Gut Well
Colorectal & Dietary Specialists

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1. Abstract

This paper addresses the limited access to suitable healthcare professionals for colorectal diseases and digestive health issues, proposing a comprehensive Colorectal & Dietary Healthcare center as a solution. The center offers specialized care from experienced healthcare professionals, facilitated by a patient portal for convenient appointment registration and access to medical history. Additionally, the website is integrated with ChatGPT, a decision support system, to enhance the dietary planning process. ChatGPT collects necessary information about the patient, including their target goals, and assists the doctor in developing a personalized dietary plan. The system description includes sections such as About Us, Services, Medical Professionals, Research, News and Updates, and Contact Us. It incorporates features like appointment scheduling, secure medical history access, and a search function. The desktop app caters to receptionist and doctor duties, streamlining patient registration and follow-up processes. The intended audience includes.

doctors, receptionists, clients, and admins for the website, while the desktop system is used by doctors, receptionists, and admins. The system users consist of patients, medical professionals, and system administrators, each with their respective roles and access levels. The integration of ChatGPT with the website empowers doctors in creating specialized dietary plans for patients, leveraging the system's decision support capabilities. Overall, the Colorectal & Dietary Healthcare center offers a comprehensive solution by addressing access limitations and utilizing ChatGPT for optimized dietary planning, ensuring improved healthcare outcomes for patients with colorectal diseases and digestive health issues.

2. Introduction

Colorectal diseases and digestive health issues are prevalent health concerns that can significantly impact a person's quality of life. These conditions require timely and effective diagnosis and treatment to improve health outcomes. However, patients may face challenges accessing suitable healthcare professionals who can provide specialized care for colorectal diseases and digestive health issues. Moreover, patients may lack convenient and easy access to their medical history, making it difficult for healthcare professionals to provide optimal care. There is a need for a comprehensive healthcare center that provides timely and effective diagnosis and treatment for colorectal diseases

and digestive health issues while ensuring patient convenience and ease of access.

Our colorectal & dietary healthcare website offers a comprehensive solution to the problem of limited access to suitable healthcare professionals for colorectal diseases and digestive health issues. Our center provides patients with access to a team of experienced and qualified healthcare professionals who specialize in the diagnosis and treatment of these conditions. We also offer a patient portal that allows patients to register appointments and view their medical history, ensuring that healthcare professionals have access to the most up-to-date and relevant information when providing care.

Our website's objectives are to provide timely and effective diagnosis and treatment for colorectal diseases and digestive health issues while promoting patient convenience and ease of access. We offer a range of services, including diagnostic testing, dietary planning, and personalized treatment plans tailored to each patient's needs. We aim to improve public health outcomes by providing timely and effective diagnosis and treatment for colorectal diseases and digestive health issues.

Our objectives include:

- Providing patients with access to experienced and qualified healthcare professionals who specialize in the diagnosis and treatment of colorectal diseases and digestive health issues.
- Offering a patient portal that enables patients to register appointments and view their medical history, lab results, and sending a message ensuring that healthcare professionals have access to the most up-to-date and relevant information when providing care.
- Offering a doctor portal that enables doctors to view his appointments and providing patients with personalized treatment plans tailored to their individual needs, including dietary planning and lifestyle recommendations.
- Promoting patient convenience and ease of access by offering a welcoming and supportive environment that fosters open communication between healthcare professionals and patients.

In summary, our Colorectal & Dietary Healthcare center offers a comprehensive solution to the problem of limited access to suitable healthcare professionals for colorectal diseases and digestive health issues, ensuring timely and effective diagnosis and treatment while prioritizing patient convenience and well-being.

3. System Description

The homepage of the website should provide a brief overview of the hospital's services and highlight any recent news or updates. It should also provide quick access to important resources, such as patient records, medical research articles, and training materials.

The website should include sections such as:

- About Us: This section should provide information about the hospital's history, mission, and values.
- Services: This section should provide detailed information about the hospital's services, including medical specialties, departments, and facilities.
- Medical Professionals: This section should provide information for medical professionals, including job openings, continuing education opportunities, and links to professional organizations.
- Research: This section should provide information about the hospital's research programs, including ongoing research projects and publications.

- News and Updates: This section should provide the latest news and updates related to the hospital and its services.
- Contact Us: This section should provide contact information for the hospital, including phone numbers, email addresses, and physical addresses.
- The appointment: the scheduling system should be user-friendly, with an easy-to-use interface that allows medical professionals to check availability, select appointment times, and add patient information. It should also be secure, with proper authentication and encryption to protect patient information.
- Medical history: This section should allow medical professionals to access and review a patient's medical records, including their past and current medical conditions, medications, allergies, immunizations, and procedures. It should also allow for updating and adding new information to the medical records as necessary. This information is essential for providing high-quality care to patients and can help improve patient outcomes.

The system should send appointment confirmation emails to both the medical professional and the patient, including the appointment details, time, and location. It should also allow for rescheduling or canceling appointments if necessary.

The website should also include a search function, making it easy for medical professionals to quickly find the information they need. Additionally, the website should be secure and comply with relevant data privacy and security regulations.

A hospital professional website should be a valuable resource for medical professionals, providing them with the information and tools they need to provide the best possible care for their patients.

Adding an appointment scheduling system to the hospital professional website will provide medical professionals with an efficient and convenient way to schedule appointments, manage patient information, and provide better care to their patients.

Allowing patients to view their own medical history on the hospital professional website can be beneficial in several ways. It can help patients take a more active role in their healthcare by providing them with important information about their medical conditions, medications, allergies, and procedures. To allow patients to view their medical history, the website should have a secure patient portal that requires authentication to access. To ensure patient privacy and confidentiality, the patient portal should have proper security measures in place, such as encryption and multi-factor authentication.

The desktop app is divided into two sections:

- Receptionist duties
- Doctor's duties

The receptionist receives the patient and takes all basic data such as name, age, address, and phone number, then registers through a specific identification number of their own, and then gives the patient an appropriate date. then determine the next session and follow up on their condition.

Intended Audience

The website used by doctors, receptionists, clients, and admins.

The desktop system is used by doctors, receptionists, and admins.

Technologies Used

- C#
- MySQL
- SQL Microsoft
- Visual studio
- Simplifier.net
- Postman
- Html
- Java
- HAPI FHIR.

System Users

- **Patient:** The patient is an actor in the system who can access their personal health data through the website. They can input and track their health data, schedule appointments online, and communicate with medical professionals through the secure messaging system.
- **Medical Professional:** The medical professional is an actor in the system who can manage patient data through the desktop interface. They may add new patient details, view patient information, track patient progress, manage appointments, and generate reports. They may also manage clinical trials and medication information.

System Administrator: The system administrator is an actor in the system who is responsible for maintaining the database, managing user accounts and permissions, and providing technical support to users. As an actor, the system administrator may access all parts of the system, including the website and desktop applications.

4. Requirements

Functional:

- **User Authentication:** The system will allow users to register and log in securely to access their data. Each user should have a unique username and password, and the system should implement proper security measures to prevent unauthorized access.
- **Patient Management:** The system will allow medical professionals to add new patient details, view patient information, track patient progress, manage appointments, and track patient history. Patients should be able to update their demographic information and personal health data through the website.
- **Medical Professional Management:** The system will allow administrators to manage medical professional accounts, including adding new medical professionals, modifying their information, and tracking their qualifications.
- **Clinical Trial Management:** The system should allow administrators to manage clinical trials, including adding new trials, managing enrolment, viewing clinical trial data, and generating reports.
- **Medication Management:** The system will allow medical professionals to add new medications, manage prescriptions, and track adherence to medication schedules.
- **Secure Messaging System:** The system will allow medical professionals and patients to communicate securely through the website, including sending messages and uploading documents.
- **Online Appointment Scheduling:** The system will allow patients to schedule appointments with medical professionals

online, view availability, and receive confirmation of their appointments.

- **Health Data Tracking**: The system should enable patients to input and track their health data, including blood pressure, weight, and dietary information. The system should also allow medical professionals to view this data to track patient progress.
- **Reporting and Analytics:** The system will generate reports and analytics that show progress and provide insights into patient health trends. Reports should be customizable based on user requirements.
- **ABI Interface with Chatbot GPT:** The system will incorporate an ABI interface with a chatbot GPT to provide personalized, dynamic, and interactive health information to patients. The chatbot GPT should provide patients with helpful tips on nutrient management, dosages, and schedules. It should also be used to remind users of their medication schedule, notify them of upcoming appointments, and track their health data. The system should be designed to integrate the chatbot's responses into its reporting and analytics features, allowing users to track their progress in a more detailed and personalized manner.

Non-Functional:

- **Security:** The system will be secure and protect patient data from unauthorized access. It should use industry-standard encryption and access controls to ensure data confidentiality and integrity.
- **User-Friendliness:** The system will be easy to use and navigate, with intuitive interfaces that minimize training requirements for users.
- **Scalability:** The system will be designed to handle many patients and medical professionals. It should be able to handle and process data without any performance issues.
- **Reliability:** The system will be reliable and have high uptime, with regular backups and disaster recovery plans in place.
- **Performance:** The system will be fast and responsive, with low latency and high throughput, and should be able to handle concurrent users without any degradation in performance.
- **Compliance:** The system will comply with all relevant healthcare regulations and guidelines, such as HIPAA and GDPR, and should maintain audit logs to ensure regulatory compliance.

5. Interfaces

Desktop Interface:

Figure 1 - Login Page

Description: the system will allow the registered user to login providing a valid username and password.

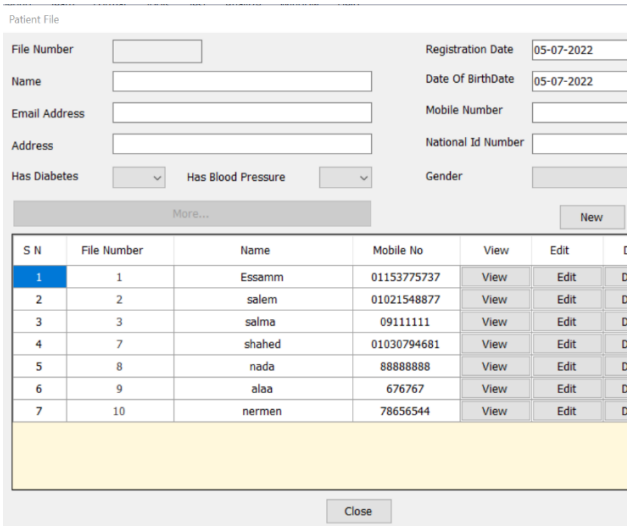

Figure 2 - Patient File

Description: These data are to be filled in to complete the patient registration process: File number, name, email, address, registration date, date of birth, mobile phone number, national ID number, gender.

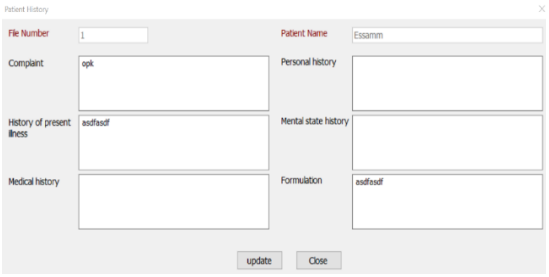

Figure 3 - Patient File

Description: Last time the receptionist was the one who filled in the data, this time the doctor will complete the patient's data in order to maintain privacy. data like medical data, personal data, history of present illness, past psychiatric history.

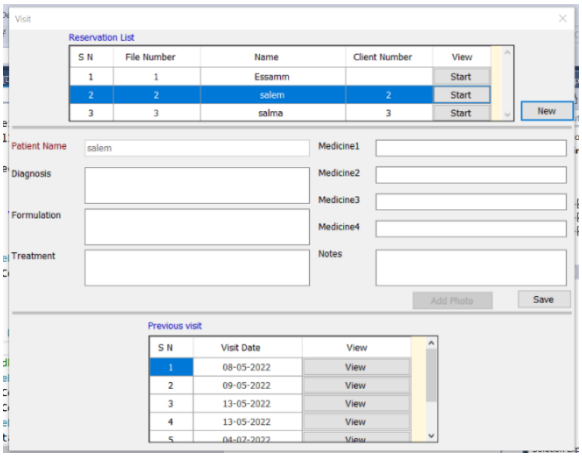

Figure 4 - Patient File

Description: The doctor will enter the patient's data in order to maintain privacy. Data like diagnosis, formulations, treatments, medicines, and upload photo. All the data of the patient saved into file patient history, and we can see it in (previous visit).

Web Interface 1:

We have two interfaces, the first one is colon, while the second interface is about nutrition.

Colon:

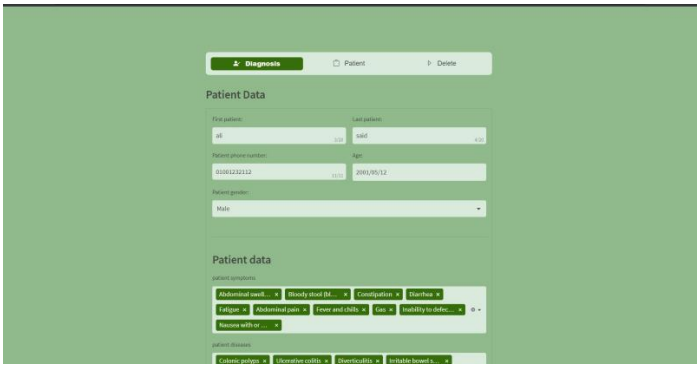

Figure 5 - Colon Login Page

Description: the system will allow the registered user to log in providing valid data. After that the patient start to registration her /his data like first name and last name patient phone number, age, patient gender.

Figure 6 - Colon Patient File

Description: The reception will enter the patient's data. data like diagnosis, formulations, treatments, medicines, present history, past history, family history, medical history, lab history after that all data will be saved.

Nutrition:

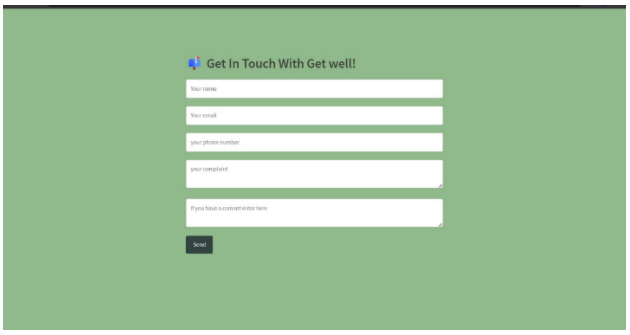

Figure 7 - Nutrition Login Page

Description: These data are to be filled in to complete the patient registration process: The patient starts to full his /her data like File number, name, email, your complaint after that his data saved.

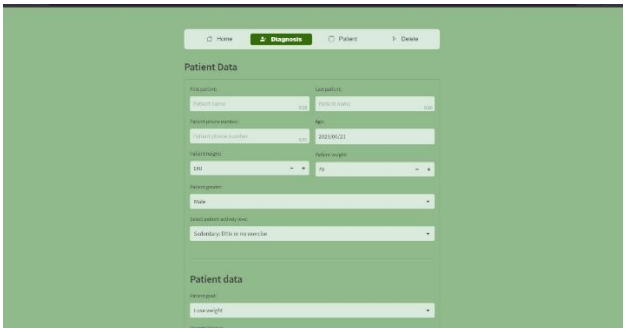

Figure 8 - Nutrition Patient File

Description: These data are to be filled in to complete the patient registration process: name, email, patient phone number, Age, patient height, patient weight, patient gender, patient activity level.

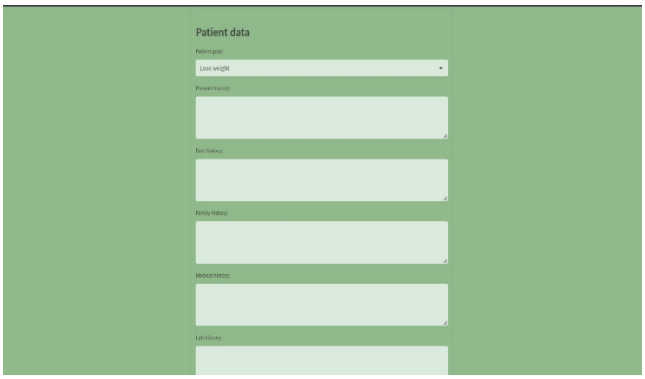

Figure 9

Description: The patient will enter his /her data. Like patient goal, present history, past history, family history, medical history, lab history, after that all data will be saved.

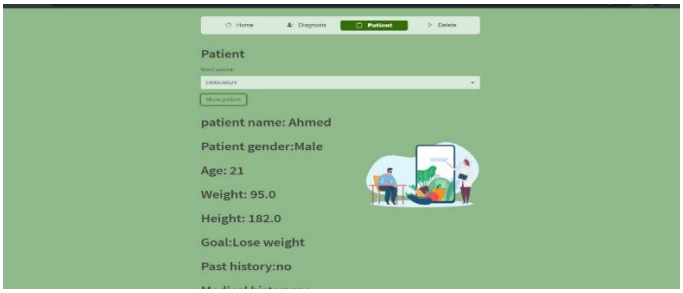

Figure 10

Description: The doctor will enter the patient's ID after that he can see the data of the patient. He can see the patient's name, patient gender, age, Weight, Height, goal, past history.

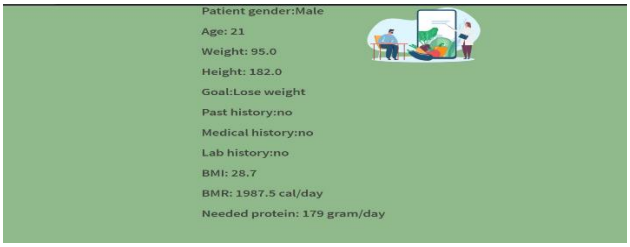

Figure 11

Description: The doctor will enter the patient's ID after that he can see the data of the patient. He can see the patient's name, patient gender, age, Weight, Height, goal, past history, medical history, lab history, BMI, BMR, needed protein after that he can know the suitable plan to the patient.

Web Interface 2:

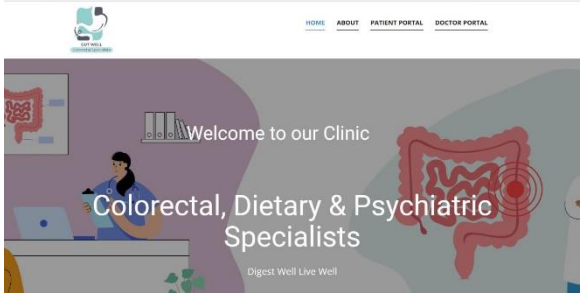

Figure 12 – Home Page

In Figure 12, the user could choose patient portal or doctor portal. If the user choses the patient portal the web page in Figure 14 will be opened, so the user could choose any preferred clinic, whether it is colon, dietary, or psychiatric clinic.

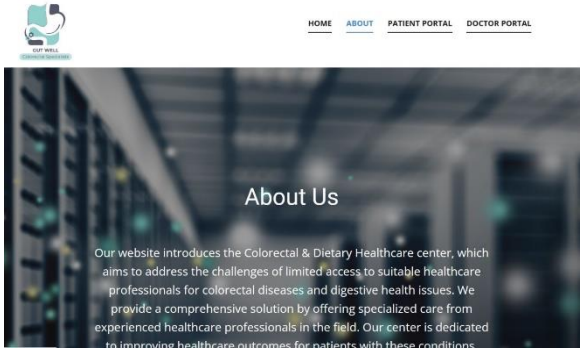

Figure 13 – About Us

If the user entered (About), the web page in Figure 13 will appear so the user could get information about our clinics and specialists.

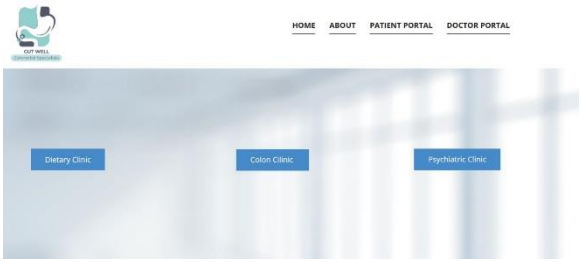

Figure 14 - Patient Portal

If the user choses the patient portal the web page in Figure 14 will be opened, so the user could choose any preferred clinic, whether it is colon, dietary, or psychiatric clinic.

6. Diagrams

UML Diagram:

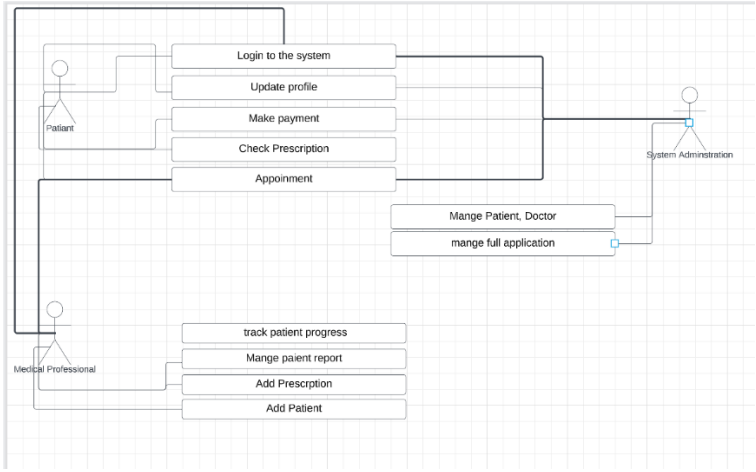

Figure 15 - UML Diagram

Sequence Diagram:

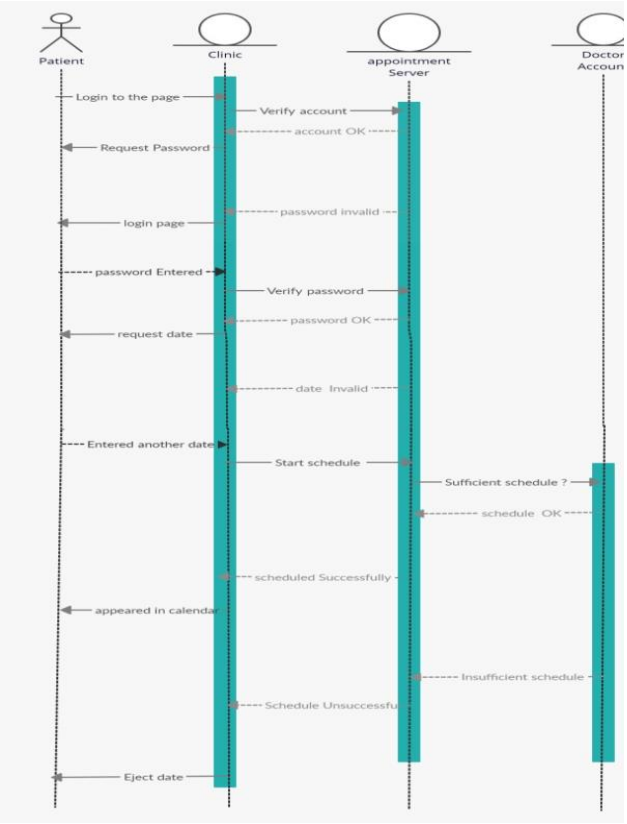

Figure 16 - Sequence Diagram

High-Level Architecture:

(System Components, Interfaces, Databases, Transfer Protocols, ... etc.)

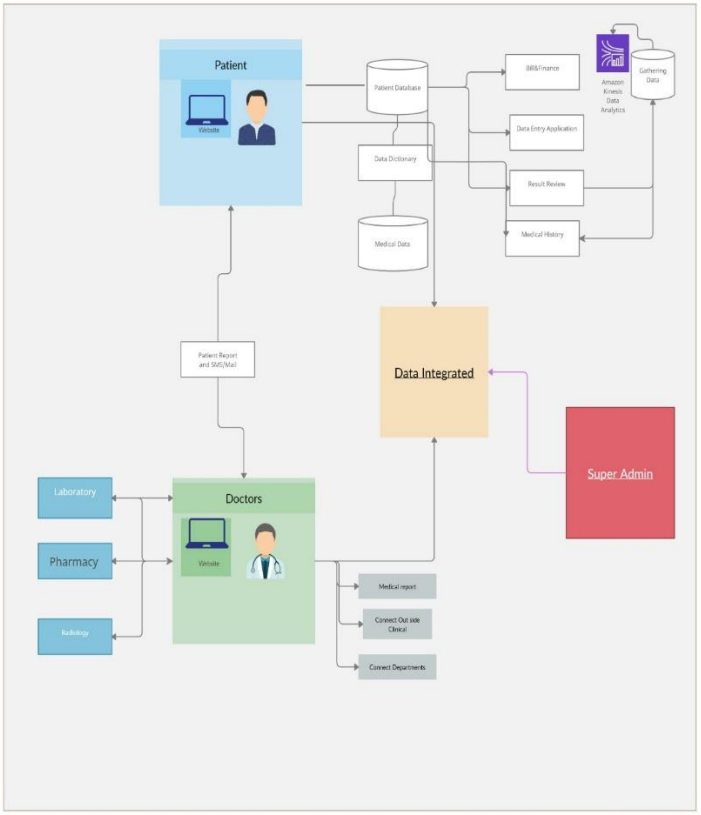

Figure 17 - High Level Architecture

7. Conclusion

In conclusion, this paper presented a comprehensive solution to address the limited access to suitable healthcare professionals for colorectal diseases and digestive health issues. The proposed solution is the establishment of a Colorectal & Dietary Healthcare center, supported by a user-friendly website and a desktop application.

The Colorectal & Dietary Healthcare center aims to provide specialized care for patients with colorectal diseases and digestive health issues. By offering access to experienced healthcare

professionals who specialize in these conditions, the center ensures timely and effective diagnosis and treatment, ultimately improving health outcomes for patients.

The website serves as a central platform for patients, medical professionals, and system administrators. It provides various sections, including About Us, Services, Medical Professionals, Research, News and Updates, and Contact Us, to offer comprehensive information and resources. The integration of ChatGPT, a decision support system, enhances the dietary planning process by collecting patient information and assisting doctors in developing personalized dietary plans.

The website's functionality includes features like appointment scheduling, secure medical history access, and a search function, improving patient convenience and ease of access. The desktop application caters to receptionist and doctor duties, streamlining patient registration, follow-up processes, and data management.

The intended audience for the system includes doctors, receptionists, clients (patients), and administrators. Each user group has specific roles and access levels to ensure appropriate usage and data security.

The paper also outlined the technologies used, including C#, MySQL, SQL Microsoft, Visual Studio, Simplifier.net, Postman, HTML, Java, and HAPI FHIR. These technologies contribute to the system's functionality, security, and scalability.

The system requirements were defined, covering both functional and non-functional aspects. Key functional requirements include user authentication, patient and medical professional management, clinical trial and medication management, secure messaging, online appointment scheduling, health data tracking, reporting and analytics, and integration of ChatGPT for personalized health information. Non-functional requirements encompass security, user-friendliness, scalability, reliability, performance, and regulatory compliance.

Additionally, the paper provided visual representations of the system through UML and sequence diagrams, as well as a high-level architecture overview, showcasing the system components, interfaces, databases, and transfer protocols.

Overall, the proposed Colorectal & Dietary Healthcare center, accompanied by the website and desktop application, offers a comprehensive solution to address the limited access to suitable healthcare professionals for colorectal diseases and digestive health issues. By leveraging technology, personalized care, and streamlined processes, the system aims to enhance healthcare outcomes and improve the well-being of patients in this domain.