NEXTGEN HEALTHCARE SOLUTIONS
DATABASE MANAGEMENT SYSTEM

A Project Report Submitted
in Partial Fulfilment of the
Requirements for the Degree of

BACHELOR OF TECHNOLOGY
in
Computer Science and Engineering
by

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Under the Guidance of
Dr. Jasvant Kumar

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UNIVERSITY OF LUCKNOW, LUCKNOW.
2022-2023

DECLARATION

We hereby declare that this submission is our own work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person or material which to a substantial extent has been accepted for the award of any otherdegree or diploma of the University or other institute of higher education, except where dueacknowledgement has been made in the text.

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CERTIFICATE

Certified that **Shivam Verma** (190013135081), **Prateek Gupta** (190013135060) and **Rashi Singh** (190013135067) has carried out the project work presented in this project report entitled **"NEXTGEN Healthcare Solutions"** for the award of **Bachelor of Technology** (Computer Science and Engineering) from **Faculty of Engineering and Technology, University of Lucknow, Lucknow** under the guidance of Dr. Jasvant Kumar. The project reportembodies results of original work, and studies are carried out by ourselves and the contents of the project report do not form the basis forthe award of any other degree to the candidate or to anybody else from this or any other University/Institution.

ACKNOWLEDGEMENT

We would like to acknowledge all those without whom this project would not have been successful. Firstly, we would wish to thank our **Assistant Professor Dr. Jasvant Kumar** who guided me throughout this project and gave his immense support. He made us understand how to successfully complete this project and without him, the project would not have been complete.

This project has been a source to learn and bring our theoretical knowledge to the real-life world. So, we would really acknowledge his help and guidance for this project.

We would also like to thank our parents who have always been there whenever needed. Once again, thanks to everyone for making this project successful.

Also, we would like to thank all the faculty members of our school/college for their kindness and support. Lastly, we should really thank our friends who were always there to support us whenever needed.

Once again, thank you everyone who are involved in making this project a success.

ABSTRACT

Our project **NextGen Hospital Management system** includes registration of patients, storing their details into the system, and also set the appointments with the desired doctor in the hospital. It basically deals with the collection of patient's information, diagnosis details, etc. Patients can also book their slot through the slot booking page. The system will be used to allocate beds to patients on a priority basis, and to assign doctors to patients in designated wards as need arises. Our software has the facility to give a unique id for every patient and stores the details of every patient and the staff automatically. It includes a search facility to know the current status of each room. User can search availability of a doctor and the details of a patient using the id. Traditionally, it was done manually. The main function of the system is register and store patient details and retrieve these details as and when required, and also to manipulate these details meaningfully. It is an integrated end-to-end Hospital Management System that provides relevant information across the hospital to support effective decision making for patient care.

The **Hospital Management System** can be entered using a username and password. It is accessible by the user. Only they can add data into the database. The data can be retrieved easily. The interface is very user-friendly. The data are well protected for personal use and makes the data processing very fast.

TABLE OF CONTENTS

LIST OF FIGURES

Page No.

CHAPTER 1
INTRODUCTION

1.1 GENERAL

EXISTING SYSTEM:

Hospitals currently use manual system for the management and maintenance of critical information. The current system requires numerous paper forms, with data stores spread throughout the hospital management infrastructure. Often information is incomplete or does not follow management standards. Forms are often lost in transit between departments requiring a comprehensive auditing process to ensure that no vital information is lost. Multiple copies of the same information exist in the hospital and may lead to inconsistencies in data in various datastores.

PROPOSED SYSTEM:

The **NEXTGEN Hospital Management System** is designed for any hospital to replace their existing manual paper-based system. The new system is to control the information of patients. Room availability, staff and operating room schedules. These services are to be provided in an efficient, cost-effective manner, with the goal of reducing the time and resources currently required for such tasks.

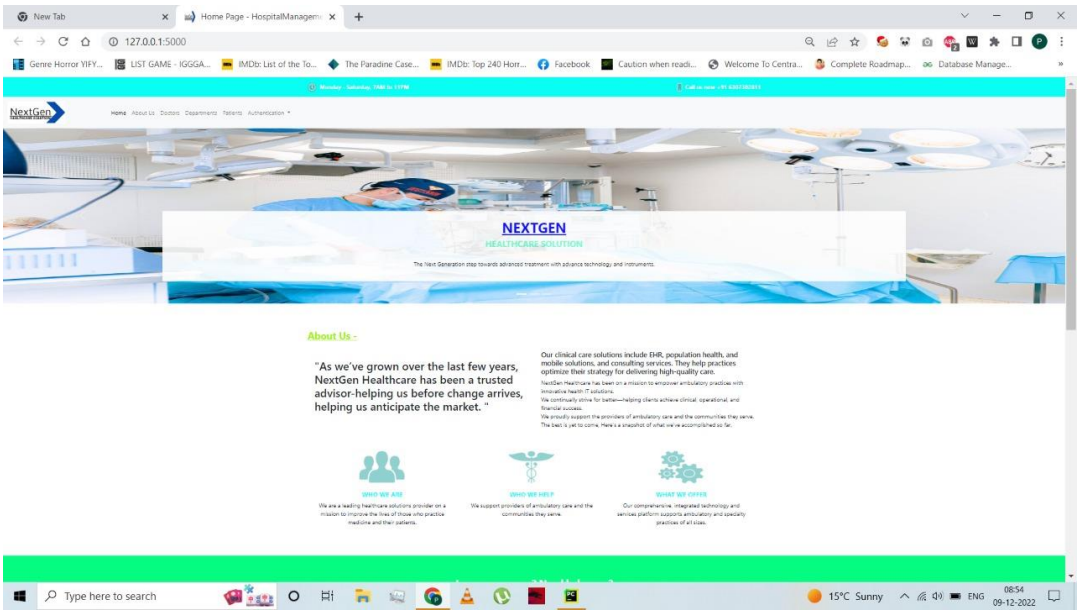

Figure 1:Interface

1.2 BRIEF DESCRIPTION OF THE PROJECT

The software specifications used for this project includes:

Frontend:

- HTML
- JavaScript
- CSS
- Bootstrap

Backend:

- Python
- Flask
- SQL Alchemy
- Xampp Server

HTML

The **Hyper Text Markup Language** or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as **Cascading Style Sheets (CSS)** and scripting languages such as **JavaScript.**

HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes, and other items. HTML elements are delineated by tags, written using angle brackets. Tags such as <img /> and <input /> directly introduce content into the page. Other tags such as <p> surround and provide information about document text and may include other tags as sub-elements. Browsers do not display the HTML tags but use them to interpret the content of the page.

CSS

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML (including XML dialects such as SVG, MathML or XHTML). CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

Figure 2:CSS

JavaScript

JavaScript (JS) is a lightweight, interpreted, or just-in-time compiled programming language with first-class functions. While it is most well-known as the scripting language for Web pages, many non-browser environments also use it, such as **Node.js, Apache CouchDB** and **Adobe Acrobat.** JavaScript (JS) is the world's most popular lightweight, interpreted compiled programming language. It is also known as a scripting language for web pages. It can be used for Client-side as well as Server-side developments.

JavaScript is the most popular and hence the most loved language around the globe. Apart from this, there are abundant reasons to learn it. Below are a listing of few important points:

- **No need of compilers**: Since JavaScript is an interpreted language, therefore it does not need any compiler for compilations.
- **Used both Client and Server-side**: Earlier JavaScript was used to build client-side applications only, but with the evolution of its frameworks namely Node.js and Express.js, it is now widely used for building server-side applications too.
- **Helps to build a complete solution**: As we saw, JavaScript is widely used in both client and server-side applications, therefore it helps us to build an end-to-end solution to a given problem.
- **Used everywhere**: JavaScript is so loved because it can be used anywhere. It can be used to develop websites, games or mobile apps, etc.
- **Huge community support**: JavaScript has a huge community of users and mentors who love this language and take its legacy forward.

Python

Designed by **Guido van Rossum**, Python is a programming language that was first released back in 1991 and has been gaining traction in the industry over the last five years. With an emphasis on code readability, this open-source language is friendly and easy to use. It is also our backend language of choice and, today, we'd like to talk about why.

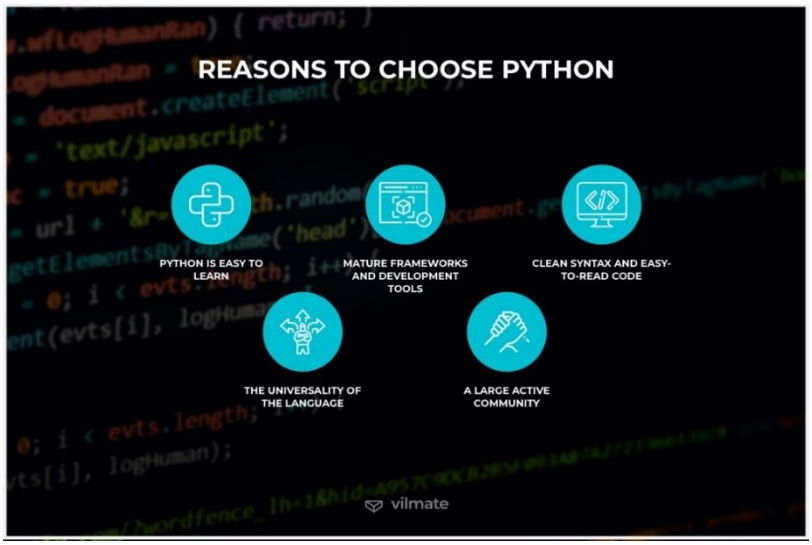

Figure 3:Reasons

Flask

Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions.

To understand what Flask is you have to understand a few general terms.

WSGI: Web Server Gateway Interface (WSGI) has been adopted as a standard for Python web application development. WSGI is a specification for a universal interface between the web server and the web applications.

Werkzeug: It is a WSGI toolkit, which implements requests, response objects, and other utility functions. This enables building a web framework on top of it. The Flask framework uses Werkzeug as one of its bases.

jinja2: jinja2 is a popular templating engine for Python. A web templating system combines a template with a certain data source to render dynamic web pages.

Flask-Login: Flask-Login provides user session management for Flask. It handles the common tasks of logging in, logging out, and remembering your users' sessions over extended periods of time.

SQLAlchemy

SQLAlchemy is the Python SQL toolkit and Object Relational Mapper that gives application developers the full power and flexibility of SQL.

It provides a full suite of well-known enterprise-level persistence patterns, designed for efficient and high-performing database access, adapted into a simple and Pythonic domain language.

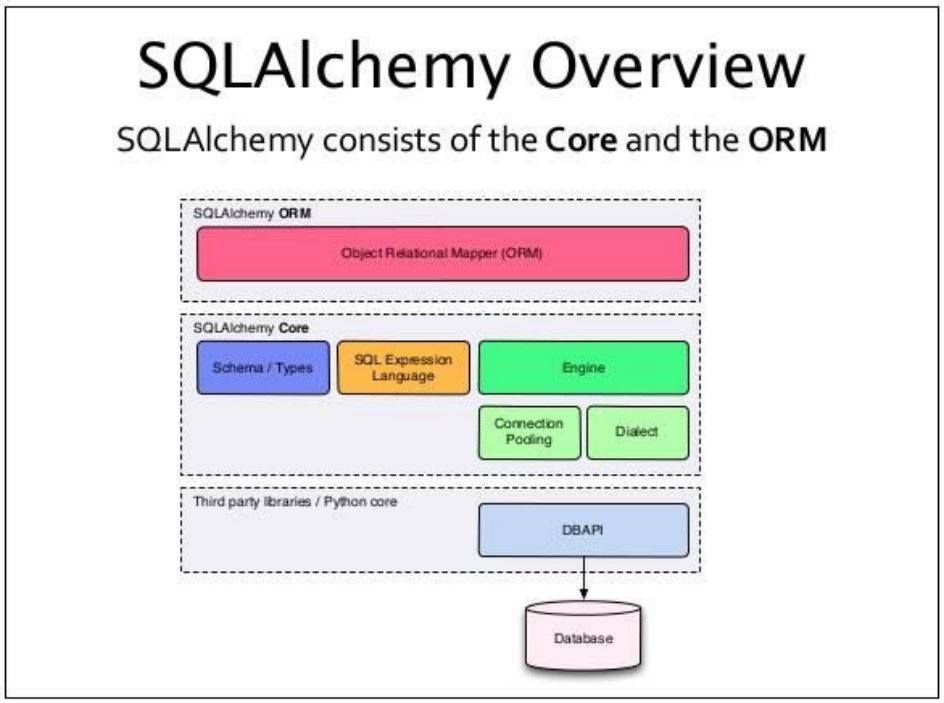

Figure 4:SQLAlchemy

SQL databases behave less like object collections the more size and performance start to matter; object collections behave less like tables and rows the more abstraction starts to matter. SQLAlchemy aims to accommodate both of these principles.

XAMPP server

XAMPP is one of the widely used cross-platform web servers, which helps developers to create and test their programs on a local webserver. It was developed by the Apache Friends, and its native source code can be revised or modified by the audience. It consists of Apache HTTP Server, MariaDB, and interpreter for the different programming languages like PHP and Perl. It is available in 11 languages and supported by different platforms such as the IA-32 package of Windows & x64 package of macOS and Linux.

XAMPP is an abbreviation where X stands for **Cross-Platform**, A stands for **Apache**, M stands for **MYSQL**, and the Ps stand for **PHP and Perl**, respectively. It is an open-source package of web solutions that includes Apache distribution for many servers and command-line executables along with modules such as. **Apache server, MariaDB, PHP, and Perl**.
XAMPP helps a local host or server to test its website and clients via computers and laptops before releasing it to the main server. It is a platform that furnishes a suitable environment to test and verify the working of projects based on Apache, Perl, MySQL database, and PHP through the system of the host itself. Among these technologies, Perl is a programming language used for web development, PHP is a backend scripting language, and MariaDB is the most vividly used database developed by MySQL.

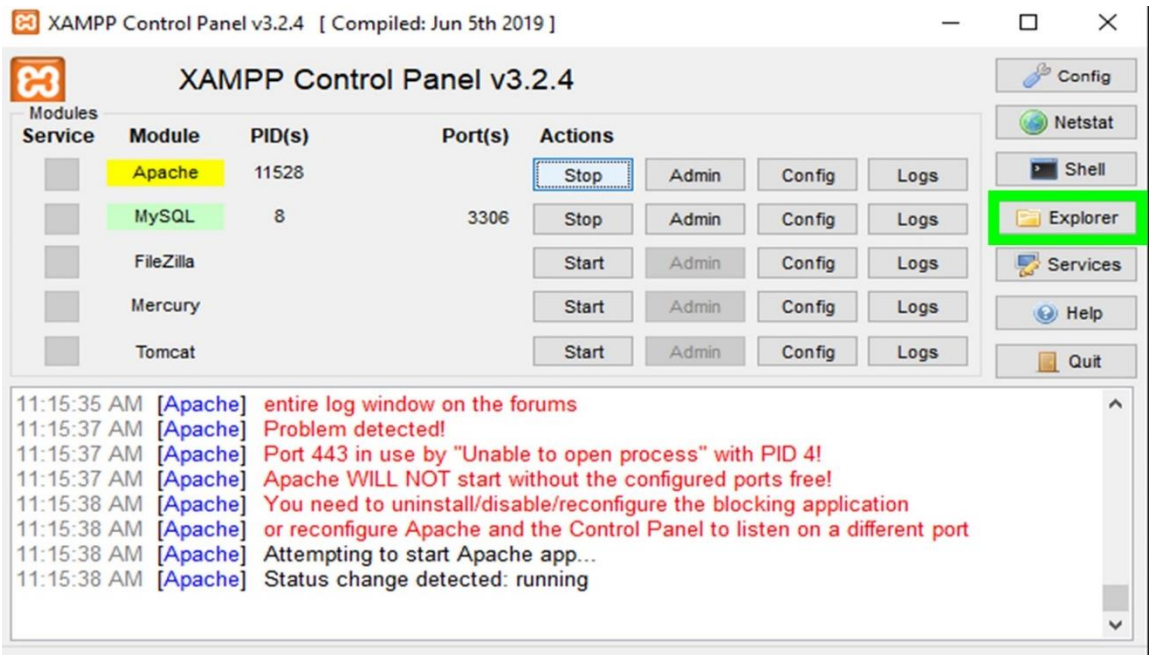

Figure 5:Control Pane

Chapter 2
LITERATURE REVIEW

I. Implementation of Hospital Management System for Real Life Problem by Nirupam Saha, Biplab Mondal, Bishal Paul, Debopom Pan, Debjyoti Roy, Moloy Dhar, Bidyutmala Saha, Rupak Chakraborty, Department of Computer Science and Engineering, Guru Nanak Institute of Technology.

Hospital Management System includes registration of patients, storing the details into the system and appointing doctors online. Our software has the facility to give a unique id for every patient and stores the details of every patient and list of all the doctors which work in the hospital[1]. It includes a search availability of a doctor and the details of a patient using the id. Our system gives each doctor a unique code due to which patients can book their appointments online. The Hospital Management System can be entered using a username and a password. It is accessible by an administrator, doctor and the patient as well. Each doctor has their unique username and password which can be logged in by their correspond email-id, like the doctor patient also have their unique username and pass. But the admin has access to both the doctors and patients details and everything which would help the admin to keep an eye over its hospital management. The interface is simple and user-friendly. The data are well protected for personal use and makes the data processing very fast. The proposed software product is Hospital Management System. The system will be used in any hospital, clinics or pathology labs to get the information from the patients and then storing the data for future use. This software will help the patient to communicate with the doctors and need not to go to any clinics to appoint a date for any doctor. This software will show the doctor list and will update you with the best doctors and timings of any doctor. The current system in use is a paper-based system. It is too slow and cannot provide updated lists of patients within a reasonable timeframe. The intensions of the system are to reduce over-time pay and increase the number of patients that can be treated accurately. This software is online which is must now a days as now the world is updating constant. In this software the patient will also have their privacy which will not be accessed by any other. The researchers in a study have identified three main human challenges that are being a barrier in adopting the HMS in healthcare industries namely:

- Shortage of professional healthcare faculty who have in-depth knowledge of HMS and other similar technologies.
- Poor acceptance of HMS Software.
- Shortage of health informatics professionals who are well capable of establishing and implementing the techniques.

This paper aimed at providing:

- Ease of data access.
- Improved Efficiency.
- Improved data security.
- Cost effective software.

II. Advanced Hospital Management System by Rohit Gopal Misal, Mujahid Ramzan Sanaafrin, Lakhan Baban Bagade, Mrunal Rahul Gadade, Subhanali Shaikh Sayyad, Department of Computer Science Engineering, SBERCT's BIT Barshi.

MySQL software which is one of the best and the easiest software to keep our information. This project uses JAVA as the front-end software which is an Object-Oriented Programming and has connectivity with MySQL[2]. Advanced Hospital Management System is custom built to meet the specific requirement of the mid and large size hospitals across the globe. All the required modules and features have been particularly built to just fit in to your requirement This package has been widely accepted by the clients in India and overseas. Not stopping only to this but they are highly satisfied and appreciating. Entire application is web based and built on 3 tier architecture using the latest technologies. The sound database of the application makes it more users friendly and expandable. The package is highly customizable and can be modified as per the needs and requirements of our clients. Prolonged study of the functionalities of the hospital and its specific requirement has given it a wonderful shape both technically and usability wise. It covers all the required modules right from Patient Registration, Medicine details, Doctor, Wards, Admin, Store, Patient appointment, bill payment, record modification, discharge details etc. This project includes registration of patients, storing their details into the system, and also computerized billing in the pharmacy, and labs. The software has the facility to give a unique id for every patient and stores the details of every patient and the staff automatically. It includes a search facility to know the current status of each room. User can search availability of a doctor and the details of a patient using the id. The Advanced Hospital Management System can be entered using a username and password. It is accessible either by an administrator or receptionist. Only they can add data into the database. The data can be retrieved easily. The interface is very user-friendly. The data are well protected for personal use and makes the data processing very fast. Advanced Hospital Management System is powerful, flexible, and easy to use and is designed and developed to deliver real conceivable benefits to hospitals. Advanced Hospital Management System is designed for multispecialty hospitals, to cover a wide range of hospital administration and management processes. It is an integrated end-to-end Advanced Hospital Management System that provides relevant information across the hospital to support effective decision making for patient care, hospital administration and critical financial accounting, in a seamless flow. Advanced Hospital Management System is a software product suite designed to improve the quality and management of hospital management in the areas of clinical process analysis and activity-based costing. Advanced Hospital Management System enables you to develop your organization and improve its effectiveness and quality of work. Human Body is a very complex and sophisticated structure and comprises of millions of functions. All these complicated functions have been understood by man him, pan-by-pan their research and experiments. As science and technology progressed, medicine became an integral Wt of the research. Gradually, medical science became an entirely new branch of science. As of today, the Health Sector comprises of medical institutions i.e., Hospitals, HOSPITALs etc. research and development institutions and medical colleges. Thus, the Health sector aims at providing the best medical facilities to the common man Managing the key processes efficiently is critical to the success of the hospital helps you manage your processes.

III. Covid 19 Hospital Management System by Rupesh Gaur, Amandeep Kaur, Lovely Professional University

This research work is on design and construction of Covid-19 hospital management system. The system uses html and css as frontend and Django as frontend and has a connection with the backend. Covid-19 Hospital Management System is an integrated hospital management system which address all the major functional areas of the multi- speciality hospitals. This hospital system management enables better patient care and prevents the confusion and misleading of information at the time of need. Covid-19 HOSPITAL MANAGEMENT SYSTEM is an integrated Hospital Information System, which addresses all the major functional areas of covid related problems in the hospitals. The HOSPITAL MANAGEMENT enables good patient care, patient safety, their confidentiality, efficiency, reduced costs and better management information system [3]. It helps in giving accurate idea of data thus helps in easy process with less possibility of errors. This project deals with processing of covid department in the hospital with ease. It helps in reducing the manual process of the current system. The Scope of the project takes care of the details of covid department. These details give the doctor, staffs, and patient details. The details of doctors and staff help the hospital to maintain the record of every person.

CHMSs are the need of the hour in the hospitals in these times. In this report we explored the management and solutions which may re-design the way of registering without getting into hectic and long lines. We initially talked about how CHMSs works like addition of sources like beds, doctors etc. then uploading it on the hospital sever. Also, how the ownership works in case of CHMSs. Then we talked about the technical components like how the distribution of the CHMSs do is done on the backend and how smart contracts will help us in secure environment. Then we learn why the concept of CHMS is so much hyped in the market. Like why many hospitals are moving towards the CHMSs instead of working and managing everything manually and offline. Then we discussed about the packages like models and view, the main component than helps the CHMSs to be unique among others.

IV. Introduction of Database Management System by C Vairavel, Department of Computer Science and Engineering Galgotias University, Yamuna Expressway Greater Noida, Uttar Pradesh.

Database management system (DBMS) is computer software designed to manage the database in efficiently and conveniently. The main purpose of DBMS is to store and retrieve the data in the convenient and efficient way[4]. This paper presents the overview of the database management system such as its components, data model which describing how data is to be arranged for a specific purpose. Major aim of database is to supply users with an abstract view of data. In database development process normalization play an important role. By using DBMS developers can eliminate duplication data and develop standards by which all data can be measured. It allows organizations to conveniently develop and use databases for various applications by database administrators (DBAs). Currently database management systems (DBMS) are not capable of supporting such flexibility. With the increase of data to be indexed and retrieved and the increasing heavy workloads, modern search engines suffer from Scalability, reliability, distribution and performance problems. This paper presents a new and simple way for integration and compares the performance of our system to the current implementations based on storing the full text index directly on the file system. A Database Management System (DBMS) is a collection of programs that enables a user to perform various operations like insert, modify, update, delete, maintain and access the database. DBMS relieves the user from knowing how the data is stored physically and complex algorithms used for performing operations on the database. Only focus on how the operations are to be performed to retrieve the data from the database. DBMS is also charge of access, security, storage and host of other functions for the database system. It does through a selection of computer programs. Database (DB) is a collection of inter-related data which are used to retrieve, insert and delete the data efficiently. Data can be used to organize in the various format such as table, schema, views, and reports, etc. For example: The college Database organizes the data about the admin, staff, students and faculty etc. This can be can easily retrieve, insert, and delete the information using database. Like other software database management system also have some advantages and disadvantages. DBMS is a computer application designed for efficient and effective storage, retrieve and update large volume of data. Users take help of DBMS on managing the database. Data is stored in the form of record and every record consists of a group of related data values. For inserting, deleting, modifying records data manipulation language (DML) is used. Every organization has its own database to manage the records. Many applications and projects are working on DBMS example attendance is biometric, data is automatically stored in the database. DBMS remove data redundancy, duplication and manage the data consistency. Either programmer or the one who implemented the database will have much more work to do without using DBMS. Operations such as to arrange data or inserting data into the database and also retrieving data out from the database it will become difficult.

Chapter 3
TECHNICAL DESCRIPTIONS

3.1 METHODOLOGIES

The entire project mainly consists of 4 modules:

- Admin
  - ✓ Admin Activity
  - ✓ doctorsManagement
  - ✓ hospitalManagement
- Hospitals
  - ✓ Hid
  - ✓ addHospital
  - ✓ deleteHospital
  - ✓ hospitalActivity
  - ✓ patientDetail
  - ✓ doctorDetail
  - ✓ hospitalManagement
- Doctors
  - ✓ Did
  - ✓ Appointment
  - ✓ addDoctor
  - ✓ deleteDoctor
  - ✓ doctorActivity
  - ✓ patientDetail
  - ✓ searchDoctor
  - ✓ updateDoctor
  - ✓ viewDoctor
- Patient
  - ✓ Pid
  - ✓ deletePatient
  - ✓ addPatient
  - ✓ patientActivity
  - ✓ searchPatient
  - ✓ updatePatient

- ✓ viewPatient

- Main
  - ✓ Admin
  - ✓ Connector
  - ✓ Doctor
  - ✓ Hospital
  - ✓ Patient

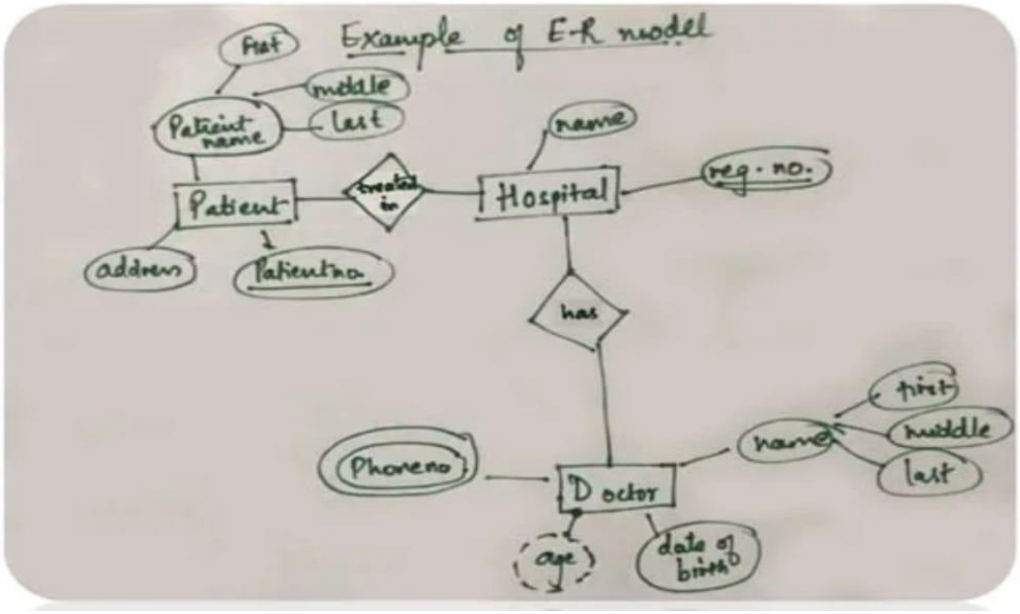

Figure 6- E-R Diagram

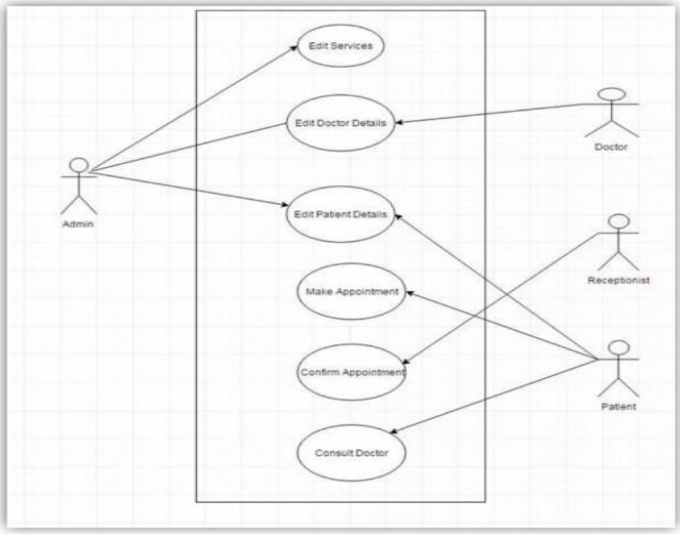

Figure 7 –Use Case Diagram

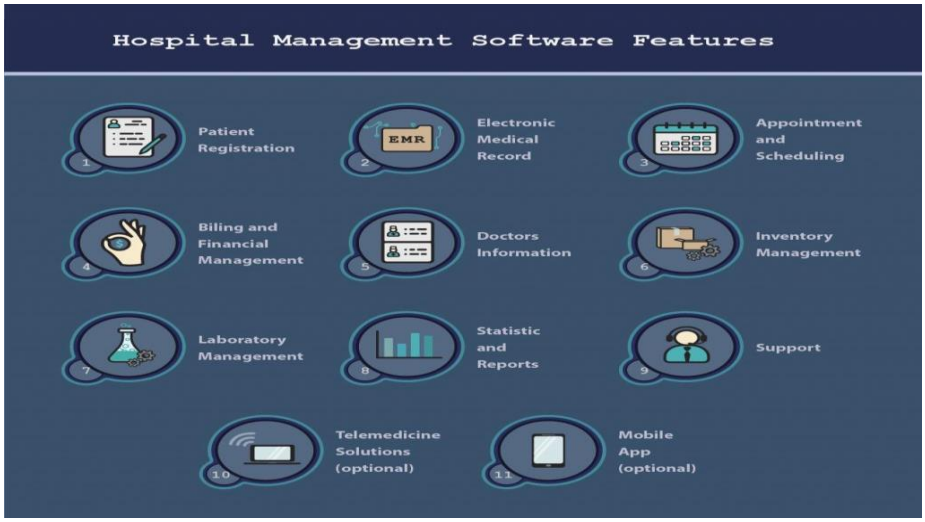

Figure 8 Tools Stack

3.2 TOOLS STACK

- **HTML(HyperText Markup Language)**
  - HTML stands for Hyper Text Markup Language
  - HTML is the standard markup language for creating Web pages
  - HTML describes the structure of a Web page
  - HTML consists of a series of elements
  - HTML elements tell the browser how to display the content
    - HTML elements label pieces of content such as "this is a heading", "this is a paragraph", "this is a link", etc.
- **Bootstrap**

  Bootstrap is the most popular CSS Framework for developing responsive and mobile-first websites. Bootstrap 5 is the newest version of Bootstrap.

  Bootstrap is a free, open source front-end development framework for the creation of websites and web apps. Designed to enable responsive development of mobile-first websites, Bootstrap provides a collection of syntax for template designs.
- **CSS(Cascading Style Sheets)**
  - CSS is the language we use to style an HTML document.
  - CSS describes how HTML elements should be displayed.
  - CSS stands for Cascading Style Sheets
  - CSS describes how HTML elements are to be displayed on screen, paper, or in other media
  - CSS saves a lot of work. It can control the layout of multiple web pages all at once

- **JavaScript**
    - JavaScript is the world's most popular programming language.
    - JavaScript is the programming language of the Web.
    - JavaScript is easy to learn.
- **Python Flask**

  Flask is a lightweight Python web framework that provides useful tools and features for **creating web applications in the Python Language**. It gives developers flexibility and is an accessible framework for new developers because you can build a web application quickly using only a single Python file

  The primary advantages of choosing Flask are built-in fast debugger, secure cookies and unit testing support, Unicode basis, and more. The framework allows developers to decide how exactly to build the application needed.
- **Xampp Localhost Server**

  XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages.

  XAMPP is an abbreviation for cross-platform, Apache, MySQL, PHP and Perl, and it allows you to build WordPress site offline, on a local web server on your computer. This simple and lightweight solution works on Windows, Linux, and Mac – hence the "cross-platform" part

  The goal of XAMPP is to build an easy to install distribution for developers to get into the world of Apache. To make it convenient for developers, XAMPP is configured with all features turned on.
- **VS (Visual Studio) Code**

  Visual Studio Code is a streamlined code editor with support for development operations like debugging, task running, and version control. It aims to provide just the tools a developer needs for a quick code-build-debug cycle and leaves more complex workflows to fuller featured IDEs, such as Visual Studio IDE.

  Robust and extensible architecture. Architecturally, Visual Studio Code combines the best of web, native, and language-specific technology.

CHAPTER 4
DESIGN AND SOFTWARE IMPLEMENTATION

4.1 DESIGN

The frontend design is created using HTML, CSS, JavaScript and Bootstrap. The webpages contain navigation bars which are added using bootstrap.

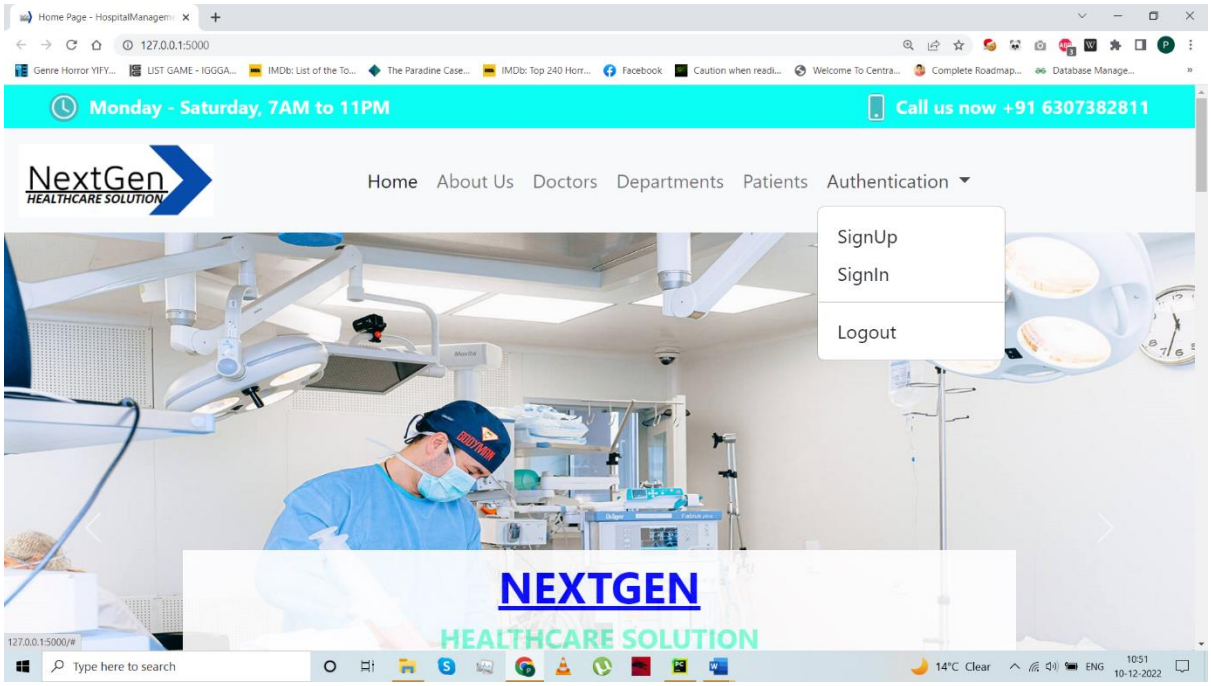

Figure 9 Home Page

The navigation bars redirect us to the different pages of our website.

```
<! ---------------- Navigation Starts -------------------->
  <nav class="navbar navbar-expand-lg navbar-light bg-light sticky-top">
    <div style="width: 100%;" class="container-fluid">
      <a class="navbar-brand" href="#"><img width="61%" height="41%"
src="/static/img/menuLogo.png" alt="Loading..."></a>
      <button class="navbar-toggler" type="button" data-bs-toggle="collapse" data-bs-
target="#navbarSupportedContent"
        aria-controls="navbarSupportedContent" aria-expanded="false" aria-label="Toggle
navigation">
        <span class="navbar-toggler-icon"></span>
      </button>
      <div style=" width: 70%;" class="collapse navbar-collapse "
id="navbarSupportedContent">
        <ul class="navbar-nav me-0 mb-2 mb-lg-0 ">
          <li class="nav-item">
            <a class="nav-link active" aria-current="page" href="/">Home</a>
          </li>
          <li class="nav-item">
```

```
          <a class="nav-link " aria-current="page" href="#ABOUT">About Us</a>
        </li>
        <li class="nav-item">
          <a class="nav-link" href="/doctors">Doctors</a>
        </li>
        <li class="nav-item">
          <a class="nav-link" href="#departments">Departments</a>
        </li>
        <li class="nav-item">
          <a class="nav-link" href="#">Patients</a>
        </li>
        <li class="nav-item dropdown">
          <a class="nav-link dropdown-toggle" href="#" role="button" data-bs-
toggle="dropdown" aria-expanded="false">
            Authentication
          </a>
          <ul class="dropdown-menu">
            <li><a class="dropdown-item" href="/signup">SignUp</a></li>
            <li><a class="dropdown-item" href="/signin">SignIn</a></li>
            <li>
              <hr class="dropdown-divider">
            </li>
            <li><a class="dropdown-item" href="/">Logout</a></li>
          </ul>
        </li>
        <!-- <li class="nav-item">
              <a class="nav-link"><button></button></a>
            </li> -->
      </ul>
    </div>
  </div>
 </nav>
 <! ------------------ Navigation Ends ---------------------->
```

A YouTube video is linked at the end of the homepage which shows the idea behind this website.

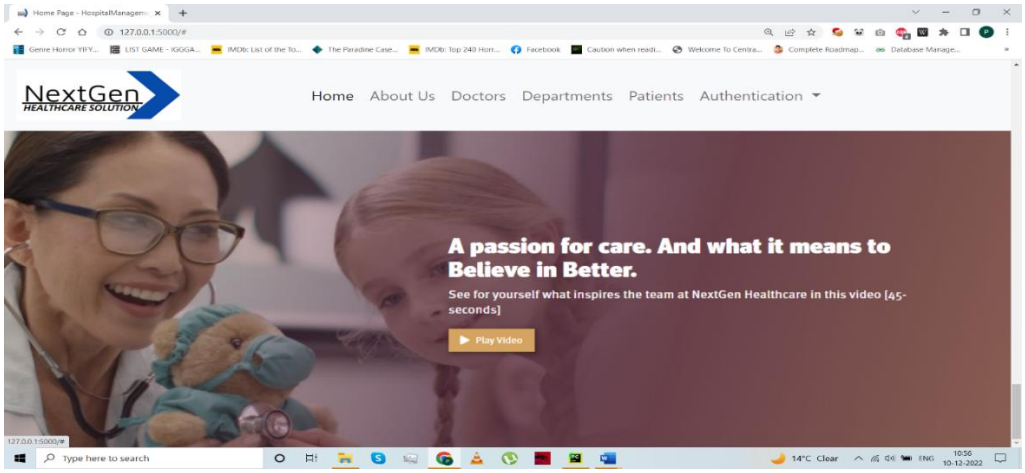

Figure 10 Video Link

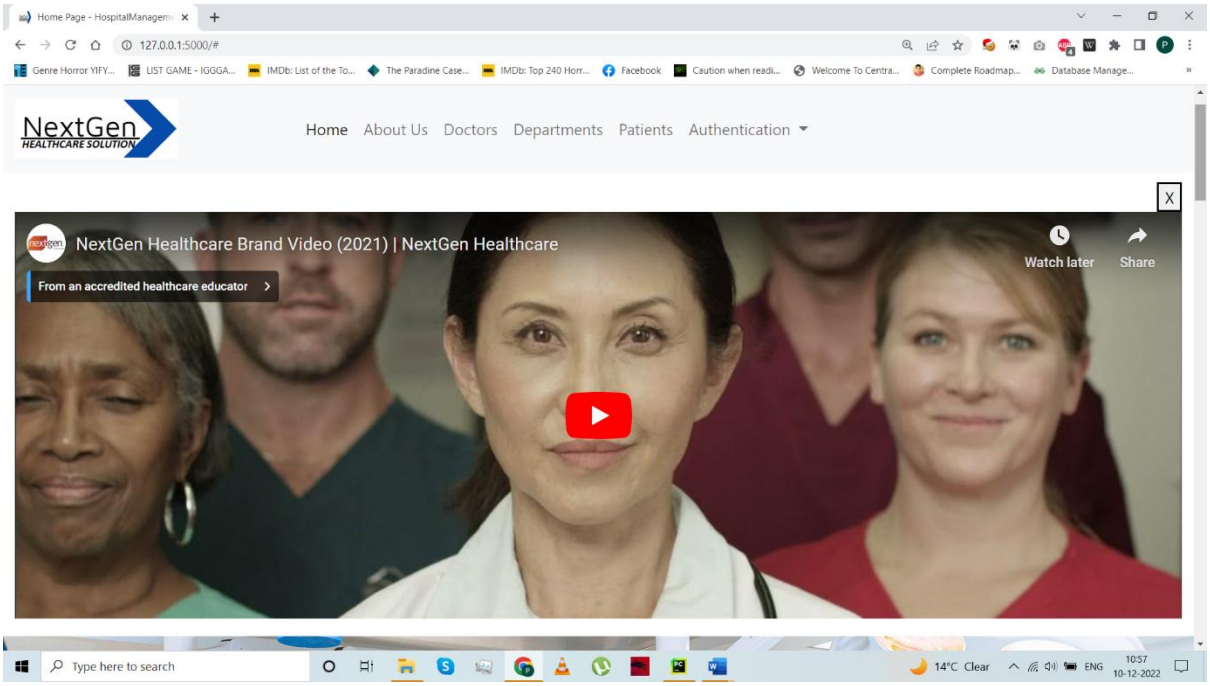

Figure 11 Youtube Video

```
<! -- YOU TUBE Video -->
  <div style="display: none;" id="YOUTUBE" class="youtube">
    <button onclick="closeYoutube();" style="float: right; ">X</button>
    <iframe  width="100%" height="415"
src="https://www.youtube.com/embed/DEivXTFNgp4" title="YouTube video player"
frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media;
gyroscope; picture-in-picture" allowfullscreen></iframe>
  </div>
  <! -- YOU TUBE Video -->
```

The following Departments and specializations are catered to from our hospital management system:

- Cardiology
- Neurology
- Hepatology
- Pediatrics

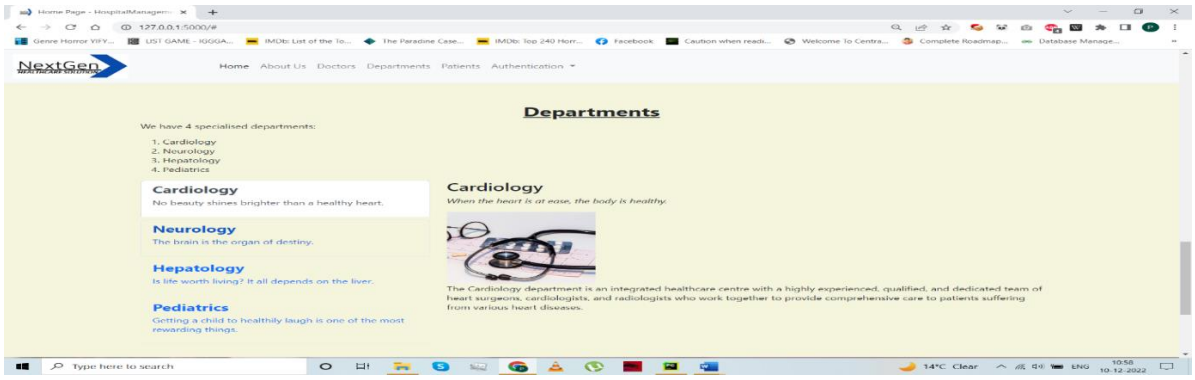

Figure 12 Departments

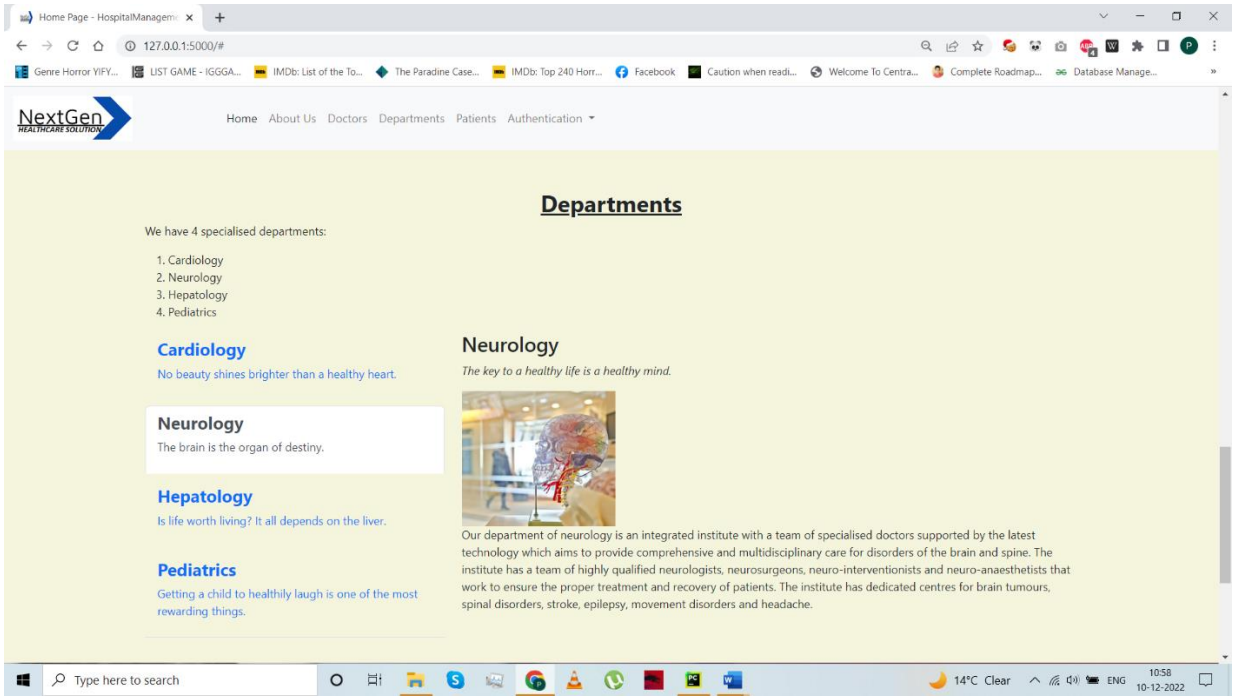

Figure 13 Departments

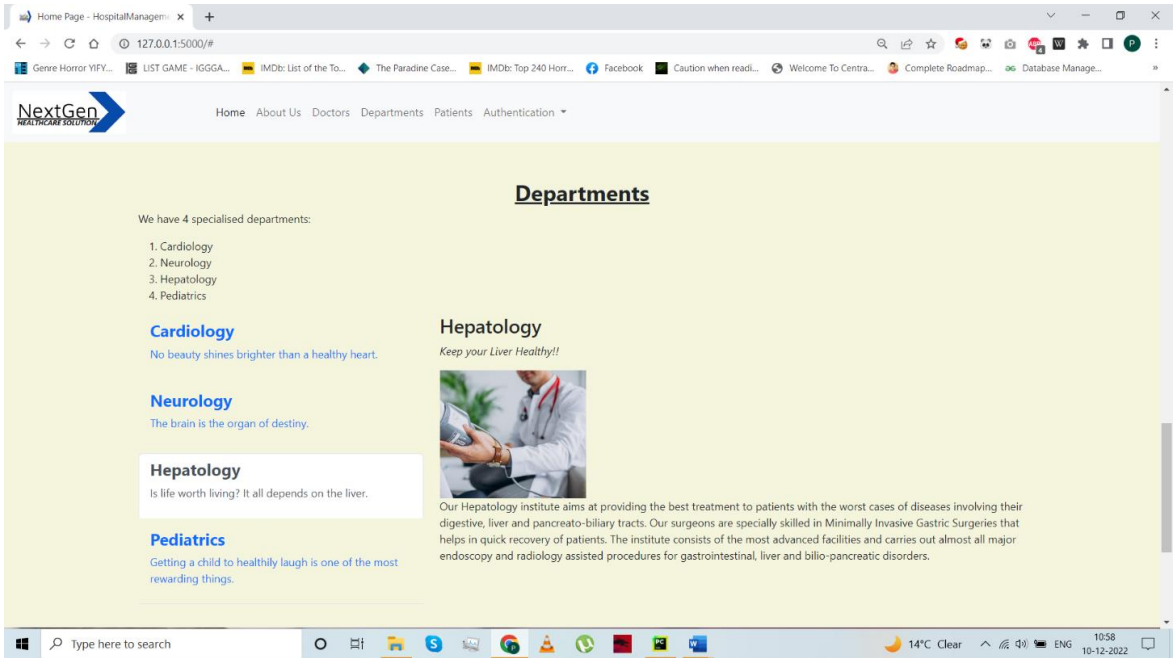

Figure 14 Departments

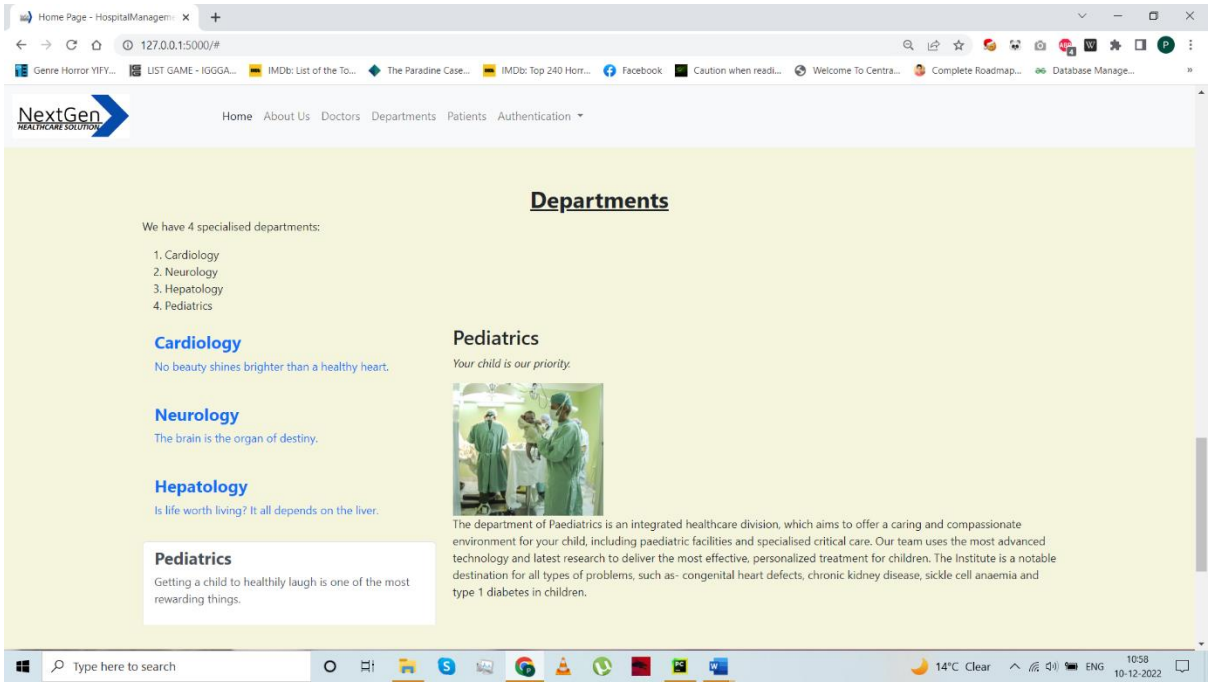

Figure 15 Departments

```
<!-- ======= Departments Section ======= -->
 <section id="departments" class="departments">
  <br><br>
  <div class="container" data-aos="fade-up">

    <div class="section-title">
      <center><h2><b><u>Departments</u></b></h2></center>
      <p>We have 4 specialised departments: </p>
      <ol>
        <li>Cardiology</li>
        <li>Neurology</li>
        <li>Hepatology</li>
        <li>Pediatrics</li>
      </ol>
    </div>

    <div class="row" data-aos="fade-up" data-aos-delay="100">
      <div class="col-lg-4 mb-5 mb-lg-0">
        <ul class="nav nav-tabs flex-column">
          <li class="nav-item">
            <a class="nav-link active show" data-bs-toggle="tab" data-bs-target="#tab-1">
              <h4><b>Cardiology</b></h4>
              <p>No beauty shines brighter than a healthy heart.</p>
            </a>
          </li>
          <li class="nav-item mt-2">
            <a class="nav-link" data-bs-toggle="tab" data-bs-target="#tab-2">
              <h4><b>Neurology</b></h4>
```

```
          <p>The brain is the organ of destiny.</p>
        </a>
      </li>
      <li class="nav-item mt-2">
        <a class="nav-link" data-bs-toggle="tab" data-bs-target="#tab-3">
          <h4><b>Hepatology</b></h4>
          <p>Is life worth living? It all depends on the liver.</p>
        </a>
      </li>
      <li class="nav-item mt-2">
        <a class="nav-link" data-bs-toggle="tab" data-bs-target="#tab-4">
          <h4><b>Pediatrics</b></h4>
          <p>Getting a child to healthily laugh is one of the most rewarding things.</p>
        </a>
      </li>
    </ul>
  </div>
  <div class="col-lg-8">
    <div class="tab-content">
      <div class="tab-pane active show" id="tab-1">
        <h3>Cardiology</h3>
        <p class="fst-italic">When the heart is at ease, the body is healthy.</p>
        <img width="25%" height="25%" src="static/img/departments-1.jpg" alt=""
class="img-fluid">
        <p>The Cardiology department is an integrated healthcare centre with a highly
experienced, qualified, and dedicated team of heart surgeons, cardiologists, and radiologists
who work together to provide comprehensive care to patients suffering from various heart
diseases.</p>
      </div>
      <div class="tab-pane" id="tab-2">
        <h3>Neurology</h3>
        <p class="fst-italic">The key to a healthy life is a healthy mind.</p>
        <img width="25%" height="25%" src="static/img/departments-2.jpg" alt=""
class="img-fluid">
        <p>Our department of neurology is an integrated institute with a team of specialised
doctors supported by the latest technology which aims to provide comprehensive and
multidisciplinary care for disorders of the brain and spine.
The institute has a team of highly qualified neurologists, neurosurgeons, neuro-
interventionists and neuro-anaesthetists that work to ensure the proper treatment and recovery
of patients. The institute has dedicated centres for brain tumours, spinal disorders, stroke,
epilepsy, movement disorders and headache.</p>
      </div>
      <div class="tab-pane" id="tab-3">
        <h3>Hepatology</h3>
        <p class="fst-italic">Keep your Liver Healthy!!</p>
        <img width="25%" height="25%" src="static/img/departments-3.jpg" alt=""
class="img-fluid">
        <p>Our Hepatology institute aims at providing the best treatment to patients with the
worst cases of diseases involving their digestive, liver and pancreato-biliary tracts. Our
surgeons are specially skilled in Minimally Invasive Gastric Surgeries that helps in quick
```

recovery of patients.
The institute consists of the most advanced facilities and carries out almost all major endoscopy and radiology assisted procedures for gastrointestinal, liver and bilio-pancreatic disorders.

<h3>Pediatrics</h3>
Your child is our priority.
<img width="25%" height="25%" src="static/img/departments-4.jpg" alt="" class="img-fluid">

</section>
<!-- End Departments Section -->

4.2 SOFTWARE IMPLEMENTATION

The python modules used for backend software implementation are:

- flask
- flask_login
- flask_sqlalchemy
- werkzeug.security

Flask is a web framework, it's a Python module that lets you develop web applications easily. It's having a small and easy-to-extend core: it's a microframework that doesn't include an ORM (Object Relational Manager) or such features.

```
local_server = True
app = Flask(__name__)
app.secret_key = 'DBMS'
# this is for getting unique user access
login_manager = LoginManager(app)
login_manager.login_view = 'login'

def fun():
    return render_template('index.html')
@app.route('/doctors')
def doctors():
    return render_template('doctors.html')
@app.route("/signup", methods=["GET", "POST"])
def add():
    if request.method == "POST":
        email = request.form.get('email')
        contact = request.form.get('number')
        password = request.form.get('password')
        user = User.query.filter_by(email=email).first()
        if email == "" or contact == "" or password == "":
            flash("Don't leave any fields empty!", "warning")
```

```
            return render_template('/signup.html')
        elif user:
            flash("Email Already Exist", "warning")
            return render_template('/signup.html')
        new_user = db.engine.execute(
            f"INSERT INTO `user` (`contact`,`email`,`password`) VALUES
    ('{contact}','{email}','{password}')")

        flash("Signup Success Please Login", "warning")
    return render_template("signup.html")
```

Flask_login provides user session management for Flask. It handles the common tasks of logging in, logging out, and remembering your users' sessions over extended periods of time.

```
app = flask.Flask(__name__)
app.secret_key = 'super secret string'
```

Flask-Login works via a login manager. Setting up the login manager by instantiating it and telling it about our Flask app:

```
import flask_login
login_manager = flask_login.LoginManager()
login_manager.init_app(app)
users = {'foo@bar.tld': {'password': 'secret'}}
```

Flask-Login needs to know how to load a user from a Flask request and from its session. To do this we need to define our user object, a user_loader callback, and a request_loader callback.

```
class User(flask_login.UserMixin):
    pass
@login_manager.user_loader
def user_loader(email):
    if email not in users:
        return
    user = User()
    user.id = email
    return user
@login_manager.request_loader
def request_loader(request):
    email = request.form.get('email')
    if email not in users:
        return

    user = User()
    user.id = email
    return user
```

Flask_sqlalchemy, the Python Toolkit is a powerful OR Mapper, which provides application developers with the full functionality and flexibility of SQL.

Flask-SQLAlchemy is a Flask extension that adds support for SQLAlchemy to the Flask application.

ORM is short for Object Relation Mapping (sometimes Object Relationship Mapping).

- Most programming language platforms are object-oriented.
- The data in the RDBMS server is stored in tables.

Object-relational mapping is a technique that maps object parameters to the structure of a layer

RDBMS table. The ORM API provides a way to perform CRUD operations without writing raw SQL statements.

```
app = Flask (__name__)
app.config ['SQLALCHEMY_DATABASE_URI'] = 'sqlite:///students.sqlite3'
db = SQLAlchemy(app)
class students(db.Model):
   id = db.Column('student_id', db.Integer, primary_key = True)
   name = db.Column(db.String(100))
   city = db.Column(db.String(50))
   addr = db.Column(db.String(200))
   pin = db.Column(db.String(10))

def __init__(self, name, city, addr,pin):
   self.name = name
   self.city = city
   self.addr = addr
   self.pin = pin
db.create_all()
# Inserts records into a mapping table
db.session.add (model object)
# delete records from a table
db.session.delete (model object)
# retrieves all records (corresponding to SELECT queries) from the table.
model.query.all ()
```

Werkzeug is python library which contains lot of development and debugging tools for implementation of web application gateway interface (WSGI) applications. The good part is you can use this system not only for your web applications but also for standalone python applications like desktop apps, scripts, mobile apps and so on.

- Passwords will not be stored as plaintext in database.
- Password will be stored as hash which is irreversible to plaintext. (one way hash).
- With given hash attacker cannot guess plaintext.
- Each user password will be hashed with salt to mitigate rainbow table attacks; Just in case if database got compromised.

There are various security functions available in the werkzeug. security but we are interested in generate_password_hash and check_password_hash.

generate_password_hash

generate_password_hash takes plaintext password, hashing method and salt length as an input to produce hashed password. By default, it produces salt string with length 8.

```
from werkzeug.security import generate_password_hash
print generate_password_hash("P1ain-text-user-passw@rd", "sha256")
sha256$lTsEjTVv$c794661e2c734903267fbc39205e53eca607f9ca2f85812c95020fe8afb3bc
62
```

Note that output string contains hashing method, salt and hashed password concatenated with the $ (dolor). Store hashed string as it is in your database under column hashed_password.

check_password_hash

check_password_hash takes two inputs password hash and plaintext password and returns True if hash matches actual hash of plaintext password else returns False

Chapter 5
CONCLUSION AND FUTURE SCOPE

5.1 CONCLUSION

Since we are entering details of the patients electronically in the" Hospital Management System", data will be secured. Using this application, we can retrieve patient's history with a single click. Thus, processing information will be faster. It guarantees accurate maintenance of Patient details. It easily reduces the book keeping task and thus reduces the human effort and increases accuracy speed.

Hospital Management System is essential for maintaining detail about the Doctor, Patient, Hospital staff etc. we understand that by using of Hospital Management System project the work became very easy and we save lot of time. Hospital administrators would be able to significantly improve the operational control and thus streamline operations. This would enable to improve the response time to the demands of patient care because it automates the process of collecting, collating and retrieving patient information. Accounting sometimes becomes awfully pathetic and complex. This product will eliminate any such complexity.

5.2 FUTURE SCOPE

All this work is done manually by the receptionist and other operational staff and lot of papers are needed to be handled and taken care of. Doctors have to remember various medicines available for diagnosis and sometimes miss better alternatives as they can't remember them at that time. The limited time and resources have restricted us to incorporate, in this project, only main activities that are performed in a Hospital Management System, but utmost care has been taken to make the system efficient and user friendly.

Most of the analysis and interpretations, made for this report, are based on secondary data obtained. This data could have some inherent mistakes and errors. Finally, although due care has been taken those can be typing and compilation errors in the report itself. The tasks specified were not well defined because nothing was mentioned regarding validations in the project. Though we gave maximum effort to check the software. But it in no way alters the ultimate aim of the project and because it's highly USER FRIENDLY, it would be the choice of all kinds of personnel.

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