

PREDICTING CHANCES OF DISEASES USING MACHINE LEARNING

**A Minor Project Report
Submitted in Partial fulfillment for the award of
Bachelor of Engineering in Computer Science & Engineering**

Submitted to
**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA
BHOPAL (M.P)**



MINOR PROJECT REPORT

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Session 2019-20**



LAKSHMI NARAIN COLLEGE OF TECHNOLOGY, BHOPAL

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CERTIFICATE

This is to certify that the work embodied in this project work entitled "**Predicting chances of diseases using Machine Learning**" has been satisfactorily completed by the **Abhishek Jain** (0103CS171006), **Bhola Prasad Chilhate** (0103CS171046) , **Krishna Yadav** (0103CS171072). It is a bonafide piece of work, carried out under the guidance in **Department of Computer Science & Engineering, Lakshmi Narain College of Technology, Bhopal** for the partial fulfillment of the **Bachelor of Engineering** during the academic year 2019-2020.

Guided By

(Prof. Aditya Patel)
Mentor CSE Dept.

Approved By

Prof. & Head
Department of Computer Science & Engineering



LAKSHMI NARAIN COLLEGE OF TECHNOLOGY, BHOPAL

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

ACKNOWLEDGEMENT

We express our deep sense of gratitude to Prof. Aditya Patel (Guide) department of Computer Science & Engineering L.N.C.T., Bhopal. Whose kindness valuable guidance and timely help encouraged me to complete this project.

A special thank goes to Dr. Bhupesh Gour (HOD) who helped me in completing this project work. She exchanged her interesting ideas & thoughts which made this project work successful.

We would also thank our institution and all the faculty members without whom this project work would have been a distant reality.

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CHAPTER 1

PROBLEM DOMAIN

The problem domain for this project is related to health and diagnostics in medical research and practices.

This project uses the ongoing modern technologies and tools into practice to develop a useful software or website for medical experts and general public.

We make the best use of past recorded medical data for open source repositories and machine learning technology to develop a **disease prediction system**, which uses symptoms fed by the client to predict the most likely disease related to mentioned symptoms.

This system will be helpful for general public and also for medical experts to semi-automate the diagnostic procedure of many diseases. Because it can predict possible diseases the patient may contain by analyzing the symptoms of the patients.

We will be developing a website for feeding few symptoms which further be used by the model to predict the disease. The website is expected to be interactive and simplistic.

The prediction module will be developed by the use of machine learning algorithms and will be deployed on the server end where requests can be handled and user details can be stored in a well-organized manner.

CHAPTER 2

LITERATURE SURVEY

We had gone through some research papers related to our problem domain. The most influential research was found on the following website:

https://shiring.github.io/machine_learning/2017/03/31/webinar_code

In the above mention research the publisher took Cancer diagnostic data and built a meaningful machine learning model out of it. It shows an approach to build ml models on a specific disease and encourages us to take this further for other problem domains. This research was the main source of inspiration for our project.

We also visited some educational websites such as [geeksforgeeks.com](https://www.geeksforgeeks.com), medium.com, etc. to get general ideas to implement our problem domain by using websites as front-end.

We also decided the best method to develop our ML model (from various classification, regression algorithms).

We selected the most suitable dataset for our current problem domain after shortlisting from a few datasets with different sizes and features.

We consistently visited various educational sites for solving small sub-problems in the problem domain.

CHAPTER 3

MAJOR OBJECTIVE & SCOPE OF PROJECT

3.1 Major objectives of project

Following are the major objectives of our project:

- To build a meaningful machine learning model for predicting disease according to the symptoms provided.
- To develop and deploy an interactive and attractive website as our front-end of our project.
- To develop a robust back-end of the project to store user data and software, scripts and ml models.

3.2 Scope of project

We will build our machine learning model using python because it is very interactive and easy to code in case of developing ML models. There are various libraries available in python such as numpy, pandas, scipy, scikitlearn, etc. which are a great help in machine learning.

Also we will be using HTML, CSS, and various technologies and some python scripts and libraries such as Flask to develop website and deploy our ML model to website. We may also use MySQL as our back-end database for user data storage and other purposes.

Due to hardware limitations for building ML model, we will be using a relatively small dataset for our model which might not work much efficiently (due to small training set). Apart from hardware limitations, ML models never works fully perfect in every scenario, rather it may improve overtime.

CHAPTER 4

PROBLEM ANALYSIS AND REQUIREMENT SPECIFICATION

4.1 Problem analysis

Firstly, we need to develop our ML model. For that we need a reliable dataset from the internet. Then we require a development environment for developing ML model. We will be using jupyter notebook to code python scripts and will make use of libraries such as numpy, pandas, scikitlearn, etc. will add to our development. We also need a machine to code and run scripts which should be powerful enough to develop our model.

Then we need to develop a website to serve as a front-end and it would require scripting languages such as HTML and CSS. Also then we have to develop some python scripts to deploy our ML model to the web server and require API such as Flask for connectivity of our model to the website.

We also require MySQL database deployed on our web server to store and serve user details and credentials to the website, also we require web server hardware powerful enough to handle client requests.

4.2 Requirement Specification

Following are the requirement specification for this project:

- Appropriate dataset for training and testing of ML model.
- Development environment such as Anaconda and python 3.
- Libraries such as numpy, pandas, scikitlearn, etc.
- Website development environment such as Notepad++ and Google Chrome.
- Scripting languages such as HTML, CSS, Python 3, etc.
- Hardware for software development and web server deployment.
- MySQL database and Python 3 as back-end storage and scripts.
- Connectivity API such as Flask.

CHAPTER 5

DETAILED DESIGN (MODELING AND ERD / DFD)

Fig 5.1 shows the DFD for this project and Fig 5.2 shows the ERD model for the database used.

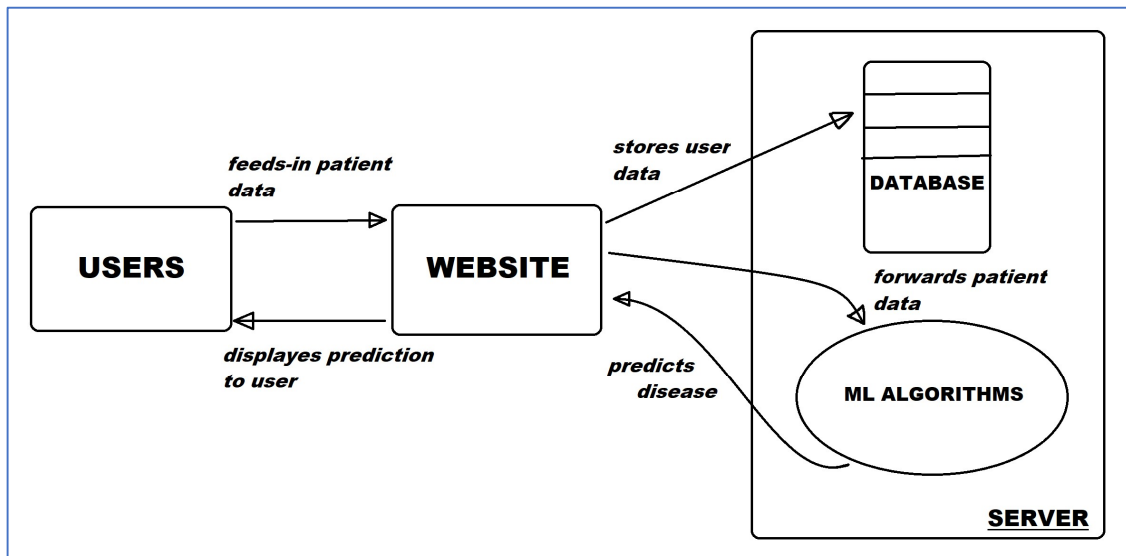


Fig 5.1 Data Flow Diagram of the project

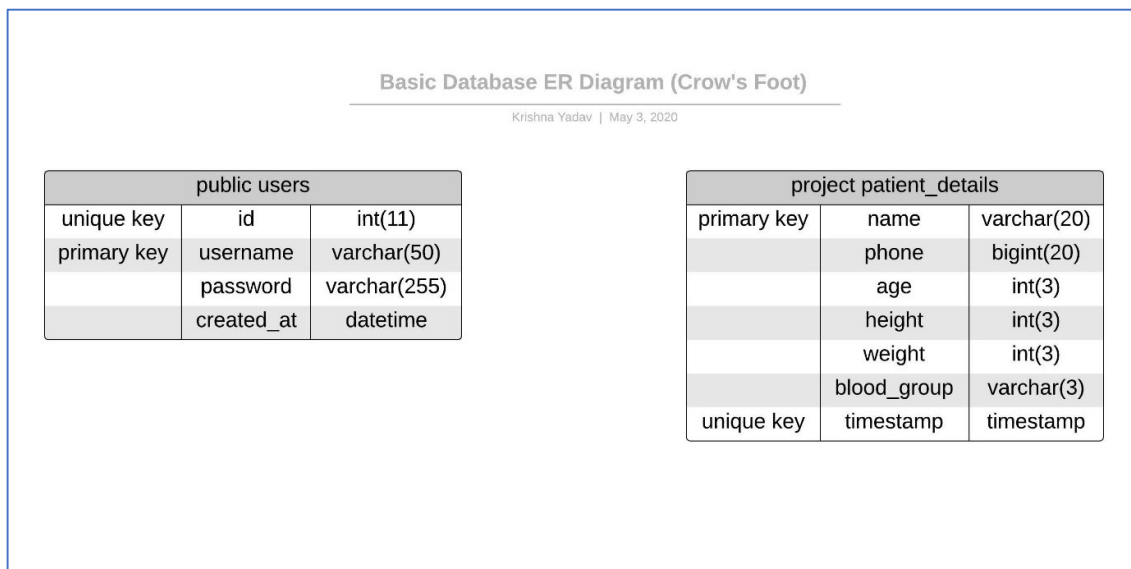


Fig 5.2 Entity-Relationship diagram of the Database

CHAPTER 6

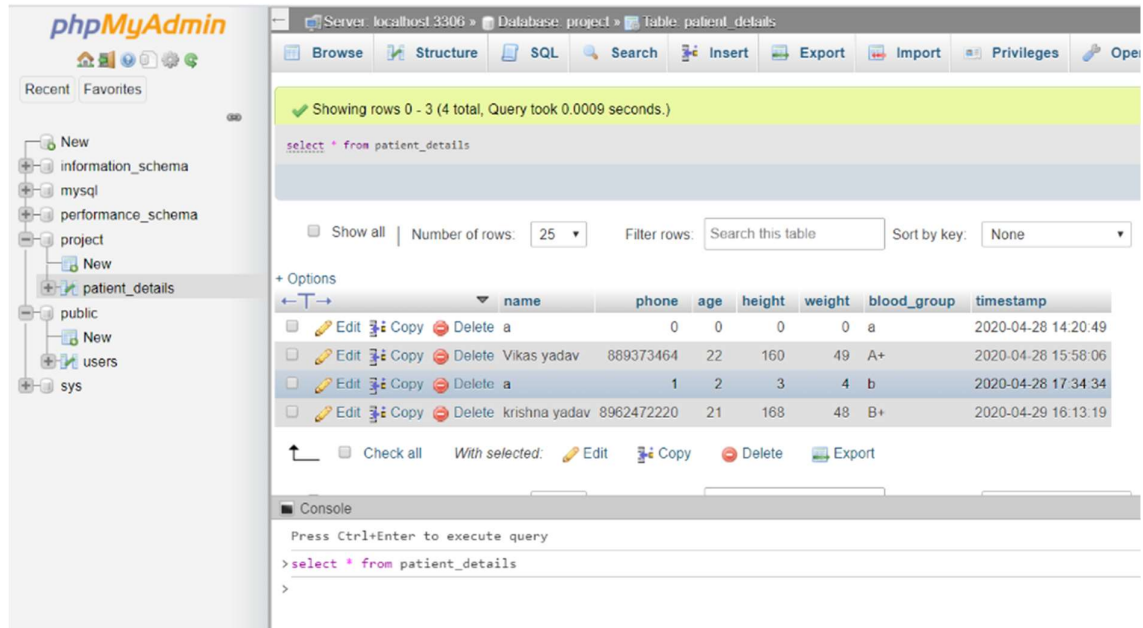
HARDWARE / SOFTWARE PLATFORM ENVIRONMENT

Following are the hardware and software requirements for the project:

- Any PC, Laptop, Tablet or Smartphone.
- Working internet connection.
- Memory: min. 1 GB RAM (recommended).
- Operating System: Any (Windows, Linux, Android, etc.)
- Any Browser with JavaScript enabled. (Chrome, Firefox, etc.)

CHAPTER 7

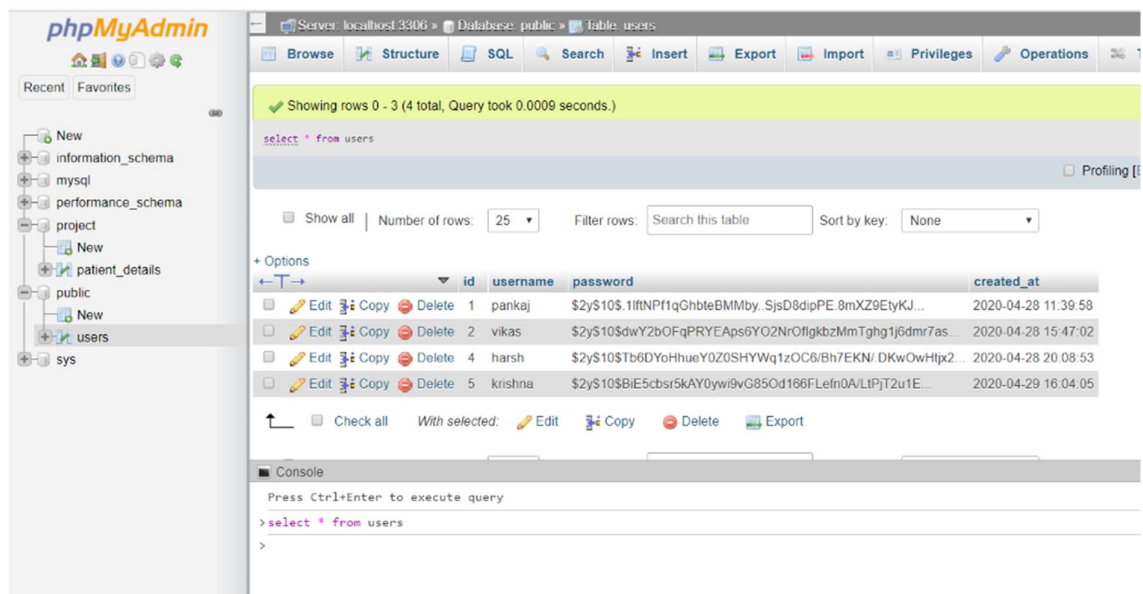
SNAPSHOTS OF INPUT & OUTPUT



The screenshot shows the phpMyAdmin interface. On the left, the database structure tree is visible, with 'project' selected and 'patient_details' highlighted. The main panel displays the 'patient_details' table structure and data. The table has columns: name, phone, age, height, weight, blood_group, and timestamp. The data shows four rows of patient information.

	name	phone	age	height	weight	blood_group	timestamp
<input type="checkbox"/>	a	0	0	0	0	a	2020-04-28 14:20:49
<input type="checkbox"/>	Vikas yadav	889373464	22	160	49	A+	2020-04-28 15:58:06
<input type="checkbox"/>	a	1	2	3	4	b	2020-04-28 17:34:34
<input type="checkbox"/>	krishna yadav	8962472220	21	168	48	B+	2020-04-29 16:13:19

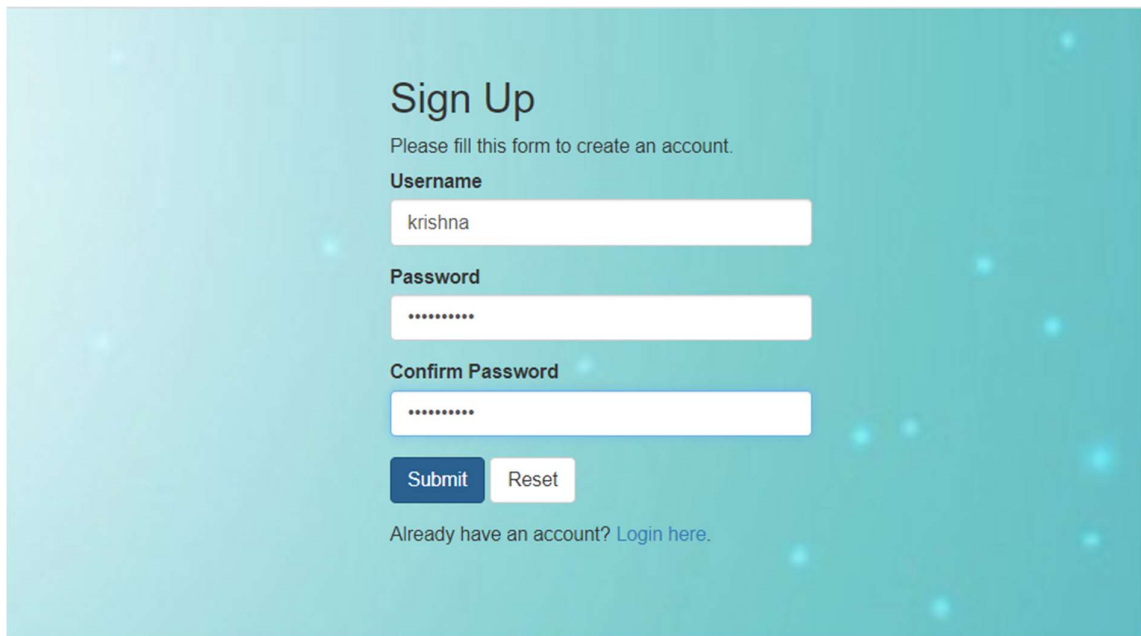
Figure 7.1 patient_details table for storing patient's details.



The screenshot shows the phpMyAdmin interface. On the left, the database structure tree is visible, with 'public' selected and 'users' highlighted. The main panel displays the 'users' table structure and data. The table has columns: id, username, password, and created_at. The data shows five rows of user information.

	id	username	password	created_at
<input type="checkbox"/>	1	pankaj	\$2y\$10\$.1lfnP1qGhbtBMMby..SjsD8dipPE.8mXZ9EtYKJ...	2020-04-28 11:39:58
<input type="checkbox"/>	2	vikas	\$2y\$10\$dWY2bOfqPRYEApS6YO2NrOfIqkzMMtghg1j6dmr7as...	2020-04-28 15:47:02
<input type="checkbox"/>	4	harsh	\$2y\$10\$tB6DYohueY0Z0SHYwq1zOC6/Bh7EKN/ DKwOwHtpx2...	2020-04-28 20:08:53
<input type="checkbox"/>	5	krishna	\$2y\$10\$BIE5cbsr5kAY0ywi9vG85Od186FLfn0A/LIPjT2u1E...	2020-04-29 16:04:05

Figure 7.2 users table for storing usernames and passwords hashes.



The image shows a 'Sign Up' form on a teal background with light blue bokeh effects. The form includes a title 'Sign Up', a subtitle 'Please fill this form to create an account.', and three input fields: 'Username' (containing 'krishna'), 'Password' (masked with dots), and 'Confirm Password' (also masked with dots). Below the fields are two buttons: 'Submit' (dark blue) and 'Reset' (light blue). At the bottom, there is a link 'Login here.' for users who already have an account.

Sign Up

Please fill this form to create an account.

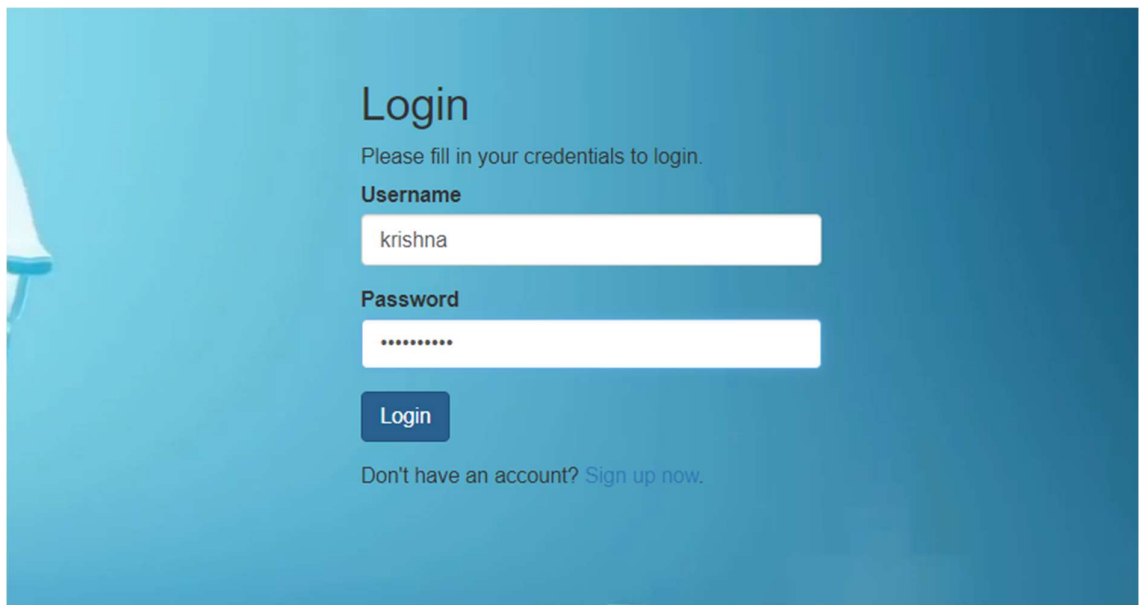
Username

Password

Confirm Password

Already have an account? [Login here.](#)

Figure 7.3 User Sign up webpage.



The image shows a 'Login' form on a blue background with a subtle pattern. The form includes a title 'Login', a subtitle 'Please fill in your credentials to login.', and two input fields: 'Username' (containing 'krishna') and 'Password' (masked with dots). Below the fields is a 'Login' button (dark blue). At the bottom, there is a link 'Sign up now.' for users who don't have an account.

Login

Please fill in your credentials to login.

Username

Password

Don't have an account? [Sign up now.](#)

Figure 7.4 User Login Page.



Figure 7.5 Homepage of website.

 The image shows a webpage titled "Patient Details" with the subtitle "Please fill the patient's details". The page has a purple background with various medical icons like pills, DNA helices, and hearts. On the left, there is an illustration of a person sitting at a desk with a laptop. On the right, there is an illustration of a doctor standing. The form consists of several input fields: "Name" (filled with "krishna yadav"), "Phone (10 digits)" (filled with "8962472220"), "Age" (filled with "21"), "Height (in cms)" (filled with "162"), "Weight (in kgs)" (filled with "48"), and "Blood Group" (filled with "B+"). At the bottom of the form, there are two buttons: "Submit" and "Reset".

Figure 7. 6 webpage for feeding-in patient details.



Figure 7.7 webpage for predicting disease.

```
In [1]: import pandas as pd
import numpy as np
data=pd.read_csv("syditriage.csv")

In [2]: data

Out[2]:
```

	sym	symptom	dis	disease	dg	v-shaped
0	1043	Holoprosencephaly	1	Del (2) (p22-p21)	0	-5000015
1	21	Cleft palate	1	Del (2) (p22-p21)	0	-5000015
2	2960	Failed corpus callosum development	1	Del (2) (p22-p21)	0	-5000015
3	77	Cleft lips	1	Del (2) (p22-p21)	0	-5000015
4	906	Kidney anomalies	1	Del (2) (p22-p21)	0	-5000015
...
200864	669	Increased sweating	20150	Hypersecretion of growth hormone	1	-44
200865	881	Menstrual irregularities	20150	Hypersecretion of growth hormone	1	-44
200866	886	Enlarged kidneys	20150	Hypersecretion of growth hormone	1	-44
200867	9098	Bone overgrowth	20150	Hypersecretion of growth hormone	1	-44
200868	9134	Enlarged lips	20150	Hypersecretion of growth hormone	1	-44

200869 rows × 6 columns

Figure 7.8 Dataset used in training machine learning model for disease prediction.

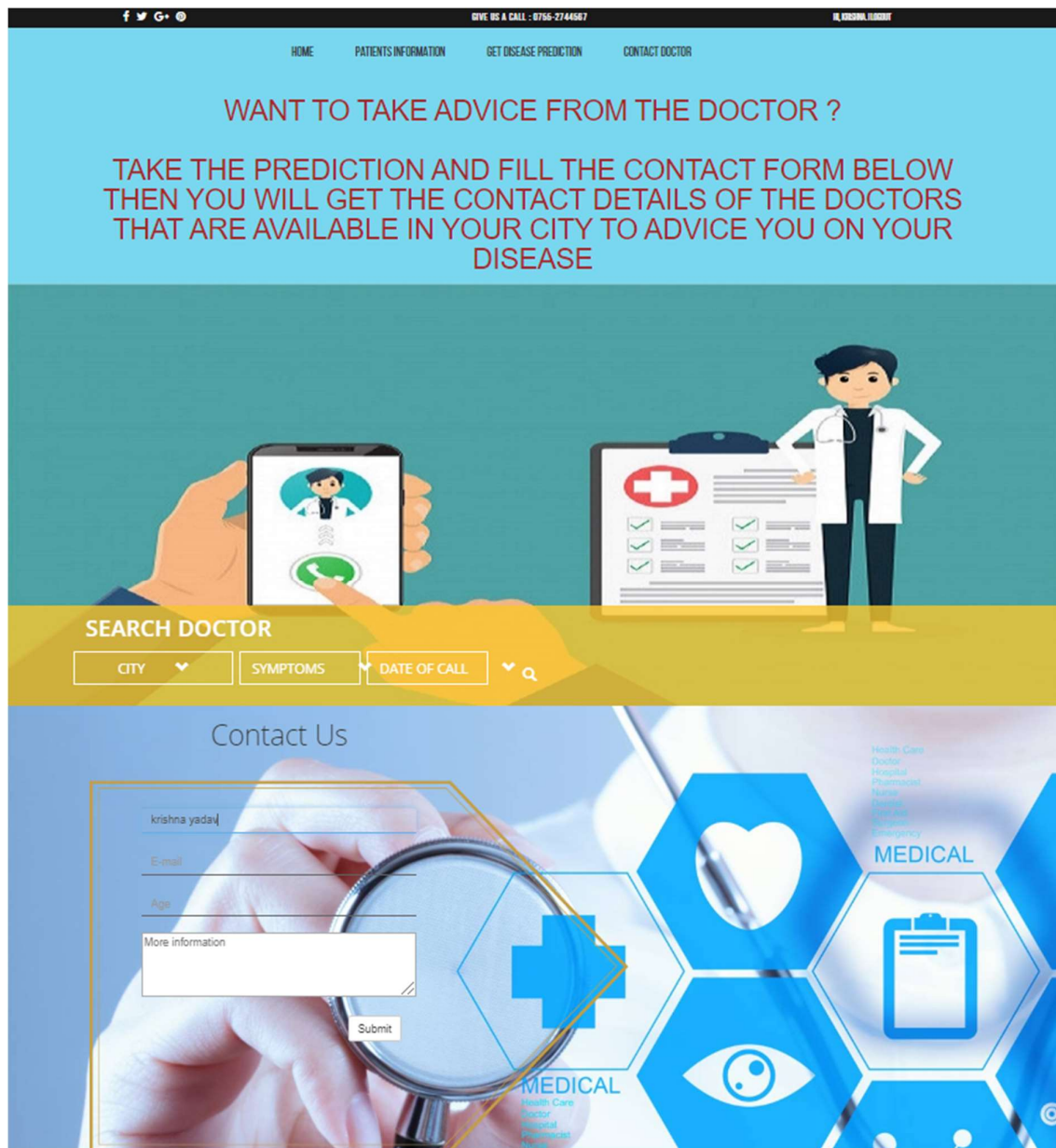


Figure 7. 2 webpage to request an appointment with the doctors.

Code for home page of the website is given below:

welcome.php:

```
<?php session_start(); if(!isset($_SESSION["loggedin"]) || $_SESSION["loggedin"] !==
true){ header("location: login.php"); exit; } ?> <!DOCTYPE html> <html lang="en">
<head> <meta charset="UTF-8"> <title>Welcome</title> <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.css"> <style
type="text/css"> body{ font: 14px sans-serif; text-align: center; } </style> <meta
charset="utf-8"> <meta name="viewport" content="width=device-width, initial-
scale=1"> <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/css/bootstrap.min.css"> <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script> <script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/js/bootstrap.min.js"></script>
<meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1"> <meta
name="viewport" content="width=device-width, initial-scale=1.0"> <link
rel="stylesheet" type="text/css" href="source/bootstrap-3.3.6-dist/css/bootstrap.css">
<link rel="stylesheet" type="text/css" href="source/font-awesome-4.5.0/css/font-
awesome.css"> <link rel="stylesheet" type="text/css" href="style/slider.css"> <link
rel="stylesheet" type="text/css" href="style/mystyle.css"> <link rel="stylesheet"
type="text/css" href="style/contactstyle.css"> <style> body{ background-image:
url("image/home.jpg"); } </style> </head> <body> <div class="allcontain"> <div
class="header"> <ul class="socialicon"> <li><a href="#"><i class="fa fa-
facebook"></i></a></li> <li><a href="#"><i class="fa fa-twitter"></i></a></li> <li><a
href="#"><i class="fa fa-google-plus"></i></a></li> <li><a href="#"><i class="fa fa-
pinterest"></i></a></li> </ul> <ul class="givusacall"> <li>Give us a call : 0755-
2744567 </li> </ul> <ul class="logreg"> <li>Hi, <?php echo
htmlspecialchars($_SESSION["username"]); ?>.</li> <li></li> <li><a
href="logout.php">Logout</a> </li> </ul> </div> <!-- Navbar Up --> <nav
class="topnav navbar-default topnav"> <div class="collapse navbar-collapse"
id="upmenu"> <ul class="nav navbar-nav" id="navbartop"> <li class="active"><a
href="welcome.php">HOME</a></li> <li class="active"><a href="patient-
details.php">patients information </a></li> </ul> </div> </nav> </div> </body>
</html>
```


Code for webpage for registering patient's details of the website is given below:

patient-details.php:

```
<?php session_start(); if(!isset($_SESSION["loggedin"]) || $_SESSION["loggedin"] !== true){
header("location: login.php"); exit; } /* Database credentials. */ define('DB_SERVER', 'localhost');
define('DB_USERNAME', 'project_admin'); define('DB_PASSWORD', 'projectpass'); define('DB_NAME',
'project'); /* Attempt to connect to MySQL database */ $link = mysqli_connect(DB_SERVER,
DB_USERNAME, DB_PASSWORD, DB_NAME); if($link === false){ die("ERROR: Could not connect.
". mysqli_connect_error()); } $name = $phone = $age = $height = $weight = $blood_group = "";
if($_SERVER["REQUEST_METHOD"] == "POST"){ $name = trim($_POST["name"]); $phone =
trim($_POST["phone"]); $age = trim($_POST["age"]); $height = trim($_POST["height"]); $weight =
trim($_POST["weight"]); $blood_group = trim($_POST["blood_group"]); $sql = "INSERT INTO
`patient_details` (`name`, `phone`, `age`, `height`, `weight`, `blood_group`) VALUES (?, ?, ?, ?, ?)"; if($stmt
= mysqli_prepare($link, $sql)){ mysqli_stmt_bind_param($stmt, "sssss", $param_name, $param_phone,
$param_age, $param_height, $param_weight, $param_blood_group); $param_name=$name;
$param_phone=$phone; $param_age=$age; $param_height=$height; $param_weight=$weight;
$param_blood_group=$blood_group; if(mysqli_stmt_execute($stmt)){ echo "Records inserted
successfully."; header("location: medi.php"); } else{ echo "Something went wrong. Please try again later.";
} mysqli_stmt_close($stmt); } mysqli_close($link); } ?><!DOCTYPE html> <html lang="en"> <head>
<meta charset="UTF-8"> <title>Patient Details</title> <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.css"> <style type="text/css"> body {
font: 14px sans-serif; text-align: center; } .wrapper{ width: 350px; padding: 20px; } </style> <meta
charset="utf-8"> <meta name="viewport" content="width=device-width, initial-scale=1"> <link
rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/css/bootstrap.min.css"> <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script> <script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/js/bootstrap.min.js"></script> <meta http-equiv="X-
UA-Compatible" content="IE=edge,chrome=1"> <meta name="viewport" content="width=device-width,
initial-scale=1.0"> <link rel="stylesheet" type="text/css" href="source/bootstrap-3.3.6-
dist/css/bootstrap.css"> <link rel="stylesheet" type="text/css" href="source/font-awesome-4.5.0/css/font-
awesome.css"> <link rel="stylesheet" type="text/css" href="style/slider.css"> <link rel="stylesheet"
type="text/css" href="style/mystyle.css"> <link rel="stylesheet" type="text/css"
href="style/contactstyle.css"> <style> body{ background-image: url("image/patientinfo.jpg"); } </style>
</head> <body> <div class="allcontain"> <div class="header"> <ul class="socialicon"> <li><a
href="#"><i class="fa fa-facebook"></i></a></li> <li><a href="#"><i class="fa fa-twitter"></i></a></li>
<li><a href="#"><i class="fa fa-google-plus"></i></a></li> <li><a href="#"><i class="fa fa-
pinterest"></i></a></li> </ul> <ul class="givusacall"> <li>Give us a call : 0755-2744567 </li> </ul> <ul
class="logreg"> <li>Hi, <?php echo htmlspecialchars($_SESSION["username"]); ?>. </li> <li></li>
<li><a href="logout.php">Logout</a> </li> </ul> </div> <!-- Navbar Up --> <nav class="topnavbar
navbar-default topnav"> <div class="collapse navbar-collapse" id="upmenu"> <ul class="nav navbar-nav"
id="navbarontop"> <li class="active"><a href="welcome.php">HOME</a></li> <li class="active"><a
href="patient-details.php">patients information </a></li> </ul> </div> </nav> </div> <div
class="container"> <div class="col-md-4"> </div> <div class="col-md-4" style="margin-top: 10px"> <div
class="wrapper"> <h2>Patient Details</h2> <p>Please fill the patient's details.</p> <form action="<?php
echo htmlspecialchars($_SERVER["PHP_SELF"]); ?>" method="post"> <div class="form-group">
<label>Name</label> <input type="text" name="name" class="form-control" value=""> <span
class="help-block"></span> </div> <div class="form-group"> <label>Phone (10 digits)</label> <input
type="text" name="phone" class="form-control" value=""> <span class="help-block"></span> </div> <div
class="form-group"> <label>Age</label> <input type="text" name="age" class="form-control" value="">
<span class="help-block"></span> </div> <div class="form-group"> <label>Height (in cms)</label>
<input type="text" name="height" class="form-control" value=""> <span class="help-block"></span>
</div> <div class="form-group"> <label>Weight (in kgs)</label> <input type="text" name="weight"
class="form-control" value=""> <span class="help-block"></span> </div> <div class="form-group">
<label>Blood Group</label> <input type="text" name="blood_group" class="form-control" value="">
<span class="help-block"></span> </div> <div class="form-group"> <input type="submit" class="btn btn-
primary" value="Submit"> <input type="reset" class="btn btn-default" value="Reset"> </div> </form>
</div> </div> </div> </body> </html>
```

Code for webpage for predicting disease of the website is given below :

medi.php:

```
<?php session_start(); if(!isset($_SESSION["loggedin"]) || $_SESSION["loggedin"] !==
true){ header("location: login.php"); exit; } if($_SERVER["REQUEST_METHOD"] ==
"POST"){ echo "Sent"; header("location: contact.php"); } ?> <!DOCTYPE html>
<html> <head> <title>minor project</title> <meta charset="utf-8"> <meta
name="viewport" content="width=device-width, initial-scale=1"> <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/css/bootstrap.min.css"> <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script> <script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/js/bootstrap.min.js"></script>
<meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1"> <meta
name="viewport" content="width=device-width, initial-scale=1.0"> <link
rel="stylesheet" type="text/css" href="source/bootstrap-3.3.6-dist/css/bootstrap.css">
<link rel="stylesheet" type="text/css" href="source/font-awesome-4.5.0/css/font-
awesome.css"> <link rel="stylesheet" type="text/css" href="style/slider.css"> <link
rel="stylesheet" type="text/css" href="style/mystyle.css"> <link rel="stylesheet"
type="text/css" href="style/contactstyle.css"> <style> body{ background-image:
url("image/disprec.jpg"); } </style> </head> <body> <div class="allcontain"> <div
class="header"> <ul class="socialicon"> <li><a href="#"><i class="fa fa-
facebook"></i></a></li> <li><a href="#"><i class="fa fa-twitter"></i></a></li> <li><a
href="#"><i class="fa fa-google-plus"></i></a></li> <li><a href="#"><i class="fa fa-
pinterest"></i></a></li> </ul> <ul class="givusacall"> <li>Give us a call : 0755-
2744567 </li> </ul> <ul class="logreg"> <li>Hi, <?php echo
htmlspecialchars($_SESSION["username"]); ?>. </li> <li><a
href="logout.php">Logout</a> </li> </ul> </div> <!-- Navbar Up --> <nav
class="topnavbar navbar-default topnav"> <div class="collapse navbar-collapse"
id="upmenu"> <ul class="nav navbar-nav" id="navbartop"> <li class="active"><a
href="welcome.php">HOME</a></li> <li class="active"><a href="patient-
details.php">patients information </a></li> <li class="active"><a href="medi.php">Get
disease prediction</a></li> </ul> </div> </nav> </div> <div class="container"> <h1
align="center">Predicting The Disease Of patients with size of training set: 6,019
records</h1> <div class="col-md-4" style="margin-top: 10px" align="center"> <form
action="<?php echo htmlspecialchars($_SERVER["PHP_SELF"]); ?>" method="post">
<div class="form-group"> <label for="carBrand">Select the symptom(1):</label>
<select class="form-control" id="carBrand1" name="carBrand1"> </select> </div> <div
class="form-group"> <label for="carBrand">Select the symptom(2):</label> <select
class="form-control" id="carBrand2" name="carBrand2"> </select> </div> <div
class="form-group"> <label for="carBrand">Select the symptom(3):</label> <select
class="form-control" id="carBrand3" name="carBrand3"> </select> </div> <button
type="submit" class="btn btn-primary">predict</button> </form> </div> </div>
</body> </html>
```

contact.php:

```
<?php session_start(); if(!isset($_SESSION["loggedin"]) || $_SESSION["loggedin"] !== true){ header("location:
login.php"); exit; } ?> <!doctype html> <html> <head> <meta charset="UTF-8"> <title>Contact</title> <meta http-
equiv="X-UA-Compatible" content="IE=edge,chrome=1"> <meta name="viewport" content="width=device-width,
initial-scale=1.0"> <link rel="stylesheet" type="text/css" href="source/bootstrap-3.3.6-dist/css/bootstrap.css"> <link
rel="stylesheet" type="text/css" href="source/font-awesome-4.5.0/css/font-awesome.css"> <link rel="stylesheet"
type="text/css" href="style/slider.css"> <link rel="stylesheet" type="text/css" href="style/mystyle.css"> <link
rel="stylesheet" type="text/css" href="style/contactstyle.css"> <style> body{ background-color: #7ad7f0 } </style>
</head> <body> <!-- Header --> <div class="allcontain"> <div class="header"> <ul class="socialicon"> <li><a
href="#"><i class="fa fa-facebook"></i></a></li> <li><a href="#"><i class="fa fa-twitter"></i></a></li> <li><a
href="#"><i class="fa fa-google-plus"></i></a></li> <li><a href="#"><i class="fa fa-pinterest"></i></a></li>
</ul> <ul class="givusacall"> <li>Give us a call : 0755-2744567 </li> </ul> <ul class="logreg"> <li>Hi, <?php
echo htmlspecialchars($_SESSION["username"]); ?>. </li> <li></li> <li><a href="logout.php">Logout</a> </li>
</ul> </div> <!-- Navbar Up --> <nav class="topnavbar navbar-default topnav"> <div class="collapse navbar-
collapse" id="upmenu"> <ul class="nav navbar-nav" id="navbarontop"> <li class="active"><a
href="welcome.php">HOME</a></li> <li class="active"><a href="patient-details.php">patients information
</a></li> <li class="active"><a href="medi.php">Get disease prediction</span></a></li> <li class="active"><a
href="contact.php">CONTACT DOCTOR</a></li> </ul> </div> </nav> <div class="container"> <font
color="brown"><h1 align="center">WANT TO TAKE ADVICE FROM THE DOCTOR ?<BR><BR> TAKE THE
PREDICTION AND FILL THE CONTACT FORM BELOW THEN YOU WILL GET THE CONTACT DETAILS
OF THE DOCTORS THAT ARE AVAILABLE IN YOUR CITY TO ADVISE YOU ON YOUR
DISEASE</h1></font> </div> <!--
Carousel
--> <div class="allcontain"> <div id="carousel-up"
class="carousel slide" data-ride="carousel"> <div class="carousel-inner" role="listbox"> <div class="item active">
 </div> </div> <div class="nav navbar-nav navbar-default midle-nav"> <div
class="navbar-header"> <button type="button" class="navbar-toggle collapsed textcostume" data-toggle="collapse"
data-target="#navbarmidle" aria-expanded="false"> <h1>SEARCH TEXT</h1> <span class="sr-only">Toggle
navigation</span> <span class="icon-bar"></span> <span class="icon-bar"></span> <span class="icon-bar"></span> </div> <div class="collapse navbar-collapse" id="navbarmidle"> <div class="searchtxt">
<h1>SEARCH DOCTOR</h1> </div> <ul class="nav navbar-nav navbarborder"> <li class="li-category"> <a
class="btn dropdown-toggle btn-costume" id="dropdownMenu1" data-toggle="dropdown" aria-haspopup="true"
aria-expanded="true">CITY<span class="glyphicon glyphicon-chevron-down downicon"></span></a> <ul
class="dropdown-menu" id="mydd"> <li><a href="#">BHOPAL</a></li> <li><a href="#">INDORE</a></li>
<li><a href="#">JABALPUR</a></li> </ul> </li> <li class="li-minyear"><a class="btn dropdown-toggle btn-
costume" id="dropdownMenu2" data-toggle="dropdown" aria-haspopup="true" aria-
expanded="true">SYMPTOMS <span class="glyphicon glyphicon-chevron-down downicon"></span></a> <ul
class="dropdown-menu" id="mydd2"> <li><a href="#">immobile</a></li> <li><a href="#">sciatica</a></li>
<li><a href="#">rest pain</a></li> <li><a href="#">dullness</a></li> <li><a href="#">pulsus paradoxus</a></li>
<li><a href="#">room spinning</a></li> </ul> </li> <li class="li-maxyear"><a class="btn dropdown-toggle btn-
costume" id="dropdownMenu3" data-toggle="dropdown" aria-haspopup="true" aria-expanded="true">DATE OF
CALL <span class="glyphicon glyphicon-chevron-down downicon"></span></a> <ul class="dropdown-menu"
id="mydd3"> <li><a href="#">TODAY</a></li> <li><a href="#">TOMORROW</a></li> <li><a href="#">DAY
AFTER TOMORROW</a></li> </ul> </li> <li class="li-search"> <button class="searchbutton"><span
class="glyphicon glyphicon-search"></span></button></li> </ul> </div> </nav> </div> </div> <div
class="allcontain"> <div class="contact" style="background-image: url(image/disprec.jpg);"> <div
class="newslettercontent"> <div class="leftside"> 
<div class="contact-form"> <h1>Contact Us</h1> <div class="form-group group-coustume"> <input type="text"
class="form-control name-form" placeholder="Name"/> <input type="text" class="form-control email-form"
placeholder="E-mail"/> <input type="text" class="form-control name-form" placeholder="Age"/> <textarea
rows="4" cols="50" class="message-form" placeholder="More information"></textarea> <button type="submit"
class="btn btn-default btn-submit">Submit</button> </div> </div> <div class="google-maps"> <div
id="googleMap"></div> </div> </div> <div class="footer"> <div class="copyright">&copy; Copy
right 2016 | <a href="#">Privacy </a> | <a href="#">Policy</a></div> <script
src="http://maps.googleapis.com/maps/api/js"></script> <script> var myCenter=new
google.maps.LatLng(41.567197,14.681526); function initialize() { var mapProp = {center:myCenter, zoom:16,
mapTypeId:google.maps.MapTypeId.ROADMAP}; var map=new
google.maps.Map(document.getElementById("googleMap"),mapProp); var marker=new
google.maps.Marker({position:myCenter,}); marker.setMap(map); } </script> <script type="text/javascript"
src="source/bootstrap-3.3.6-dist/js/jquery.js"></script> <script type="text/javascript"
src="source/js/myscript.js"></script> <script type="text/javascript" src="source/bootstrap-3.3.6-
dist/js/bootstrap.js"></script> <script> $(window).resize(function(){ var new_height = $("#image_border").height();
console.log(new_height); $("#googleMap").height(new_height); }); $(window).load(function(){ var new_height =
$("#image_border").height(); console.log(new_height); $("#googleMap").height(new_height);
google.maps.event.addDomListener(window, 'load', initialize()); }); </script> <script type="text/javascript"
src="source/js/myscript.js"></script> <script type="text/javascript" src="source/bootstrap-3.3.6-
dist/js/jquery.1.11.js"></script> </div> </div> </body> </html>
```

Code for webpage for user login of the website is given below:

login.php:

```
<?php session_start(); if(isset($_SESSION["loggedin"]) && $_SESSION["loggedin"]
=== true){ header("location: welcome.php"); exit; } require_once "config.php";
$username = $password = ""; $username_err = $password_err = "";
if($_SERVER["REQUEST_METHOD"] == "POST"){
if(empty(trim($_POST["username"]))) { $username_err = "Please enter username."; }
else { $username = trim($_POST["username"]); }
if(empty(trim($_POST["password"]))) { $password_err = "Please enter your
password."; } else { $password = trim($_POST["password"]); }
if(empty($username_err) && empty($password_err)) { $sql = "SELECT id, username,
password FROM users WHERE username = ?"; if($stmt = mysqli_prepare($link,
$sql)){ mysqli_stmt_bind_param($stmt, "s", $param_username); $param_username =
$username; if(mysqli_stmt_execute($stmt)){ mysqli_stmt_store_result($stmt);
if(mysqli_stmt_num_rows($stmt) == 1){ mysqli_stmt_bind_result($stmt, $id,
$username, $hashed_password); if(mysqli_stmt_fetch($stmt)){
if(password_verify($password, $hashed_password)){ session_start();
$_SESSION["loggedin"] = true; $_SESSION["id"] = $id; $_SESSION["username"] =
$username; header("location: welcome.php"); } else { $password_err = "The password
you entered was not valid."; } } } else { $username_err = "No account found with that
username."; } } else { echo "Oops! Something went wrong. Please try again later."; }
mysqli_stmt_close($stmt); } } mysqli_close($link); } ?> <!DOCTYPE html> <html
lang="en"> <head> <meta charset="UTF-8"> <title>Login</title> <link
rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.css"> <style
type="text/css"> body { font: 14px sans-serif; background-image:
url("image/loginimg.png"); } .wrapper { width: 350px; padding: 20px; align-content:
center; } </style> </head> <body> <div class="container"> <div class="col-md-4"
style="margin-top: 10px"> <div class="wrapper"> <h2>Login</h2> <p>Please fill in
your credentials to login.</p> <form action="<?php echo
htmlspecialchars($_SERVER["PHP_SELF"]); ?>" method="post"> <div class="form-
group"> <?php echo (!empty($username_err)) ? 'has-error' : ''; ?>>
<label>Username</label> <input type="text" name="username" class="form-control"
value="<?php echo $username; ?>"> <span class="help-block"><?php echo
$username_err; ?></span> </div> <div class="form-group"> <?php echo
(!empty($password_err)) ? 'has-error' : ''; ?>> <label>Password</label> <input
type="password" name="password" class="form-control"> <span class="help-
block"><?php echo $password_err; ?></span> </div> <div class="form-group">
<input type="submit" class="btn btn-primary" value="Login"> </div> <p>Don't have
an account? <a href="register.php">Sign up now</a>.</p> </form> </div> </div>
</div> </body> </html>
```

Code for webpage for user account registration of the website is given below:

register.php:

```
<?php require_once "config.php"; $username = $password = $confirm_password = "";
$username_err = $password_err = $confirm_password_err = "";
if($_SERVER["REQUEST_METHOD"] == "POST"){ if(empty(trim($_POST["username"]))) {
$username_err = "Please enter a username."; } else{ $sql = "SELECT id FROM users WHERE
username = ?"; if($stmt = mysqli_prepare($link, $sql)){ mysqli_stmt_bind_param($stmt, "s",
$params_username); $params_username = trim($_POST["username"]);
if(mysqli_stmt_execute($stmt)){ /* store result */ mysqli_stmt_store_result($stmt);
if(mysqli_stmt_num_rows($stmt) == 1){ $username_err = "This username is already taken."; }
else{ $username = trim($_POST["username"]); } } else{ echo "Oops! Something went wrong.
Please try again later."; } mysqli_stmt_close($stmt); } } if(empty(trim($_POST["password"]))) {
$password_err = "Please enter a password."; } elseif(strlen(trim($_POST["password"])) < 6){
$password_err = "Password must have atleast 6 characters."; } else{ $password =
trim($_POST["password"]); if(empty(trim($_POST["confirm_password"]))) {
$confirm_password_err = "Please confirm password."; } else{ $confirm_password =
trim($_POST["confirm_password"]); if(empty($password_err) && ($password !=
$confirm_password)){ $confirm_password_err = "Password did not match."; } }
if(empty($username_err) && empty($password_err) && empty($confirm_password_err)){ $sql
= "INSERT INTO users (username, password) VALUES (?, ?)"; if($stmt = mysqli_prepare($link,
$sql)){ mysqli_stmt_bind_param($stmt, "ss", $params_username, $params_password);
$params_username = $username; $params_password = password_hash($password,
PASSWORD_DEFAULT); if(mysqli_stmt_execute($stmt)){ header("location: login.php"); }
else{ echo "Something went wrong. Please try again later."; } mysqli_stmt_close($stmt); } }
mysqli_close($link); } ?> <!DOCTYPE html> <html lang="en"> <head> <meta charset="UTF-
8"> <title>Sign Up</title> <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.css"> <style
type="text/css"> body{ font: 14px sans-serif; background-image: url("image/registerimg.jpg"); }
.wrapper{ width: 350px; padding: 20px; } </style> </head> <body> <div class="container"> <div
class="col-md-4" style="margin-top: 10px"> <div class="wrapper"> <h2>Sign Up</h2>
<p>Please fill this form to create an account.</p> <form action="<?php echo
htmlspecialchars($_SERVER["PHP_SELF"]); ?>" method="post"> <div class="form-group"
<?php echo (!empty($username_err)) ? 'has-error' : ''; ?>> <label>Username</label> <input
type="text" name="username" class="form-control" value="<?php echo $username; ?>"> <span
class="help-block"><?php echo $username_err; ?></span> </div> <div class="form-group" <?php
echo (!empty($password_err)) ? 'has-error' : ''; ?>> <label>Password</label> <input
type="password" name="password" class="form-control" value="<?php echo $password; ?>">
<span class="help-block"><?php echo $password_err; ?></span> </div> <div class="form-group"
<?php echo (!empty($confirm_password_err)) ? 'has-error' : ''; ?>> <label>Confirm
Password</label> <input type="password" name="confirm_password" class="form-control"
value="<?php echo $confirm_password; ?>"> <span class="help-block"><?php echo
$confirm_password_err; ?></span> </div> <div class="form-group"> <input type="submit"
class="btn btn-primary" value="Submit"> <input type="reset" class="btn btn-default"
value="Reset"> </div> <p>Already have an account? <a href="login.php">Login here</a>.</p>
</form> </div> </div> </div> </body> </html>
```

Code for training the machine learning model is given below:

medi1.py:

```
import sklearn
import numpy as np
import pandas as pd
import pickle

dataset = pd.read_csv('medidata.csv')
x = dataset.iloc[:,0:1].values
y = dataset.iloc[:,1].values

from sklearn.preprocessing import LabelEncoder
lb = LabelEncoder()
x[:,0]=lb.fit_transform(x[:,0])
y[:,1]=lb.fit_transform(y[:,1])

from sklearn.preprocessing import Imputer
imputer = Imputer(missing_values = 'NaN',strategy='mean',axis=0)
imputer = imputer.fit(x[:,1])
x[:,1] = imputer.transform(x[:,1])

from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.1,random_state = 0)
#print(x_test[1])

#fitting simple linear regression to the training set
from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
regressor.fit(x_train,y_train)

pickle.dump(regressor,open('model.pkl','wb'))
model = pickle.load(open('model.pkl','rb'))

#predict the test set results
y_pred = regressor.predict([[int(Target), int(Weight)]])
from sklearn.metrics import accuracy_score
print(accuracy_score(y_test ,y_pred))
```

Code for deploying machine learning model on the website is given below:

app.py:

```
import numpy as np
from flask import Flask, request, jsonify, render_template
import pickle

app = Flask(__name__)
model = pickle.load(open('model.pkl', 'rb'))

@app.route('/')
def home():
    return render_template('medil.html')

@app.route('/predict',methods=['POST'])
def predict():
    """
    For rendering results on HTML GUI
    """
    int_features = [int(x) for x in request.form.values()]
    final_features = [np.array(int_features)]
    prediction = model.predict(final_features)

    output = round(prediction[0], 2)

    return render_template('result.html', prediction_text='The predicted value of the
disease should be {}'.format(output))

if __name__ == "__main__":
    app.run(debug=True)
```

CHAPTER 9

PROJECT LIMITATION AND FUTURE SCOPE

9.1 Project limitations

This project might have following limitations:

- This project only provide solution through website and it does not provide any application for the user. So it is limited to websites only.
- Internet connection is must for serving the purpose of the problem. So, the project doesn't work when offline.
- The dataset used in developing the model is relatively small which might affect the accuracy of the prediction of our project.
- Due to hardware limitations of the developing environment, the ML model is less reliable and less accurate.
- In practice, ML model are never said to be always accurate in predicting as compared to actual human being's prediction.

9.2 Future Scope

Following key points can add up to the future scope of the project:

- We can improve our ML model's accuracy by increasing development environment capabilities and using a bigger and more accurate dataset.
- We can embed our ML model into the website so that it can also work even in offline mode.
- We can also develop applications for various platforms such as iOS, Android, Windows, etc. to be more reliable.
- We can also upgrade the website into an Online Medical Consultation System.

CHAPTER 10

REFERENCES

- <https://elitedatascience.com/>
- https://shiring.github.io/machine_learning/2017/03/31/webinar_code
- <http://archive.ics.uci.edu/ml/datasets/Breast+Cancer+Wisconsin+%28Diagnostic%29>
- <https://www.google.com/>
- Websites like www.javatpoint.com, www.geeksforgeeks.com, etc.