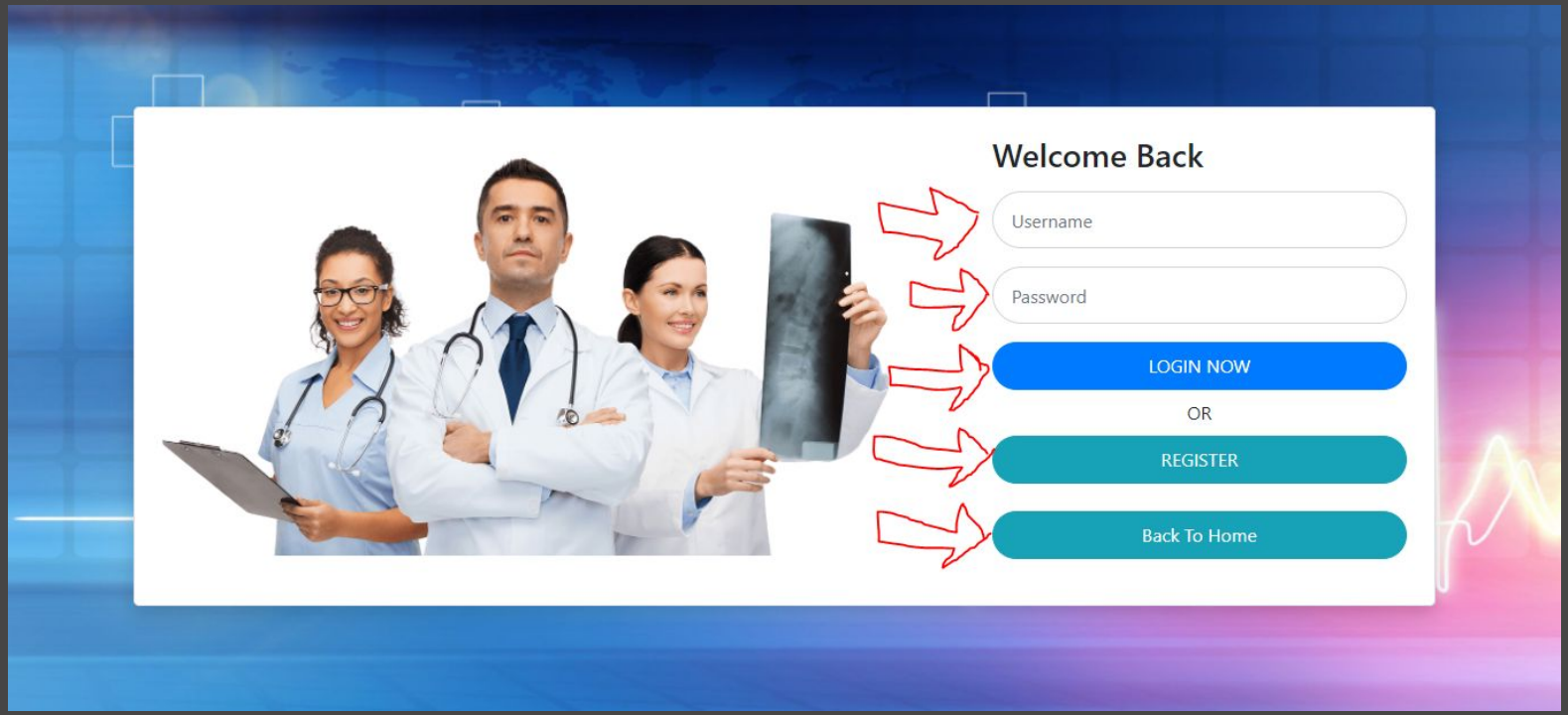
Landing Page 3/3



Registration Page



Login Page


Welcome Back
Username
Password
LOGIN NOW
OR
REGISTER
Back To Home

Home Page

Signed in as: asdf | Home | Settings | Logout

asdf

john

View Latest Prediction

View Prediction History

Find BMI

Weight in Pounds

Feet

Inches

Submit

BMI Categories:

Underweight = 18.5

Normal weight = 18.5–24.9

Overweight = 25–29.9

Obesity = BMI of 30 or greater

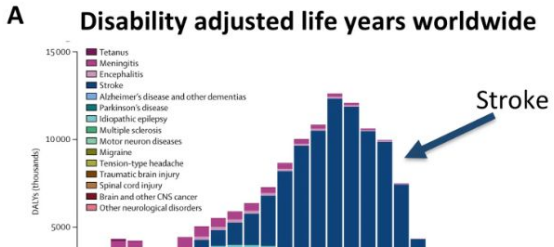
Your BMI Is :

Dashboard ~ Welcome to your dashboard, please enter all information truthfully and to the best of your knowledge in order to recieve an accurate prediction!

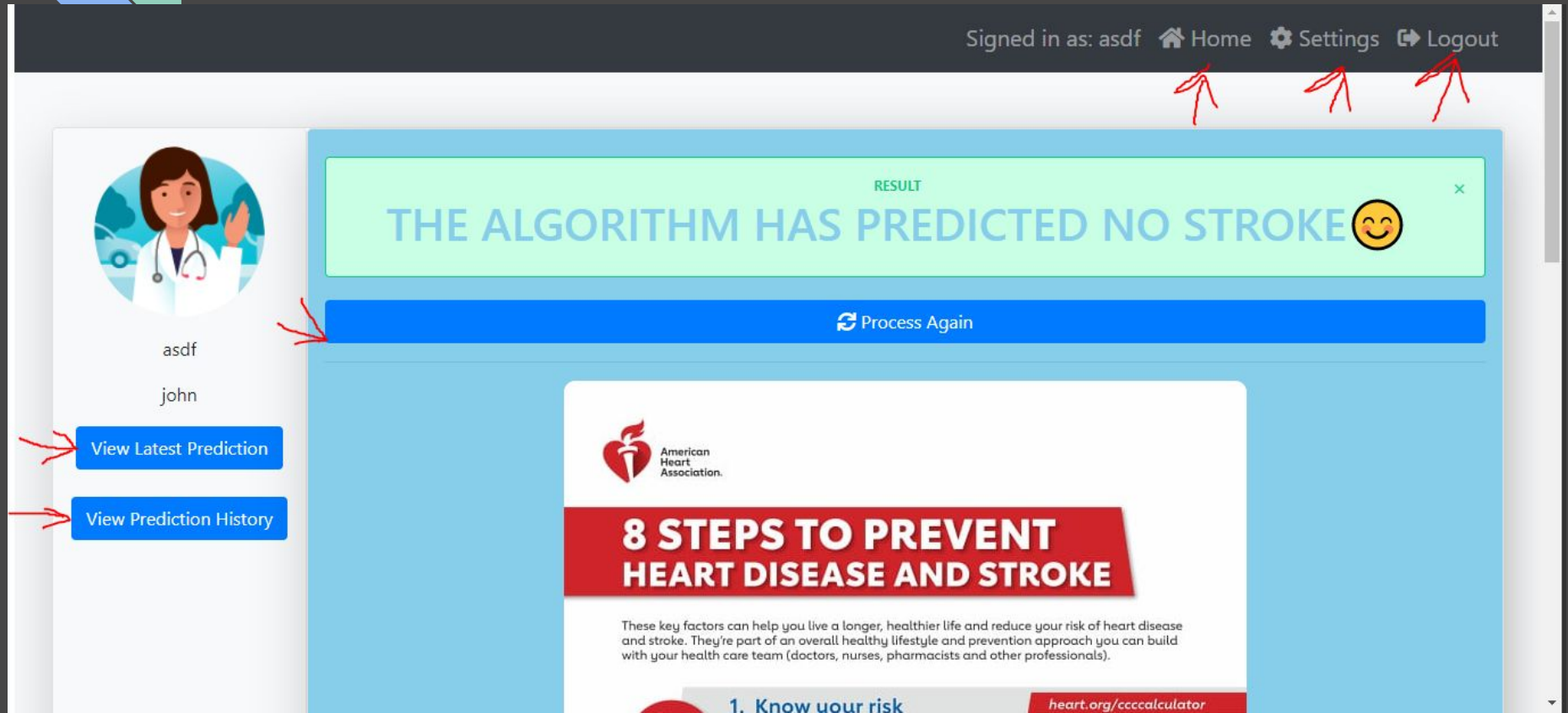
Gender	**Age (in years)**	**Hypertension**
Female		No
Are you married?	**Heart Disease**	**Work Type**
No	No	Government Job
Residence Type	**Average Glucose Level (55.1 - 272)**	**BMI**
Rural		
Smoking Status		
Unknown		

Clear

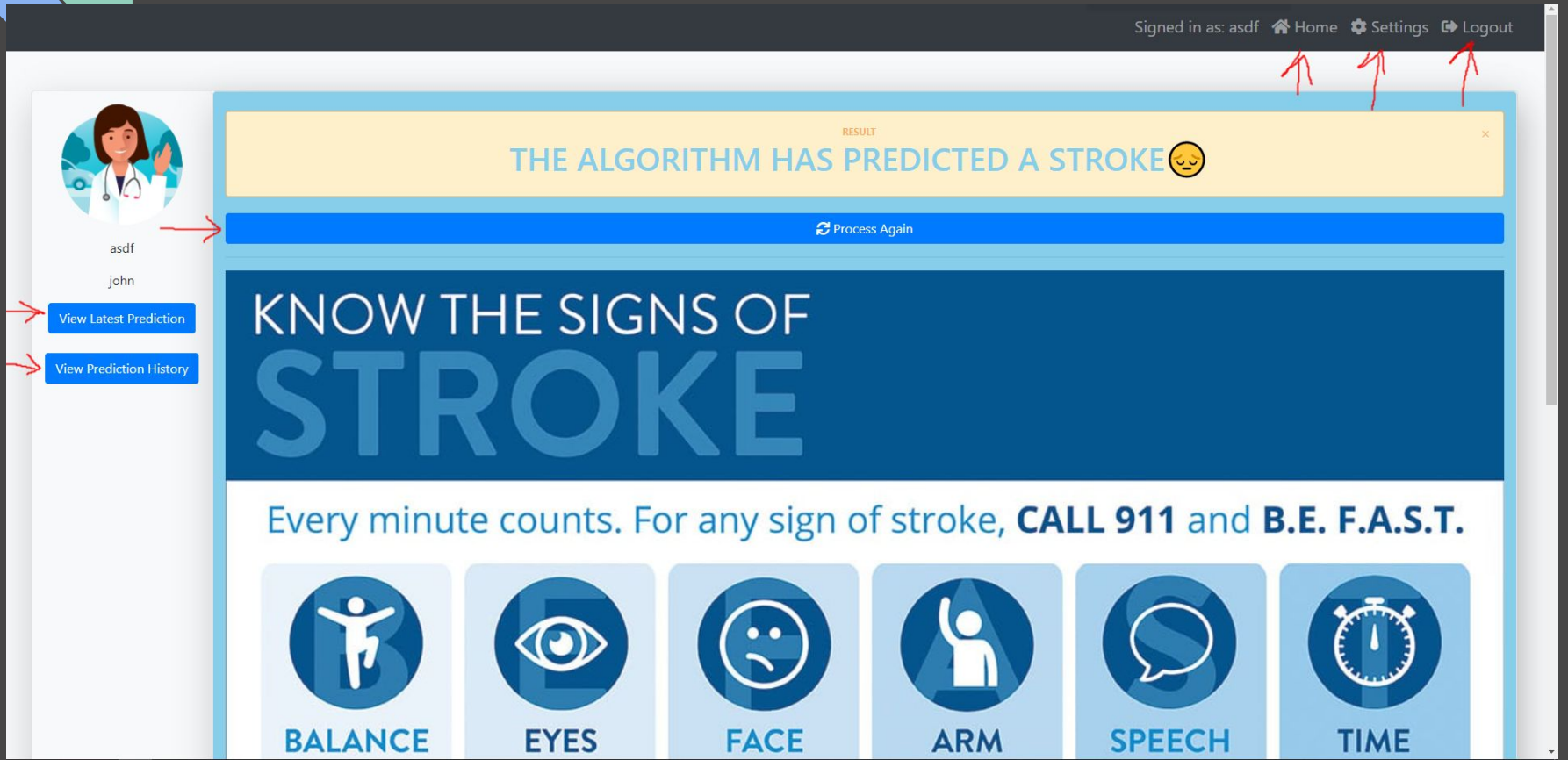
Submit



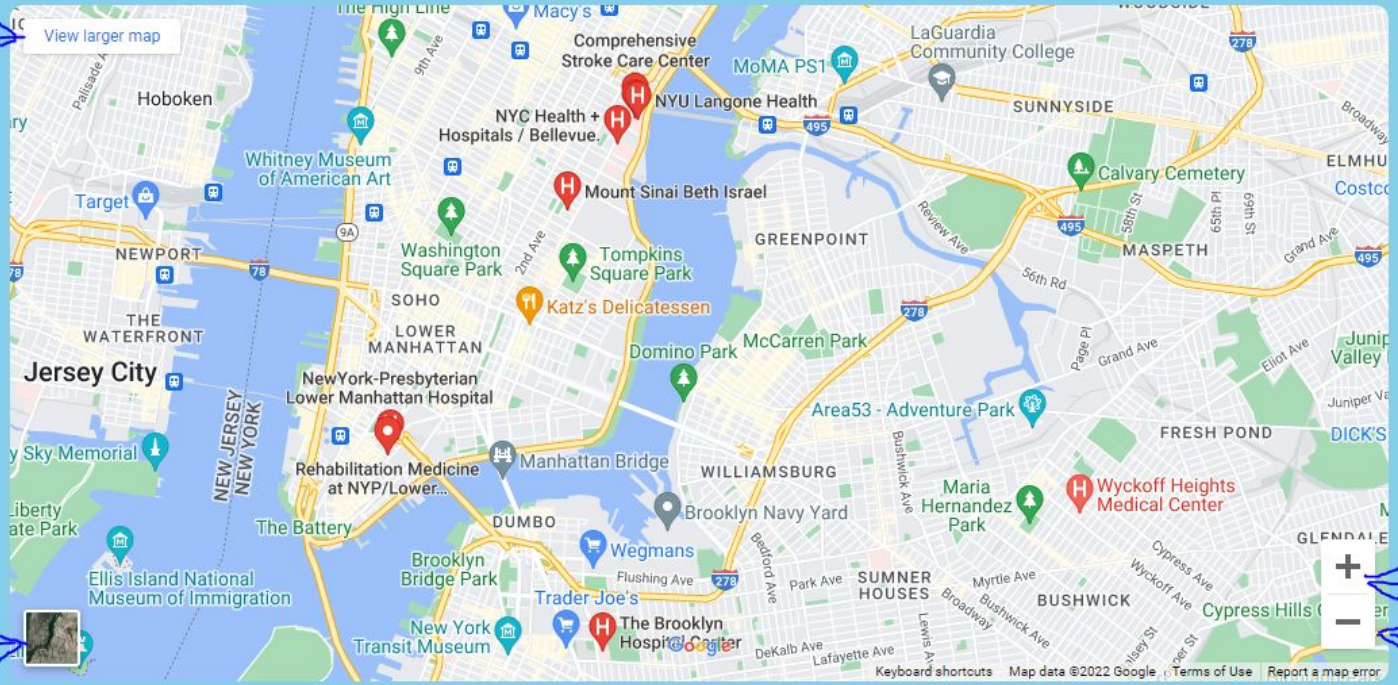
Predicted No Stroke



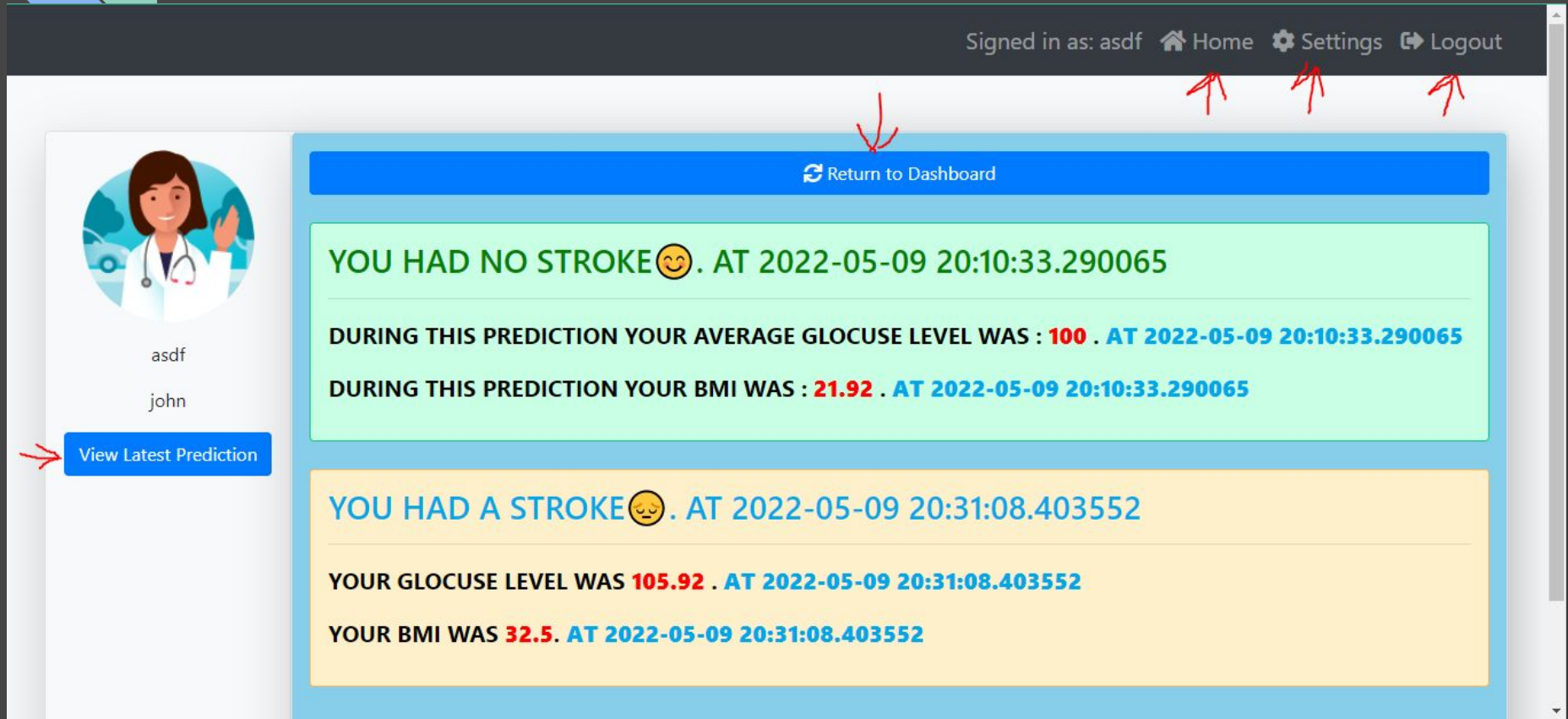
Predicted Stroke 1/2



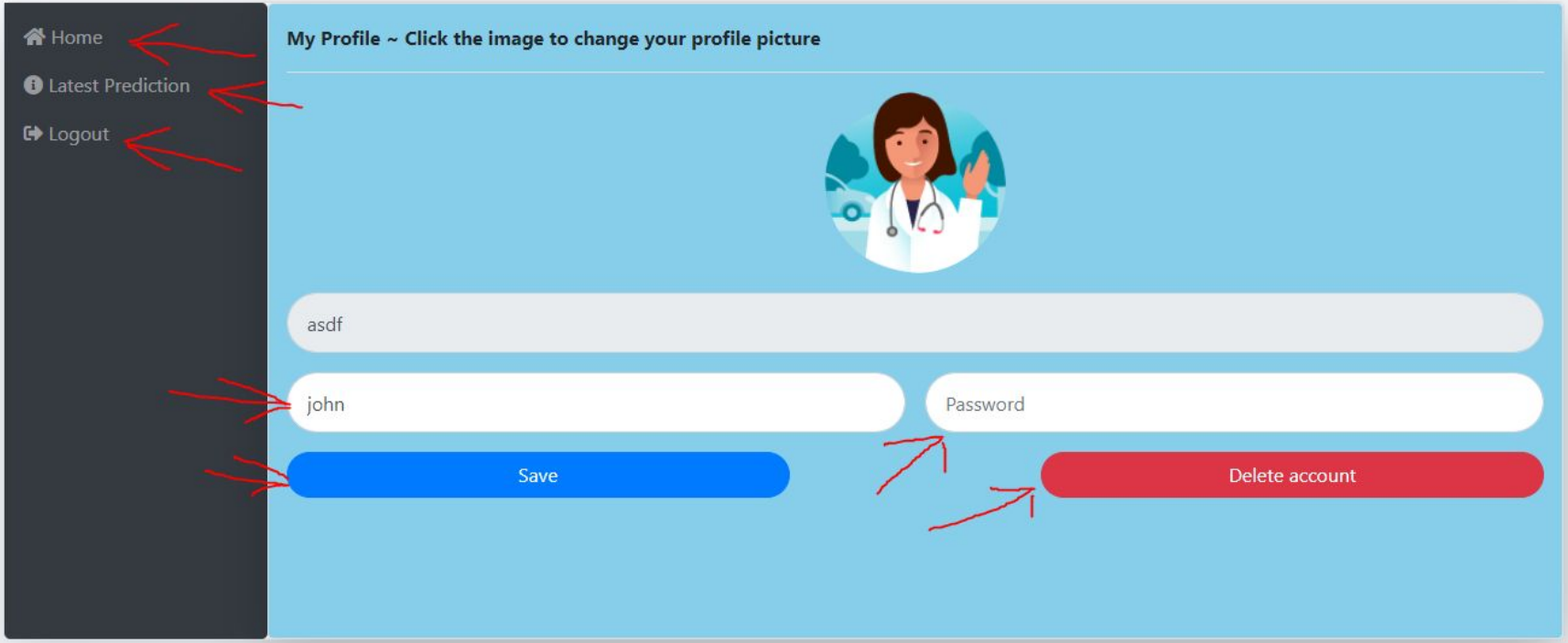
Predicted Stroke 2/2



Stroke Prediction History



Settings


Home
Latest Prediction
Logout
My Profile ~ Click the image to change your profile picture
asdf
john
Password
Save
Delete account

Live Demo