Web Solution for Patient Care with Possible Disease Detection and Doctor's Appointment

BY

Md. Abdur Rahim
ID: 152-15-5656

This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

Masud Rabbani
Lecturer
Department of CSE
Daffodil International University

Co-Supervised By

Dewan Mamun Raza
Lecturer
Department of CSE
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

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APPROVAL

This Project titled **"Web Solution for Patient Care with Possible Disease Detection and Doctor's Appointment"**, submitted by Md. Abdur Rahim, ID No: 152-15-5656 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 4 May 2019.

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Professor and Head
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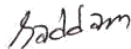**Internal Examiner**

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Senior Lecturer
Department of Computer Science and Engineering
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Daffodil International University

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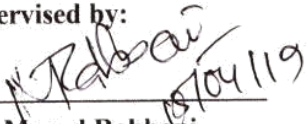
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Assistant Professor
Department of Computer Science and Engineering
United International University
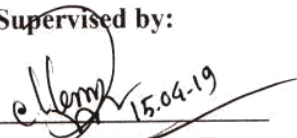
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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Mr. Masud Rabbani, Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.
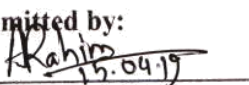
Supervised by:

Mr. Masud Rabbani
Lecturer
Department of CSE
Daffodil International University

Co-Supervised by:

Mr. Dewan Mamun Raza
Lecturer
Department of CSE
Daffodil International University

Submitted by:

Md. Abdur Rahim
ID: -152-15-5656
Department of CSE
Daffodil International University

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Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

Web Solution for Patient Care with Possible Disease Detection and Doctor's Appointment is designed to create a National Doctor's Database and confirm appointment electronically based on the patient's problem or selected specialist. We can store doctor's information with name, designation, degree, organization, location and specialty, so that we can find appropriate doctors based on patient's problems. Our system suggest a patients with appropriate doctor within a very short time which will give a great relieve to the patients and his relatives who are suffering a lot to find appropriate doctor's information and appointment.

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CHAPTER 1

Introduction

1.1 Objective

Our main objective is to prepare a doctor's database and electronics appointment system for general people based on their problems. Now a days, people are suffering a lot to find appropriate doctor for their treatment. Sometimes they are not identify which doctor do chamber in which location and what are the appointment policies. Our main objectives is to help general people to confirm their treatment and appointment with the appropriate doctor. Thus we try to collect Doctor's information, their specialty and list of the problems of human being and make a connection between all to find right doctor for right patient.

1.2 Proposed System

We proposed a web based application in where we can add Doctor's information containing their name, designation, degrees, organization, chamber, location, phone number, specialty etc. A patient can find a doctor in two ways: patient can input his/her problems into our system and our system can identify the Area of the problem and by selecting any area we can get a list of Doctors of that area. Finally, by selecting any Doctor, we can confirm the Appointment to the expected date and time.

1.3 Methodology to be used for this project

At first, when an user opens our site he/she will get a home page consisting a login feature which is only for admin. Admin can log in using username and password. By inputting valid user id and password and pressing login button. On the other hand if the user is a patient, he/she need not to login into our system and can get all doctor finding options automatically. After finding/ selecting any doctor, we can apply for

Appointment and finally our system confirm the appointment by sending a confirmation email to the patient's email inbox.

1.4 Expected Outcome

- Available service everywhere all the time.
- User friendly interface.
- Enrich the medium between both patient and doctor.
- Minimize patient suffering.

1.5 Report Layout

This report is written part by part in a sequence that can clarify the development of this project in a unique and easy way. This report followed the specific development report format that exampled by Daffodil International University.

Chapter 1 contains the idea of the project by summarizing it. Identifies objective of the proposed system and expected outcome with the methodology.

Chapter 2 contains the background analysis and feature specification of the project and idea of comparative studies.

Chapter 3 contains the requirement analysis and discusses the project development with use case, entity relationship diagram.

Chapter 4 specifies the design implementation and user interface.

Chapter 5 contains the database implementation method, front end design methodology and tests the system.

Chapter 6 the final chapter discusses about the limitations and future development of the project and marks a conclusion to the report.

CHAPTER 2

Background

2.1 Web Solution for Patient Care with Possible Disease Detection and Doctor's Appointment

This system is a website. It doesn't need any installation in our computer, we can simply access through any browser. Before this we need to host it in server. As the application is developed in .Net platform, we host it in IIS server. To enter into admin panel admin needs valid user id and password.

2.2 Accomplishment challenges

Obviously we faced many problem which were difficult to overcome. But problems are always meant to be solved. Few of the challenges we faced while developing this project "Web Solution for Patient Care with Possible Disease Detection and Doctor's Appointment" such as data insecurity, privacy violation, false data entry etc.

2.3 Benefits of the project

Using "Web Solution for Patient Care with Possible Disease Detection and Doctor's Appointment", anyone can get following facilities:

- Add a Doctor's information
- Add Problems of the patients
- Add Specialty of Doctors
- Problem based Doctor search
- Select Specialty
- Specialty based Doctor search
- Select Doctor
- Apply for Appointment
- Confirm Appointment through email to patient

2.4 Add Doctor's Information

In our system admin user can add new Doctor's information with name, designation, degrees, organization, chamber, location, phone number, specialty etc. A patient can find a doctor in two ways: patient can input his/her problems into our system and our system can identify the Area of the problem and by selecting any area we can get a list of Doctors of that area.

2.5 Add Problem of the Patients

In our system user can add main problems and other problems into our system and our system can search the Specialist of those problems automatically. In that case more than one specialist may be suggested against the patient's problems and patient need to select one of them and find the list of the doctors of that area.

2.6 Add Specialty of Doctor

In our system, admin user can add different type of Specialty/ Area of doctors like: Medicine, Cardiology, Orthopedics etc. and create a relation between doctor, specialty and problem so that we can identify right doctor for right patient.

2.7 Problem based Doctor Search

In our system, a patient can find doctor in two ways: one of them is problem based doctor search. In this system a patient add his main problem and other problem in the form. Our system will identify the area/ specialty of the problem. In that case more than one specialist may be suggested against the patient's problems and patient need to select one of them and get the list of the doctors of that area.

2.8 Specialty based Doctor Search

In this type of doctor search, a user need to select the specialty of the doctor and our system will identify the list of the doctors only for that particular areas.

2.9 Apply for Appointment

After selecting any appropriate doctor, we need to apply for the Appointment. During the applying for appointment, a user need to give following information:

1. Name of the Patients
2. Age
3. Date for the Appointment
4. Mobile Number
5. Email Address (Mandatory)

2.10 Confirm Appointment through email

After apply for appointment, our system will send an confirmation email if everything is ok.

2.11 Comparative Studies

There are various types of patient healthcare system in online. Many of them is similar in ways to our system. But what makes our online system unique is it's unique feature which can help patients to identify their possible disease and find out which specialist they should go to. Other websites doesn't have this feature.

CHAPTER 3

Requirement Specification

3.1 Business Process Modeling

First of all we collect requirement from the user. General patients are the target user of our system. We went to different hospitals and doctor's chambers and try to collect user's requirements and expectations from our treatment, service from the doctors and different type of problems they have to face during getting appointment and others services.

3.2 Requirement Collection and Analysis

We try to accumulate all the requirements in a format so that we can identify the core & non-core requirements and our technical people can draw a design for the software. [7]

Finally we can identify following requirements:

- Create Database of Doctors by adding professional information of a doctor as:
    - Name
    - Designation
    - Degrees
    - Organization
    - Chamber
    - Location
    - Phone number
    - Specialty

- Collect a list of Problems of the patients, like:
    - Blood Pressure, hypertension
    - Fever, Vomiting
    - Skin
    - Heart Block
    - Headache
    - Gynecology, female
    - Bone Fracture
    - Teeth
    - Pediatrics, Child
    - Tumor, Appendicitis
    - Urine
    - Plastic surgery
    - Gastric, ulcer

- Add Specialty of Doctors like :
    - Anaesthesia
    - Dermatology
    - Medicine
    - Cardiac Surgery
    - Family medicine
    - Internal medicine
    - Neurology
    - Obstetrics and Gynecology
    - Ophthalmology
    - Orthopedic surgery
    - Otolaryngology

- Oral and Maxillofacial Surgery
- Pediatrics
- Podiatry
- Psychiatry
- Radiology (diagnostic)
- Surgery (general)
- Urology
- Neurosurgery
- Plastic surgery
- Gastroenterology
- Cardio Medicine

- Problem based Doctor search
- Select Specialty of the Doctors
- Specialty based Doctor search
- Select Doctor
- Apply for Appointment
- Confirm Appointment through email to patient
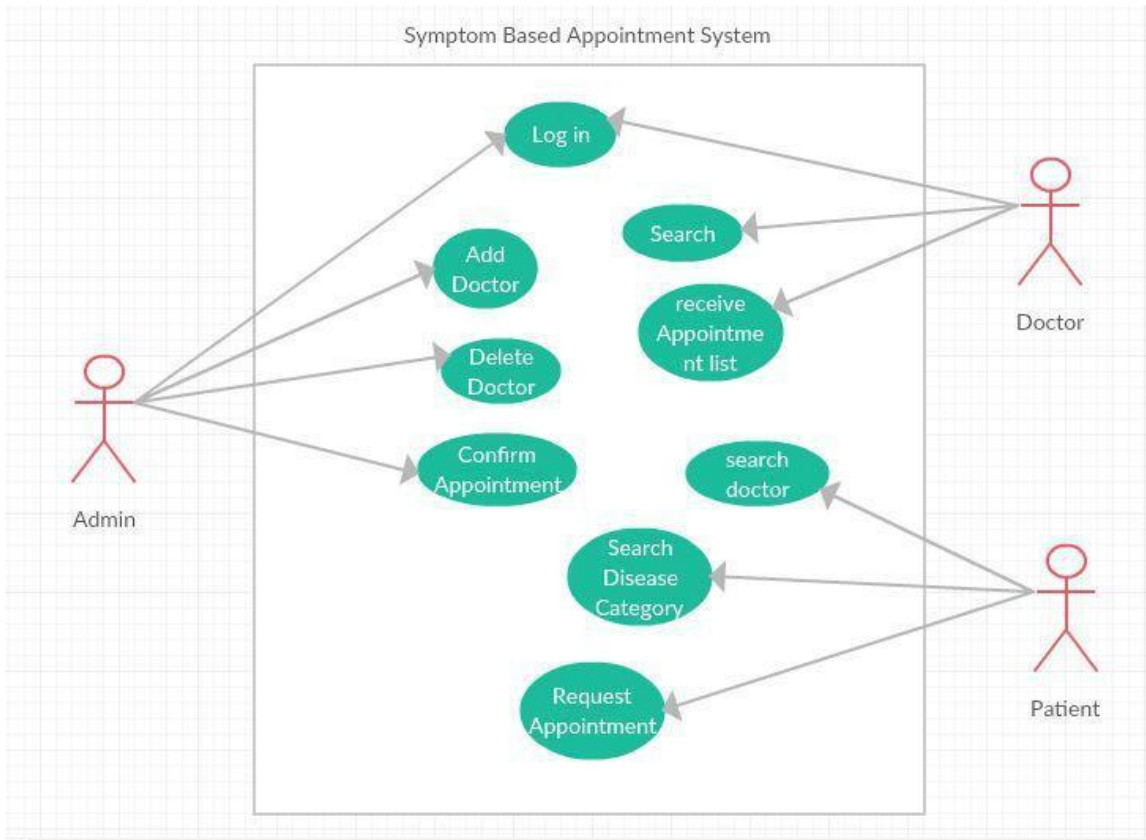
3.3 Use Case Modeling and Description

Figure 3.1- Use Case Diagram for Patient eCare and Appointment system
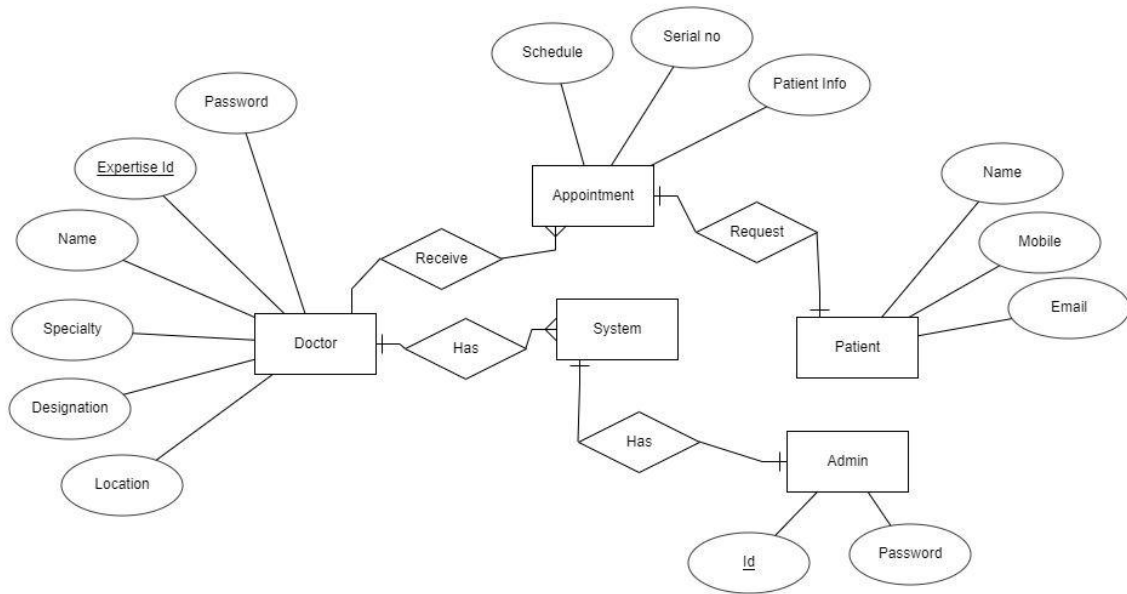
3.4 ER Diagram

Figure 3.2- Entity Relationship Diagram for Patient eCare and Appointment system

CHAPTER 4

Design Specification

4.1 Overview of development

We developed Web Solution for Patient Care with Possible Disease Detection and Doctor's Appointment using Microsoft Platform. We used Microsoft .Net web Application, C# .Net and Microsoft SQL Server 2008. First of all we try to collect main requirement by consulting among us and some other students. Then try to create the Interfaces. Based on the requirements and Templates of Interfaces we create Database. Finally we Design the UI and related methods and functions.

After completing the development part, we do Testing and finally close the development part and keep it ready for use.

The different phases of our Development times are:
➢ Requirement Analysis
➢ Template Design
➢ Database Design
➢ UI Design
➢ Coding (Method and Function)
➢ Testing

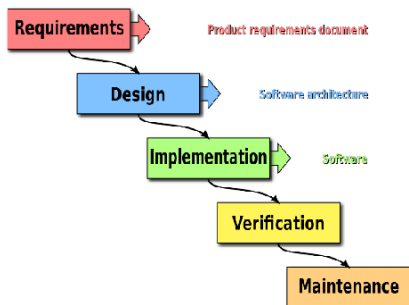In our Project, we use Waterfall Model:

Figure 4.1- Waterfall model used to develop this project

4.2 Total system

Here we try to describe the total system that we develop:

- Admin Login

- General Patient Access

- Add a Doctor's information

- Problem based Doctor search

- Specialty based Doctor search

- Select Doctor

- Apply for Appointment

- Confirm Appointment through email to patient

4.3 Interaction Design and UX

Only the Admin user can Login with full access of the system. We check the User ID and Password of the user before entering the system. [3]
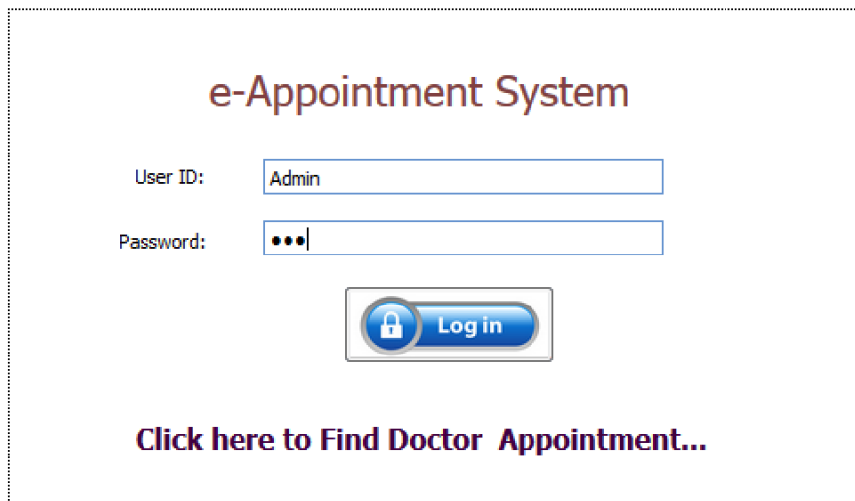

Figure 4.2- Screenshot of the log in page

4.3.2 Home Page

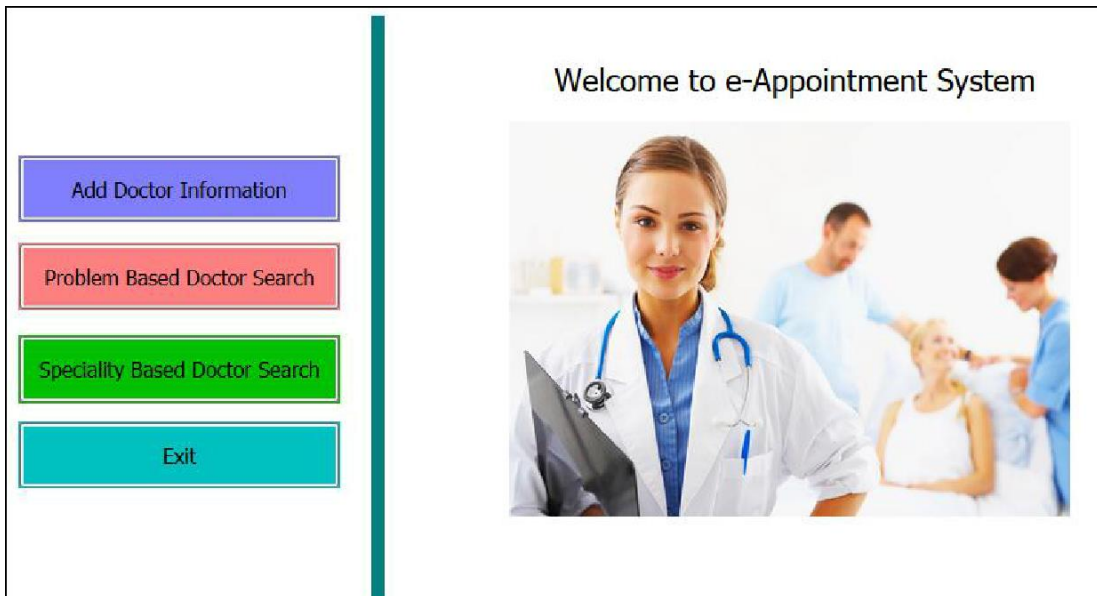Admin user can view Home page as bellow:

Figure 4.3- Screenshot of Home Page (Admin)

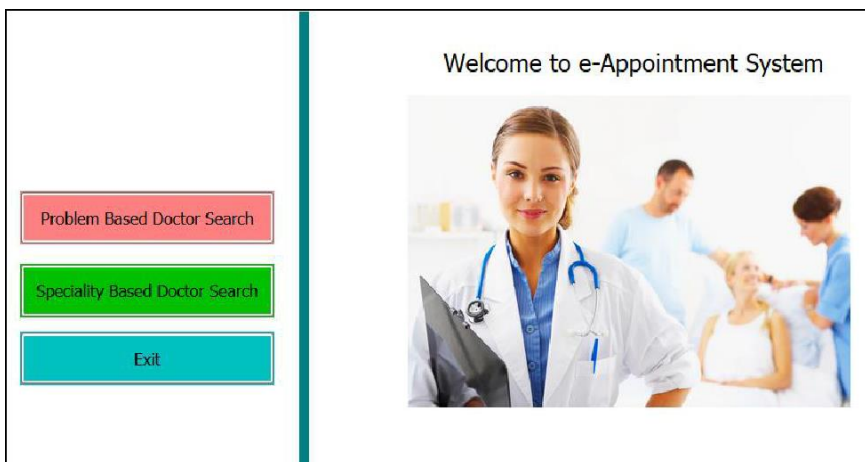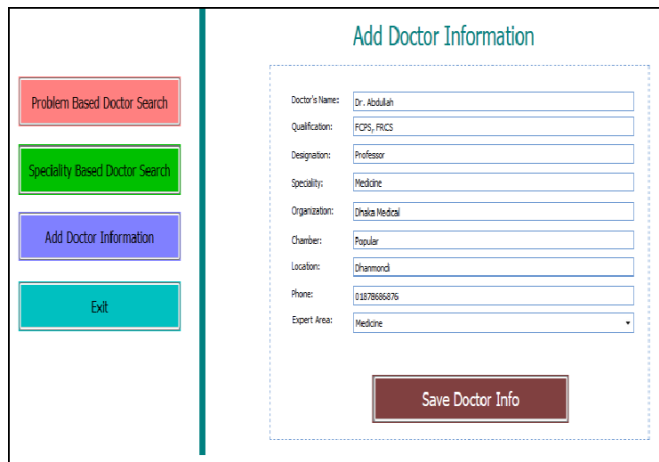Non-Admin user/ general patient can view Home page as bellow, when he do "Click here to find Doctor's Appointment"

Figure 4.4- Screenshot of Home Page (User)

a. Add Doctor's Information

In our system admin user can add new Doctor's information with name, designation, degrees, organization, chamber, location, phone number, specialty etc. A patient can find a doctor in two ways: patient can input his/her problems into our system and our system can identify the Area of the problem and by selecting any area we can get a list of Doctors of that area.

Figure 4.5- Screenshot of Doctor Information Add

4.4 Add Problem of the Patients
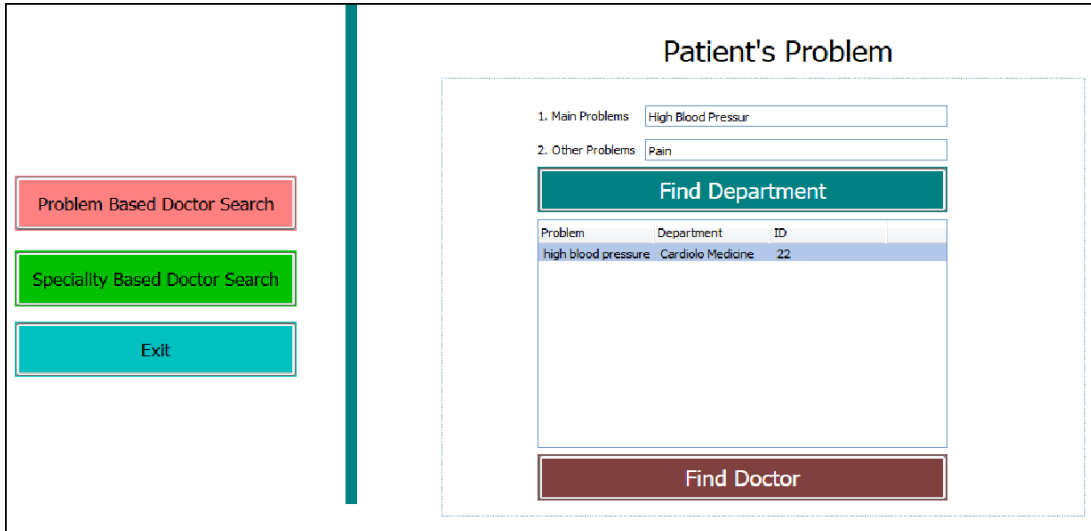
In our system user can add main problems and other problems into our system and our system can search the Specialist of those problems automatically. In that case more than one specialist may be suggested against the patient's problems and patient need to select one of them and find the list of the doctors of that area.

4.5 Add Specialty of Doctor

In our system, admin user can add different type of Specialty/ Area of doctors like: Medicine, Cardiology, Orthopedics etc. and create a relation between doctor, specialty and problem so that we can identify right doctor for right patient.

4.6 Problem based Doctor Search

In our system, a patient can find doctor in two ways: one of them is problem based doctor search. In this system a patient add his main problem and other problem in the form. Our system will identify the area/ specialty of the problem. In that case more than one specialist may be suggested against the patient's problems and patient need to select one of them and get the list of the doctors of that area.

Figure 4.6 - Screenshot of Symptom Based Search

Figure 4.7- Screenshot of Doctor List

4.7 Specialty based Doctor Search

In this type of doctor search, a user need to select the specialty of the doctor and our system will identify the list of the doctors only for that particular areas.

Figure 4.8- Screenshot of Specialty based Doctor Search

4.8 Apply for Appointment

After selecting any appropriate doctor, we need to apply for the Appointment. During the applying for appointment, a user need to give following information:

1. Name of the Patients
2. Age
3. Date for the Appointment
4. Mobile Number
5. Email Address (Mandatory)
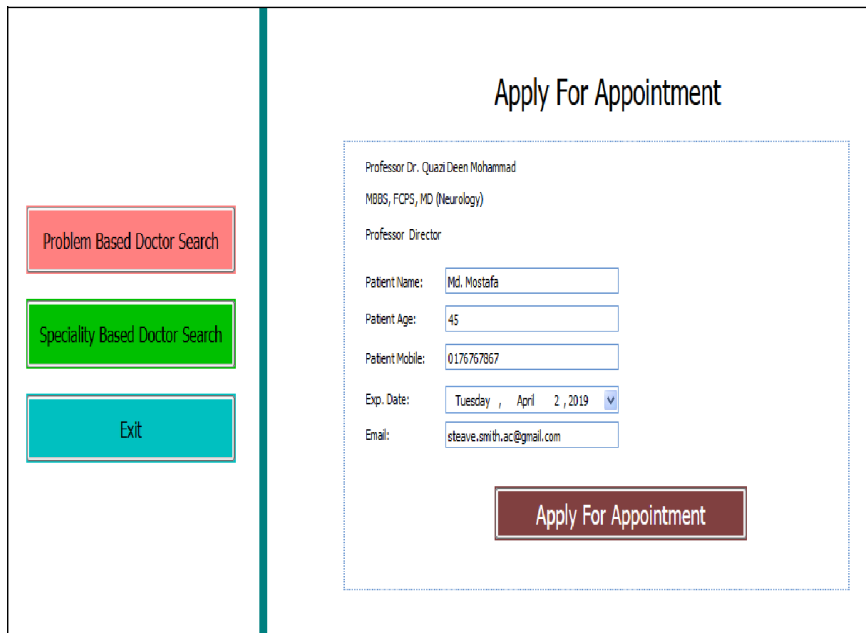
Figure 4.9- Screenshot of Apply for Appointment

4.9 Confirm Appointment through email

After apply for appointment, our system will send a confirmation email if everything is ok.
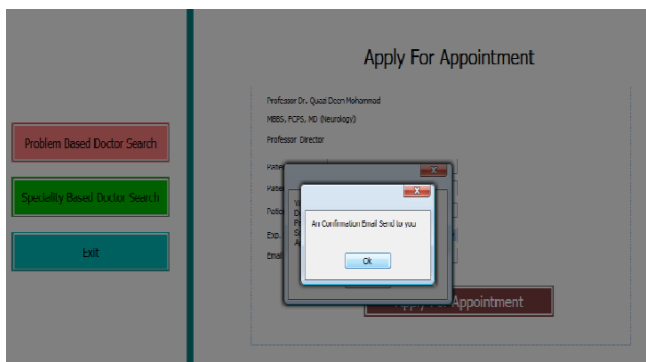
Figure 4.10- Screenshot of Pop up confirmation
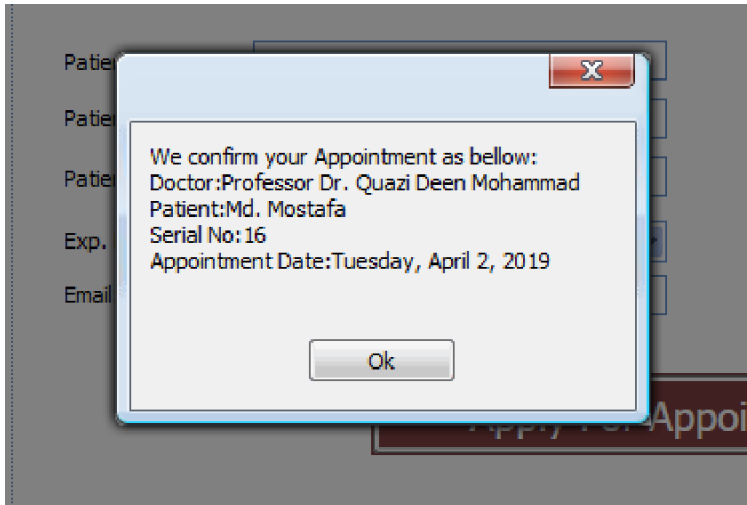
Figure 4.11- Screenshot of Confirmation Mail

CHAPTER 5

Implementation and Testing

5.1 Implementation of Database

As we worked in visual studio and web GUI in this project. We created our database in SQL database system. Hosting the database system locally in a particular computer as for this project it's in the computer where the project is being developed. Using various SQL database tool to manipulate data in the database system. SQL is one of fastest database server.

In this system, we used database named "Doctor" which consists four following tables:

      I.   **DoctorInfo,**

      II.   **AppointmentInfo,**

     III.   **ExpertiesInfo,**

     IV.   **SymptomInfo.**

Date of Appointment Table:

ID	PatientName	Age	Mobile	ExpectedDate	DoctorID
1	Mr. Alam	30	017677667	2019-01-01 00:...	1
2	Mr. Jamal	30	017677667	2019-01-01 00:...	2
3	Mr. Kamal	30	017677667	2019-01-01 00:...	3
4	Mr. A	30	017677667	2019-01-01 00:...	5
5	Mr. Abul	30	017677667	2019-01-01 00:...	6
6	Mr. Alam	30	017677667	2019-01-01 00:...	8
7	Mr. Jamal	30	017677667	2019-01-01 00:...	3
8	Mr. Kamal	30	017677667	2019-01-01 00:...	6
9	Mr. A	30	017677667	2019-01-01 00:...	2
10	Mr. Abul	30	017677667	2019-01-01 00:...	6
NULL	NULL	NULL	NULL	NULL	NULL

Table 5.1- Appointment Table

Data of Doctor Table:

DoctorName	Qualification	Designation	Speciality	Organization	Chamber	Location	Phone	Exper
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	21
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	22
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	20
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	19
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	18
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	17
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	16
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	15
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	14
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	13
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	12
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	11
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	10
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	9
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	8
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	7
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	6
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	5
Professor Dr. Q...	MBBS, FCPS, MD...	Professor & Dire...	Neurology	National Institut...	Chamber: S.P.R...	Location: 135, N...	Phone: +880-2-...	4
Professor Dr. Q	MBBS, FCPS, MD	Professor & Dire	Neurology	National Institut	Chamber: S.P.R	Location: 135, N	Phone: +880-2-	3

Table 5.2- Doctor Table

Data of Symptom Table:

ID	Symptom	ExpertiseID
1	high blood pressure hypertension	22
2	Fever, Vomating	3
3	Skin	2
4	Heart Block	4
5	Headache	7
6	Gynecology, female	8
7	bone fracture	10
8	Teeth	12
9	Pediatrics, Child	13
10	X-Ray, MRI, CT Scan	16
11	Tumor, Appendicitis	17
12	Urin	18
13	Plastic surgery	20
14	Gastric, ulcer	21

Table 5.3- Symptom Table

Data of Specialty Table:

ID	Speciality
1	Anaesthesia
2	Dermatology
3	Medicine
4	Cardiac Surgery
5	Family medicine
6	Internal medicine
7	Neurology
8	Obstetrics and Gynecology
9	Ophthalmology
10	Orthopedic surgery
11	Otolaryngology
12	Oral and Maxillofacial Surgery
13	Pediatrics
14	Podiatry
15	Psychiatry
16	Radiology (diagnostic)
17	Surgery (general)
18	Urology
19	Neurosurgery
20	Plastic surgery
21	Gastroenterology
22	Cardiolo Medicine
NULL	NULL

Table 5.4- Specialty Table

5.2 Implementation of Front-end Design

In this web based platform we mostly used Microsoft .Net technology. Clients interacts with the system via front end. Which is designed with visual C# for computer program designing. [1]

When users interact with the system via front end SQL database server provides the information user needs by running queries. As for the back end there's isn't any logical data manipulation.

SQL server gives the system an uniquely architecture storage for the system. Which maintains its best performance and availability.[2]

5.3 Implementation of Interaction

A web based system, clients who are using computer is easier to interact with the system. By entering valid data one can log in or out into the system. Also can surf through various pages and can return to previous pages if wishes to by pressing mouse point or clicking either forward or backward. Where the data may also be available that user entered before. With updated UI methods interaction is easy and flexible. [4]

5.4 Testing Implementation

Testing appointment booking form. In this system one must enter name, age, mobile number, date of the appointment and email. If any of the box is left blank system won't go any further.

- **Test for appointment form**
  In this case the field is filled up with required information. If and only if every required data is given the system will execute next step.

- **Test for appointment confirmation**
  System checks the field boxes for information which is entered by used and if the check result is yes than it generates an appointment confirmation pop up message and sends a confirmation mail to the mail address given by user.

5.5 Test Results and Report

Test case	Test case Description	Date tested	Result	Comment
Appointment check	All required data received	2-Feb-2019	Pass	Successful
Appointment confirmation	Valid entered Data	2-feb-2019	Pass	Successful

Table 5.5- Testing Table

CHAPTER 6

Conclusion and Future Scope

6.1 Goal

Actually, we have a goal to develop a Doctors Database with detail necessary information so that a Patient can identify appropriate doctor against his/her problem and also confirm the appointment easily through using our web based application ant any time and from anywhere. Our main goal is to reduce the pain of finding doctors and taking appointment for the patients and we hope, our system will do it properly.

6.2 Limitations

There are some not ignorable limitations of our solution:

1. Cannot accumulate all kind of symptoms of any specific diseases or any specific areas like Medicine, Neurology, and Cardiology etc.
2. We have no option for emergency patient.

6.3 Future development

We will incorporate following things in future:

1. We will incorporate emergency patient service in our system, so that a patient can get emergency suggestion from doctor at any time.
2. We also introduce emergency Appointment System also for critical patients.

6.4 Conclusion

In conclusion, we can say, our purpose is to come with a web based solution for patients and everyone, which can be both satisfactory and easy to use. We almost ensure it by the features in our system and we hope we can do it perfectly. As for the limitations of our system we hope to solve them in nearest future.

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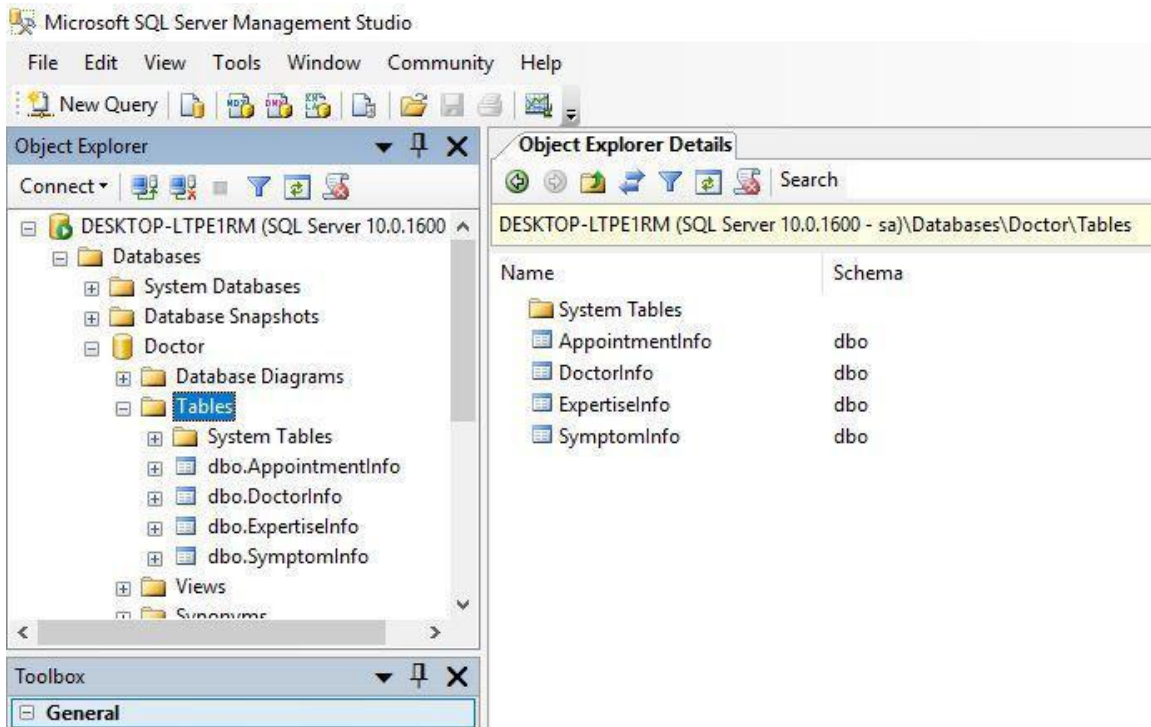**Appendices**

Appendix A: Screenshot of Database

Figure 6.1- Database of the System

Doctor's Appointment

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