Sehat Rasta: An Intelligent Health Management Application

This BS Project report is submitted to the Department of Computer Science as partial fulfillment of Bachelor of Science in Computer/Data Science degree

by

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Dedication

This project is dedicated to all individuals who need reliable and accessible health care solutions. We aim to empower users with innovative tools to manage their health effectively. By integrating AI-powered features, we strive to offer accurate symptom checking and diagnosis. Our app also includes comprehensive medication management to ensure proper adherence to treatment plans. Ultimately, our goal is to provide timely and accurate information, improving overall well-being and quality of life.

Acknowledgement

We would like to express our sincere gratitude to our supervisor, Mr. Mukarram Siddiqui, for his invaluable guidance and support throughout this project. We are equally indebted to the Institute of Business Administration (IBA) Karachi for proving the necessary support, infrastructural and academic in creation of the research culture.

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Abstract

Sehat Rasta is a cutting-edge health management app designed to enhance users' well-being through a range of features. Its AI-driven symptom analysis and diagnosis provide personalized health assessments and action recommendations. The app securely stores medical records, lab results, and imaging reports.

Emergency assistance features include one-tap emergency contact calling. Mental health support is offered through mood tracking and access to licensed therapists. The app also includes a medication interaction checker for potential drug interactions.

Sehat Rasta promotes an active lifestyle with fitness goals and calorie tracking. For expectant parents, it provides a pregnancy tracker and baby development information, making Sehat Rasta a comprehensive solution for health management.

Keywords:

Health Management, AI, Symptom Checker, Medication Management, Emergency Assistance, Mental Health Support.

1. Introduction

In today's fast-paced world, managing health and well-being can be challenging. The need for accessible, reliable, and comprehensive health management solutions is more pressing than ever. Sehat Rasta addresses this need by offering a cutting-edge health management app designed to enhance users' overall well-being through a range of advanced features.

Sehat Rasta incorporates Artificial Intelligence to offer the user a health check and advice on what should be done. It employs an AI to analyze the symptoms and diagnose the condition of the user to provide him or her with the correct and timely information. The app also makes it a point to safeguard all medical, lab, and imaging information in a digital form so that users can easily locate, access and share their health records.

In emergency situations, Sehat Rasta's one-tap emergency contact calling feature ensures that help is just a tap away. The app also prioritizes mental health by offering mood tracking and access to licensed therapists, providing users with comprehensive mental health support.

In addition, it has a drug interaction checker to assist the users in avoiding complications that may arise from combining some drugs, a drug reminder to help the patient adhere to the recommended dosage and schedule, and a drug database for easy drug information search. It encourages the user to engage in physical activities, set goals for fitness, and track the calorie intake, ensuring that the user leads a healthy lifestyle.

For expectant parents, Sehat Rasta offers a pregnancy tracker and baby development information, making it a valuable resource throughout the journey of parenthood. By integrating these diverse features, Sehat Rasta emerges as a comprehensive solution for health management, catering to the varied needs of its users and empowering them to take control of their health and well-being.

1.1 Background and Motivation

In the current era, advancements in technology have significantly transformed various aspects of our lives, including health care. Traditional health care systems often face challenges such as delayed diagnoses, fragmented medical records, and a lack of personalized care, which can lead to inefficient health management and suboptimal health outcomes.

The integration of artificial intelligence (AI) into health management systems offers promising solutions to these challenges. AI can analyze vast amounts of data, identify patterns, and provide actionable insights, enhancing the accuracy and effectiveness of health care delivery. Recognizing the potential of AI to revolutionize health care, we were motivated to develop Sehat Rasta, a comprehensive health management app.

Sehat Rasta aims to address common health care challenges by leveraging AI and advanced technologies to provide timely and accurate health assessments, secure data management, and holistic support for both physical and mental well-being. Our goal is to empower users with the tools they need to take control of their health, improve their quality of life, and ensure accessible, reliable, and efficient health care solutions for all [1].

2. Project Vision

2.1 Problem Statement

One of the primary concerns in modern healthcare is the inadequate provision of individualized guidance, non-compliance with medication regimens, and restricted availability of healthcare information. Our proposed solution, Sehat Rasta, intends to tackle these concerns by offering a comprehensive healthcare mobile application that accommodates the varied requirements of its users. For symptom analysis, medication management, emergency assistance, mental health support, and more, the application employs AI-powered tools. By providing healthcare professionals with streamlined access to patient records, it seeks to empower users to effectively manage their health and enhance the quality of care provided.

2.2 Business Opportunity

The integration of Sehat Rasta into hospital systems presents a significant business opportunity with multiple monetization strategies. As the world is shifting towards the application of digital health solutions, the given app shall be a valuable addition for hospitals and healthcare facilities. Besides, with the help of Sehat Rasta, hospitals can improve the quality of the patient care by providing timely access to patient history and data, analyzing the symptoms with the help of Artificial Intelligence and telemonitoring the patients. This not only enhances efficiency but also leads to a better patient outcome[2].

In addition, Sehat Rasta can also increase efficiency in terms of cost by decreasing the amount of paperwork and the need for direct client contact. This way, hospitals can benefit from our app to provide telemedicine services and help make healthcare more convenient for patients and accessible to those who are in remote areas. The fact that the app has the capacity of managing and storing patient information also helps in ensuring that the application of the various laws and regulations is complied with thus providing an added assurance of the validity of the app.

Besides hospitals, Sehat Rasta also provides openings for affiliations with insurance companies, pharmaceutical establishments, and corporate health programs. These collaborations can increase user engagement and create income streams for Sehat Rasta, which makes it an indispensable resource in today’s health care industry[3].

2.3 Objectives

The primary objectives of Sehat Rasta are to provide users with a comprehensive and reliable health management tool that empowers them to take control of their well-being. The specific objectives of the app include:

1. **Personalized Health Assessments:**
    - Utilize AI-driven symptom analysis and diagnosis to deliver accurate and personalized health assessments and action recommendations.
2. **Secure Health Data Management:**
    - Ensure the secure storage of medical records, lab results, and imaging reports, providing users with easy access to their health information while maintaining data privacy and security.
3. **Emergency Assistance:**
    - Offer one-tap emergency contact calling to provide quick and efficient assistance during medical emergencies.
4. **Mental Health Support:**
    - Integrate mood tracking and access to licensed therapists to support users' mental health and well-being, offering comprehensive mental health resources.
5. **Medication Safety:**
    - Implement a medication interaction checker to help users avoid potential drug interactions, ensuring safe and effective medication management.
6. **Medication Reminders:**
    - Provide a medication reminders feature to ensure users never miss a dose, promoting consistent and effective treatment adherence.
7. **Promoting Active Lifestyles:**
    - Encourage users to adopt healthy lifestyles by setting fitness goals, tracking calorie intake, and providing motivational tools to maintain physical health.
8. **Support for Expectant Parents:**
    - Provide a pregnancy tracker and baby development information to assist expectant parents throughout the stages of pregnancy and early parenthood.
9. **Comprehensive Health Management:**
    - Create an all-in-one health management solution that addresses various aspects of health, from physical and mental well-being to emergency assistance and parental support.

By achieving these objectives, Sehat Rasta aims to enhance the overall quality of life for its users, making health management accessible, efficient, and effective.

2.4 Constraints

The development of Sehat Rasta faces several constraints, including stringent data security and privacy requirements like HIPAA and GDPR compliance, which increase complexity and cost. Integration with diverse healthcare systems poses interoperability challenges. Financial constraints include significant development and ongoing operational costs. Regulatory compliance across various regions can delay the app's launch. The competitive digital health market requires differentiation and effective monetization strategies. Achieving widespread user adoption, especially among less tech-savvy individuals, is challenging. Additionally, resource availability and tight project timelines can impact the quality and thoroughness of development and testing.

2.5 Stakeholders Description

The successful development and deployment of Sehat Rasta involve a diverse range of stakeholders, each playing a critical role in the project. Understanding their needs, interests, and influence is essential for effective project management and ensuring the app meets its objectives.

1. **Patients**: The primary users of Sehat Rasta, patients benefit from personalized health assessments, secure medical record storage, and access to telehealth services. Their feedback and adoption are crucial for the app's success.
2. **Healthcare Providers**: Doctors, nurses, and other medical professionals use Sehat Rasta to access patient records, provide remote consultations, and monitor patient health trends. Their input helps ensure the app meets clinical needs and enhances patient care.
3. **Hospitals and Clinics**: These institutions integrate Sehat Rasta into their existing systems to streamline operations, improve patient management, and offer enhanced healthcare services. Their support and collaboration are vital for large-scale adoption.
4. **Developers and IT Professionals**: Responsible for building and maintaining the app, developers ensure it is secure, scalable, and user-friendly. IT professionals manage integrations with healthcare systems and handle technical issues.
5. **Regulatory Bodies**: Government and healthcare regulatory agencies ensure Sehat Rasta complies with legal standards for data protection, patient confidentiality, and medical practice. Their approval is essential for the app's legitimacy and operation.
6. **Investors and Financial Backers**: Providing the necessary funding for development, marketing, and operations, investors are interested in the app’s financial viability and return on investment. Their support enables the project to progress and scale.
7. **Insurance Companies**: These stakeholders can integrate Sehat Rasta into health plans, providing policyholders with enhanced healthcare management tools. Their participation can broaden the app's reach and add value to their services.

8. **Pharmaceutical Companies**: Interested in partnerships for medication management and drug interaction features, pharmaceutical companies can sponsor features or access data insights, providing additional revenue streams.
9. **Corporate Wellness Programs**: Employers can integrate Sehat Rasta into their wellness initiatives, promoting health among employees and potentially reducing healthcare costs. Their involvement can drive adoption in the corporate sector.
10. **Academic and Research Institutions**: These entities can use Sehat Rasta for health research and studies, contributing to advancements in medical science and technology. Their collaboration can enhance the app's credibility and utility.

By engaging these stakeholders effectively, Sehat Rasta can address diverse needs, ensure broad adoption, and achieve its mission of improving healthcare accessibility and outcomes.

3. Software Requirements Specifications

3.1 List of Functional Requirements

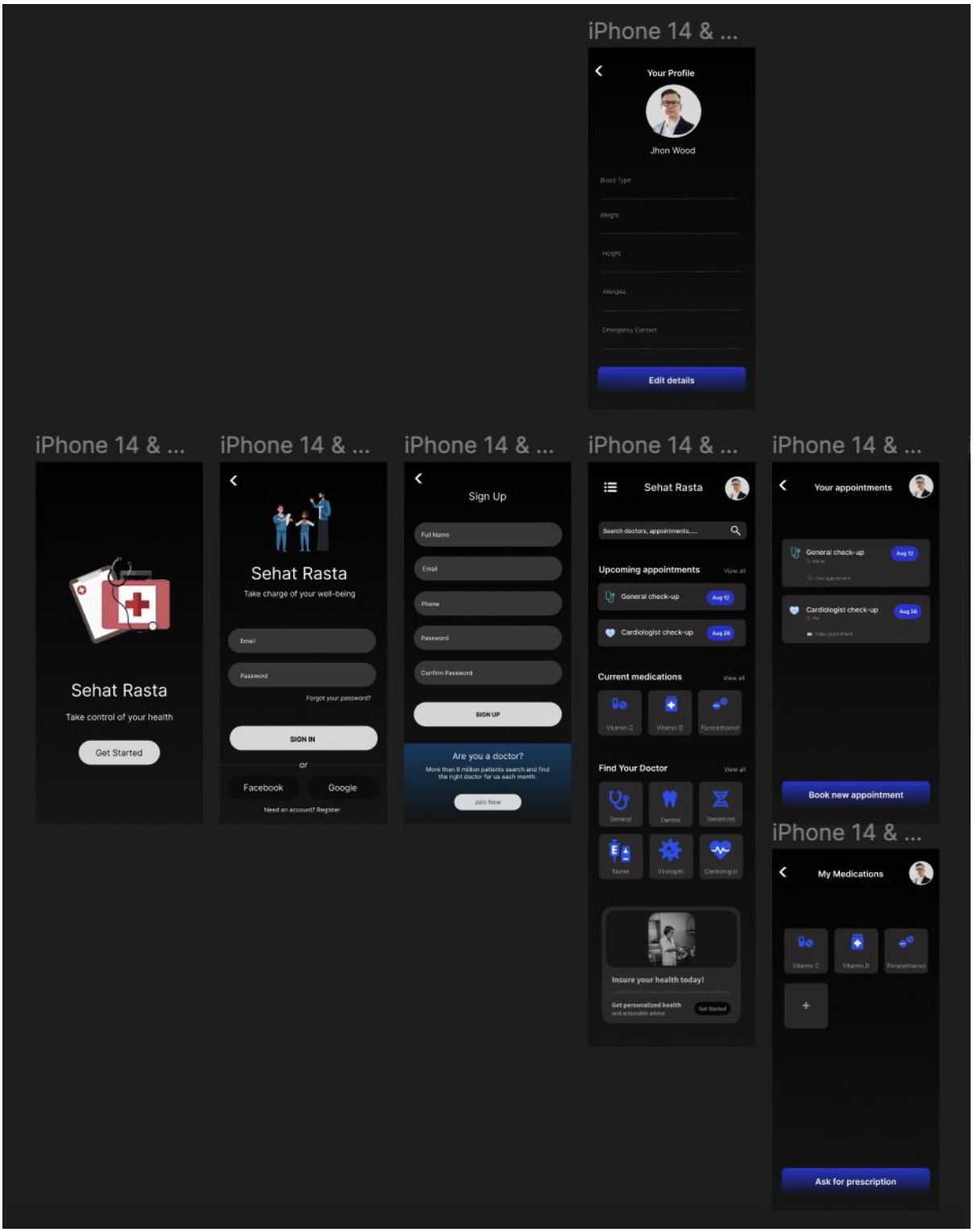
Requirement ID	Requirement Description
FR-01	AI-powered Symptom Checker achieving 90% accuracy in identifying health conditions.
FR-02	Medication Management with reminders, achieving a user adherence rate of 95% or higher.
FR-03	Emergency Assistance with one-tap calling and location sharing, response time less than 10 seconds.
FR-04	Health Tips and Articles delivery with a user engagement rate of at least 70%.
FR-05	Mental Health Support with mood tracking, mindfulness exercises, and access to counselors within 24 hours.
FR-06	Medication Interaction Checker ensuring real-time safety exceeding 95% accuracy.
FR-07	Health Reminders and Alerts customizable with a user satisfaction rate of 90%.
FR-08	Fitness Challenges engaging at least 50% of app users within the first three months.
FR-09	Pregnancy Tracker with 95% accuracy in due date calculation.

FR-10	AI-driven Health Insights providing trends and analysis after six months, with 80% predictive accuracy.

3.2 List of Non-Functional Requirements

Requirement ID	**Requirement Description**
NFR-01	Security: Implement robust encryption for medical records, adhering to industry standards.
NFR-02	Performance: Achieve response times of less than 10 seconds for emergency assistance features.
NFR-03	Availability: Ensure 99.9% uptime for the mobile app.
NFR-04	Usability: Maintain a user satisfaction rate of at least 80% for the app interface.
NFR-05	Scalability: Design the system to accommodate a user base growth of 20% per year.

3.3 User Interface Requirements



3.4 Stake Holders

- **Users/Patients:** They are the primary stakeholders, utilizing the app for symptom analysis, medication management, health record storage, emergency assistance, mental health support, medication interaction checking, health reminders, and fitness challenges to manage their health effectively.

- **Doctors/Medical Professionals**: They engage with the app to provide guidance, recommendations, and diagnoses based on the symptom analysis, review patient records, offer telemedicine consultations, and collaborate with patients for better health outcomes. They act as advisors and contributors to the app's functionality, ensuring its alignment with clinical standards and practices.

- **Healthcare Providers:** They engage with the app to access patient health records, review symptom analysis, medication adherence, and interact with patients for better care coordination and decision making.

- **Developers/Technologists:** Responsible for the creation, maintenance, and enhancement of the app, ensuring its functionality, usability, and integration of cutting-edge AI technology for accurate health assessments.

- **Regulatory Authorities:** They oversee the compliance of the app with healthcare regulations and standards, ensuring data security, privacy, and ethical use of AI in healthcare.

- **Health Insurance Companies:** They might have an interest in promoting the app to their clients to encourage healthy habits, monitor adherence to medications, and potentially reduce healthcare costs through preventive care.

- **Pharmaceutical Companies:** They could engage in partnerships or sponsorships for medication related features, such as drug interaction checking, and utilize the app to inform users about their products.

- **Investors/Financial Backers:** Provide funding and support for the app's development, marketing, and scalability, expecting returns on investment through user engagement, subscriptions, or partnerships.

3.4 Actors and Goals

- **Doctors/Clinicians:** Utilize the app for remote consultations, access patient health records for accurate diagnosis and treatment planning, ensure medication adherence, and facilitate better patient engagement for improved healthcare outcomes.

- **Patients with Chronic Conditions:** Manage their symptoms effectively, track medication adherence, and receive timely reminders for appointments and refills to maintain a higher quality of life while minimizing health complications.

- **Fitness Enthusiasts:** Set and achieve fitness milestones, participate in challenges, and track progress towards personal health and wellness goals for a more active and healthier lifestyle.

- **Therapists/Counselors:** Engage with patients seeking mental health support, provide guidance through the app's mindfulness exercises, and conduct virtual therapy sessions for emotional wellbeing and support.

3.6 Use Cases

1) Symptom Analysis and Diagnosis

Description: Users input symptoms for AI-driven personalized health assessments and recommendations.
Precondition: User has access to the internet and the app installed.
Postcondition: User receives a personalized health report.
Steps:

- User logs into the app.
- Enters symptoms via text or voice input.
- AI processes data and generates health recommendations.

2) Medication Management

Description: App assists in adhering to medication schedules and provides alerts for drug interactions and renewals.
Precondition: User has medications added to the app.
Postcondition: User takes medications as prescribed without missed doses.
Steps:

- User adds medications and schedules.
- Receives reminders for medication intake.
- Receives alerts for drug interactions or prescription renewals.

3) Health Records Centralization

Description: Users store medical records in a secure, centralized location for easy access and sharing with healthcare providers.
Precondition: User has medical records in digital format.
Postcondition: User's medical history is readily available for sharing.
Steps:

- User uploads medical records, lab results, and imaging reports.
- Accesses and shares records with healthcare providers when needed.

4) Emergency Assistance

Description: Allows quick access to emergency services, location sharing, and step-by-step First Aid guides during critical situations.
Precondition: User enables location and emergency contacts.

Postcondition: Emergency services are alerted, and user receives aid.
Steps:

- User taps the emergency contact button.
- Shares location with emergency services.
- Accesses First Aid guides if needed.

5) Medication Interaction Checker

Description: Alerts users about potential drug interactions for informed decision-making.
Precondition: User inputs medications.
Postcondition: User is aware of potential drug interactions.
Steps:

- User adds medications to the app.
- Receives real-time alerts about possible interactions.

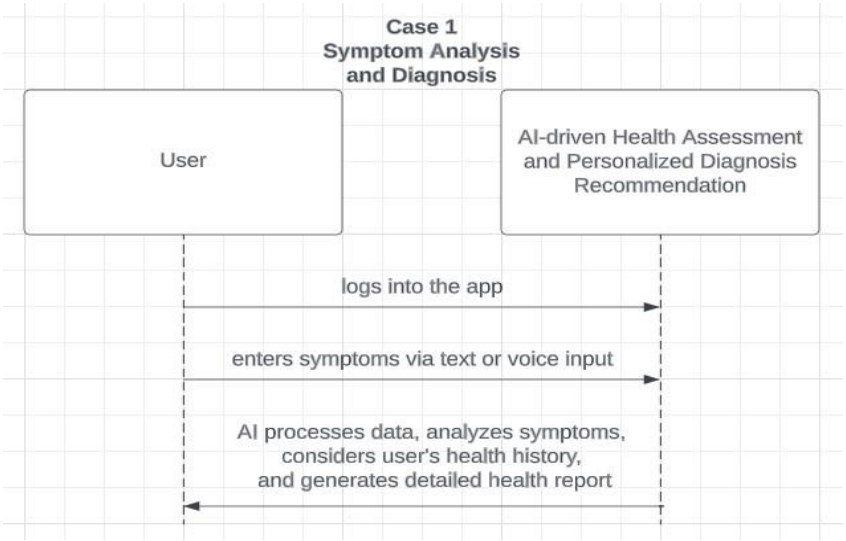
6) Health Reminders and Alerts

Description: Provides customizable reminders for vaccine schedules and health-related events.
Precondition: User sets preferences for health notifications.
Postcondition: User is reminded of health-related events.
Steps:

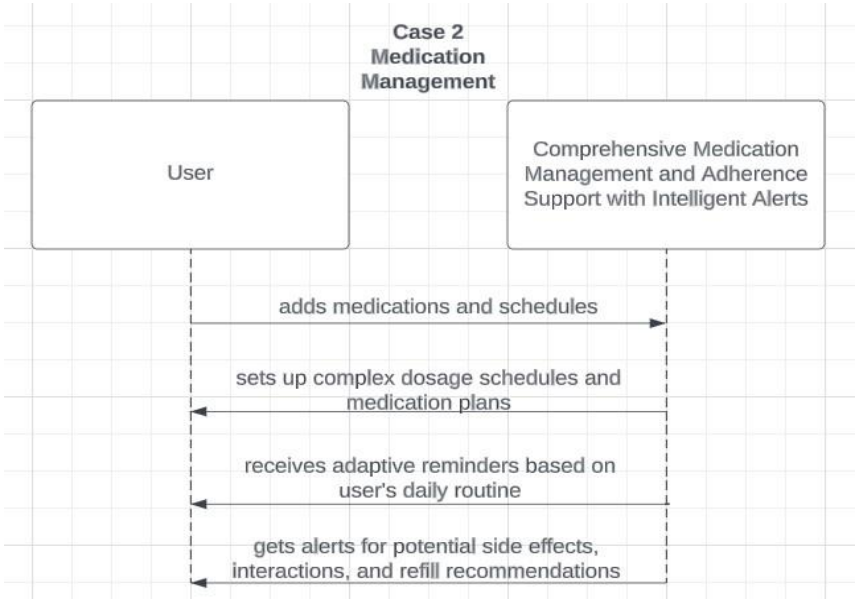
- User sets up custom reminders for vaccines or events.
- Receives timely notifications based on set preferences.

3.7 User Interface Specification

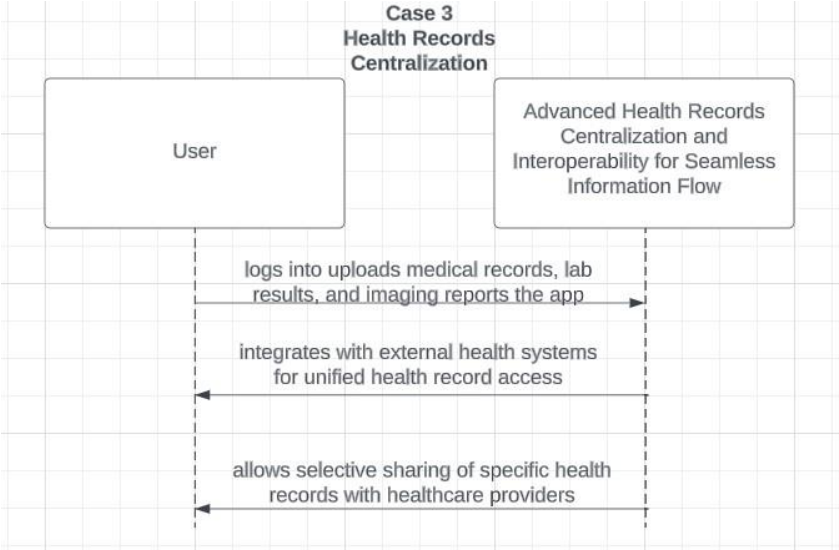
Users log into the app, input symptoms via text or voice, and receive AI-driven personalized health assessments and recommendations.



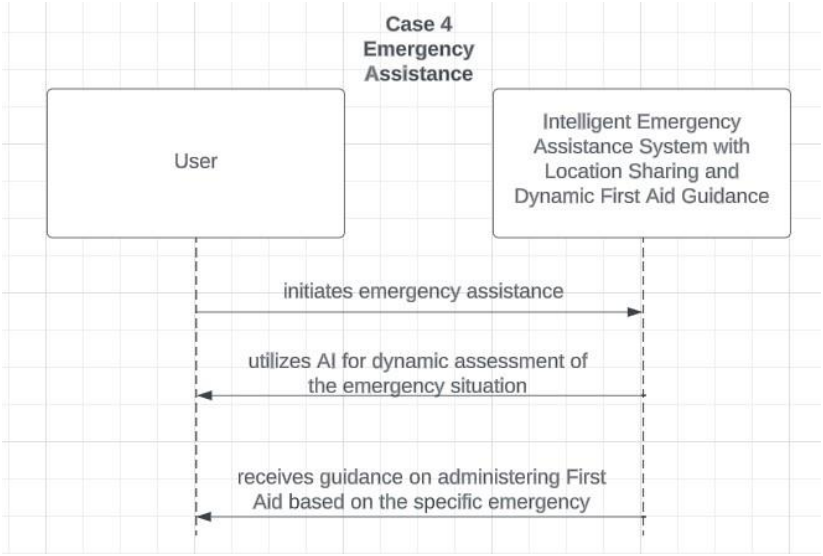
The app assists users in managing medications by providing scheduling, reminders, and alerts for interactions or renewals, ensuring adherence to prescribed regimens.



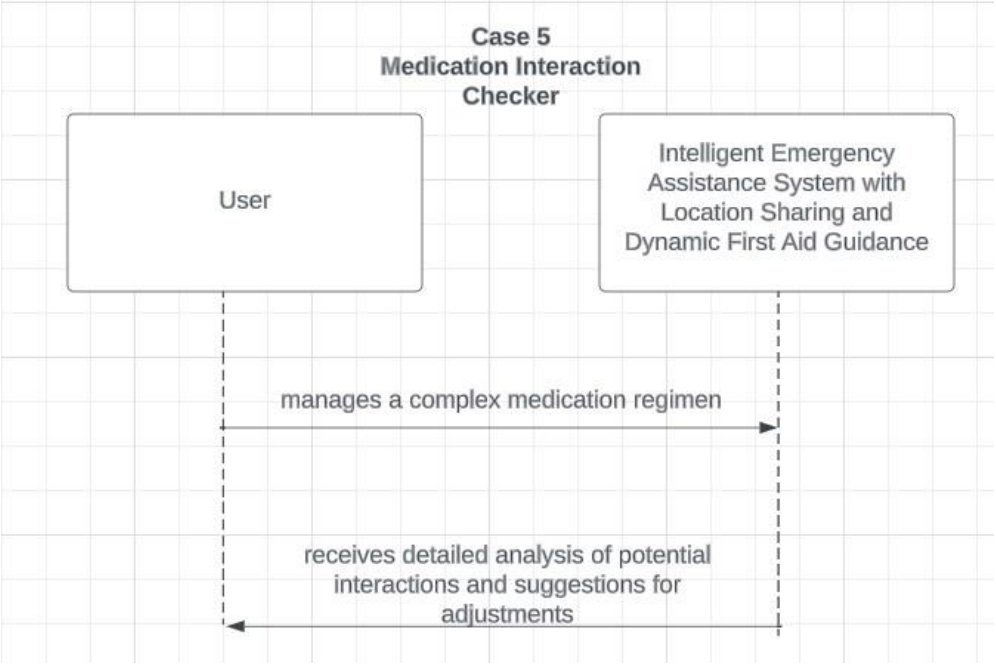
Users securely upload and store medical records, lab results, and imaging reports in a centralized location, facilitating easy access and sharing with healthcare providers.



The app enables quick access to emergency services, location sharing, and provides step-by-step First Aid guides during critical situations, ensuring timely aid and support.



Users input medications into the app, which alerts them in real-time about potential drug interactions, empowering informed decision-making.



3.8 Domain Analysis

Sehat Rasta aims to address key challenges in healthcare, primarily personalized healthcare guidance, medication adherence, and accessible health information. The application uses AI to assist with symptom analysis, medication management, emergency response, mental health support, and health education.

Building on this, Sehat Rasta will be meticulously designed to cater to the specific needs of its two primary user groups: patients seeking reliable health information and management tools, and healthcare professionals requiring efficient and accurate patient data analysis. The core functionalities of the app reflect these user centric priorities, ensuring that Sehat Rasta serves as an essential tool in both personal health management and professional healthcare delivery.

1. User Needs

Patients and healthcare professionals are at the heart of Sehat Rasta's design philosophy. The app will be crafted to meet their distinct yet interconnected needs in the healthcare journey. a. Key Functionalities:

AI-powered Symptom Analysis (FR-01): Enables patients to receive instant, reliable insights into their health conditions, aiding in early detection and prompt medical attention.

Medication Management with Reminders (FR-02): Assists patients in adhering to their medication schedules, thereby improving treatment outcomes and reducing the risk of medication errors.

Quick Access to Emergency Services (FR-03): Provides a lifeline for users in critical health situations, ensuring that help is just a tap away.

Mental Health Support Features (FR-05): Addresses the growing need for accessible mental health resources, offering tools for emotional well-being and support.

2. Data Handling

As Sehat Rasta facilitates crucial health-related functionalities, it becomes imperative to focus on the responsible handling of sensitive health data. This next section outlines how Sehat Rasta manages user data, prioritizing security and privacy to maintain trust and compliance.

a. Types of Data:

Sehat Rasta deals with critical data, including health records, medication details, and emergency contacts, all of which are integral to providing personalized healthcare services.

b. Privacy and Security:

Upholding user trust, Sehat Rasta employs stringent data protection measures (aligned with NFR-01), ensuring all personal health information is securely stored and handled.

3. Technical Needs

The backbone of Sehat Rasta's effectiveness lies in its technical robustness. Optimized for mobile devices, Sehat Rasta is built to deliver quick and reliable services (NFR-02) with a user-friendly interface (NFR-04), ensuring accessibility and ease of use.

4. Future Scope

Looking ahead, Sehat Rasta is not just about meeting today's needs but also about evolving with the advancing healthcare landscape. Which is why we are keeping scalability and technology adaption into account as well.

a. Scalability

Prepared for future expansion, Sehat Rasta is designed to scale up and accommodate a growing user base (NFR-05), ensuring that it continues to meet evolving user demands.

b. Technology Adaption

Sehat Rasta will continually integrate new AI advancements, staying at the forefront of healthcare technology innovations.

5. Connecting with the Requirements

a. Functional Requirements (FR-01 to FR-10)

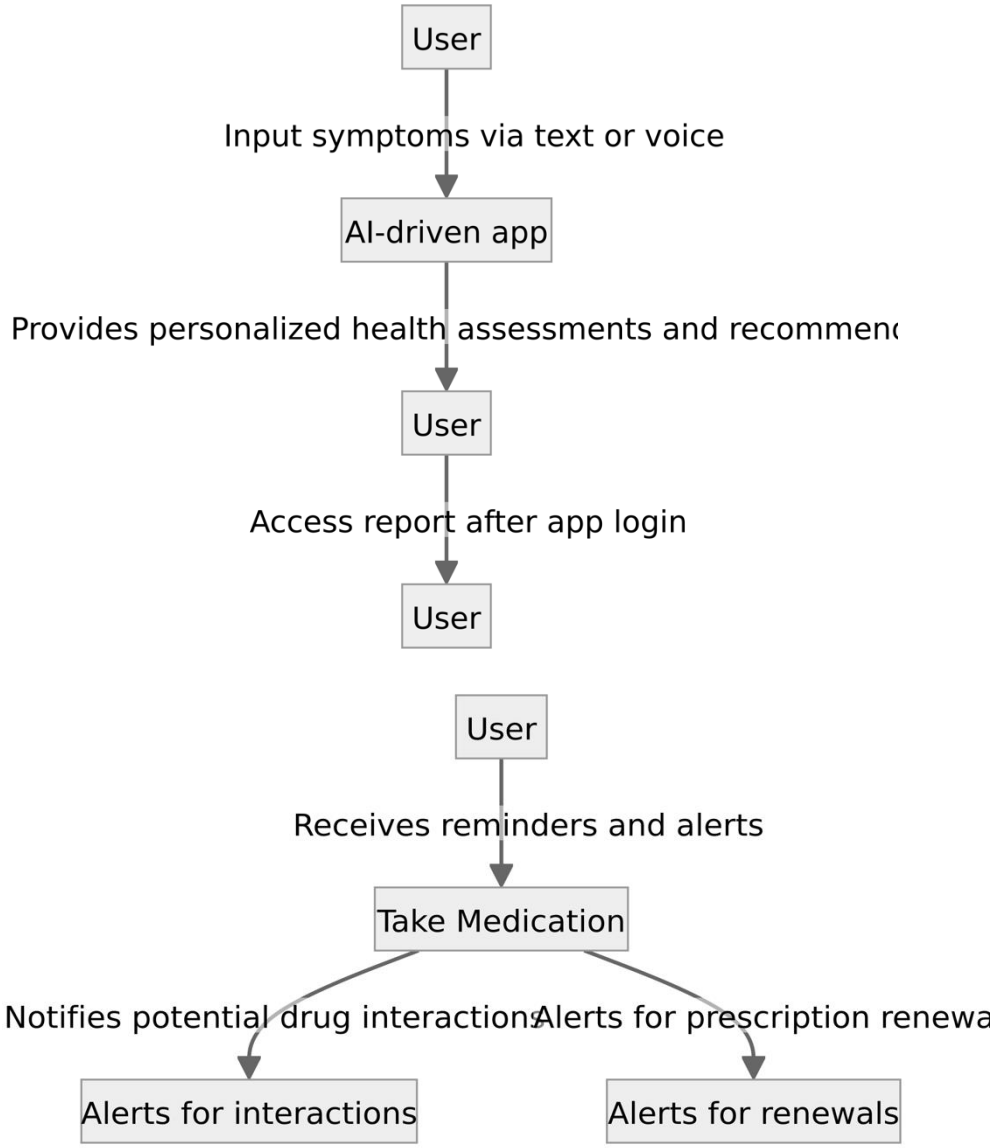
Each feature of Sehat Rasta, from symptom analysis to health insights, is a direct response to these identified requirements, ensuring that the app delivers on its promise of comprehensive healthcare assistance.

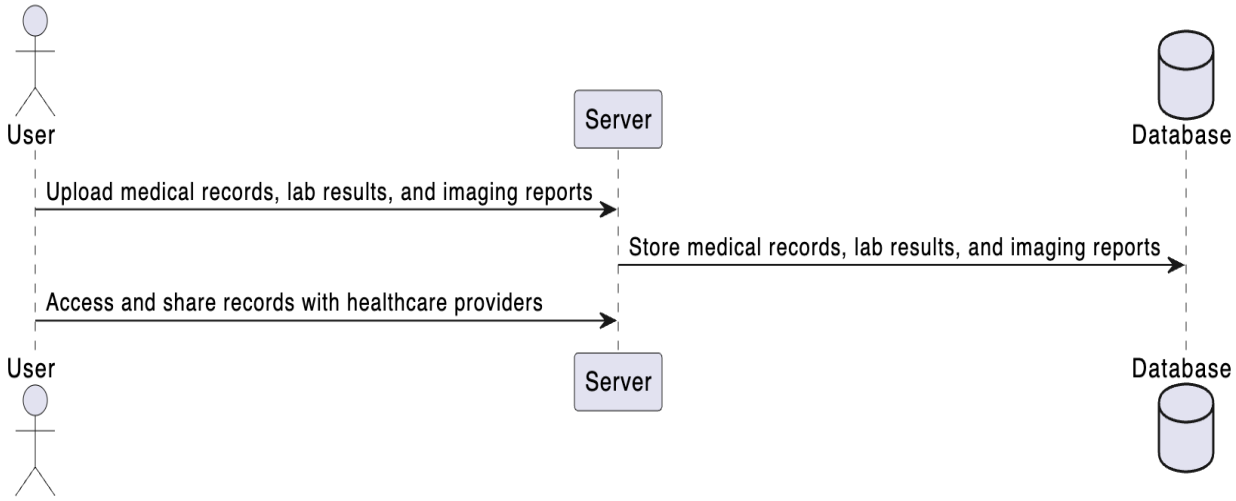
b. Non-functional Requirements (NFR-01 to NFR-05)

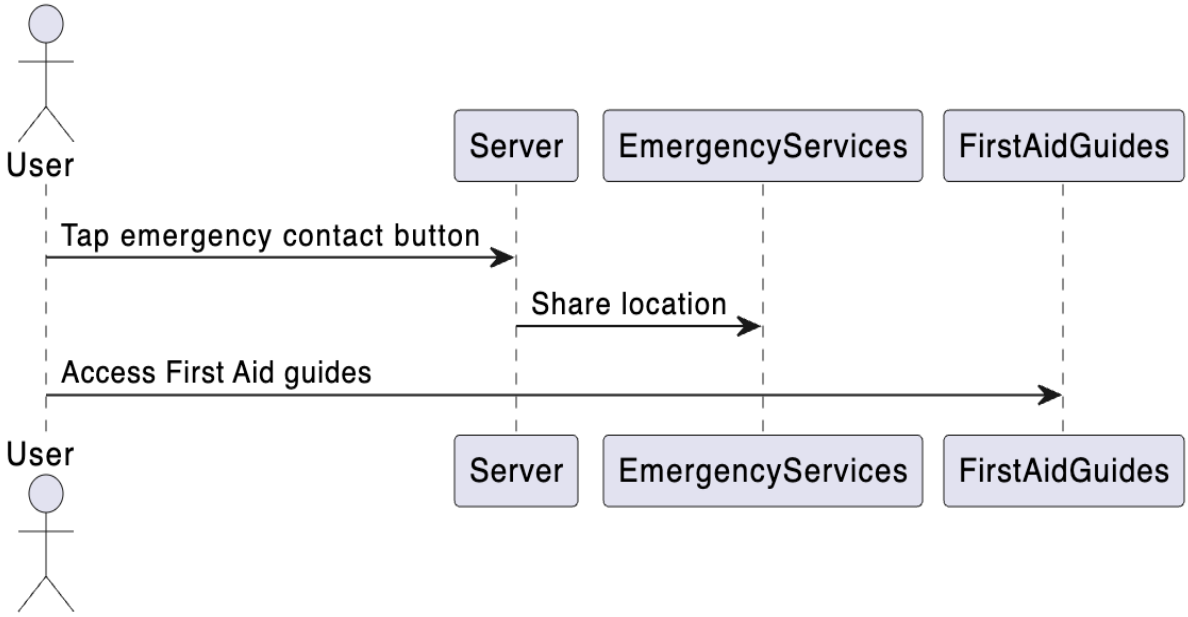
These requirements form the foundation of Sehat Rasta's operational excellence, emphasizing security, performance, and user satisfaction.

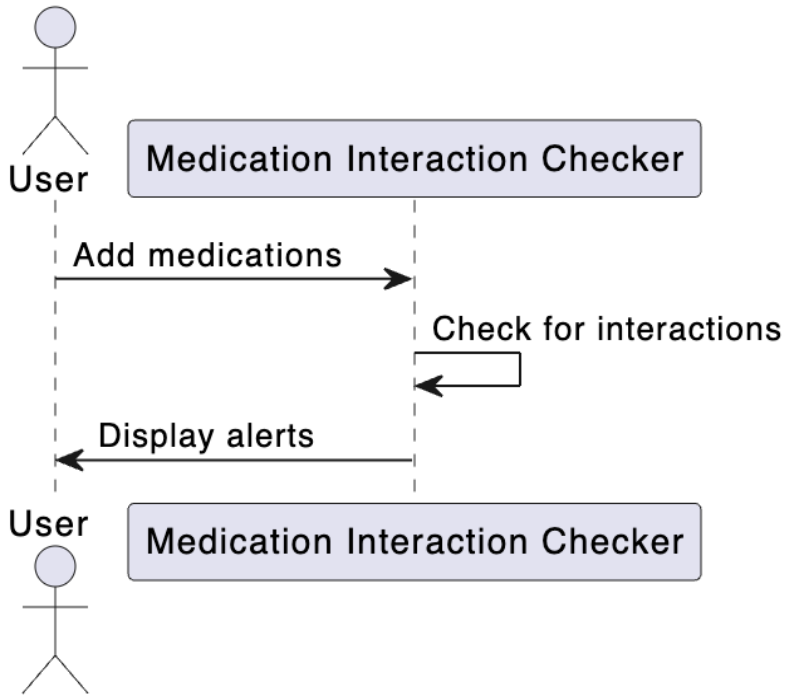
4. Software Design

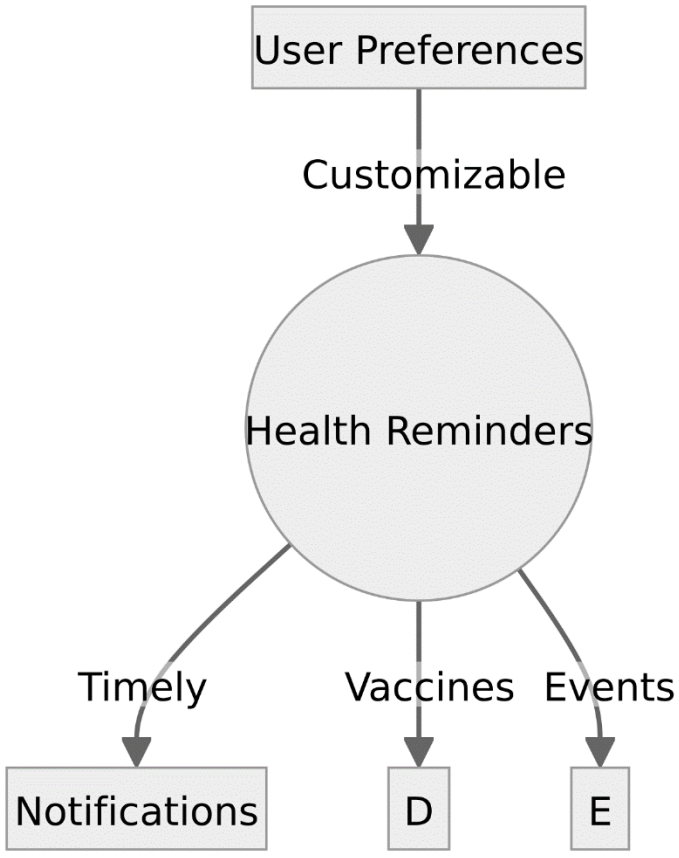
4.1 Interaction Diagrams



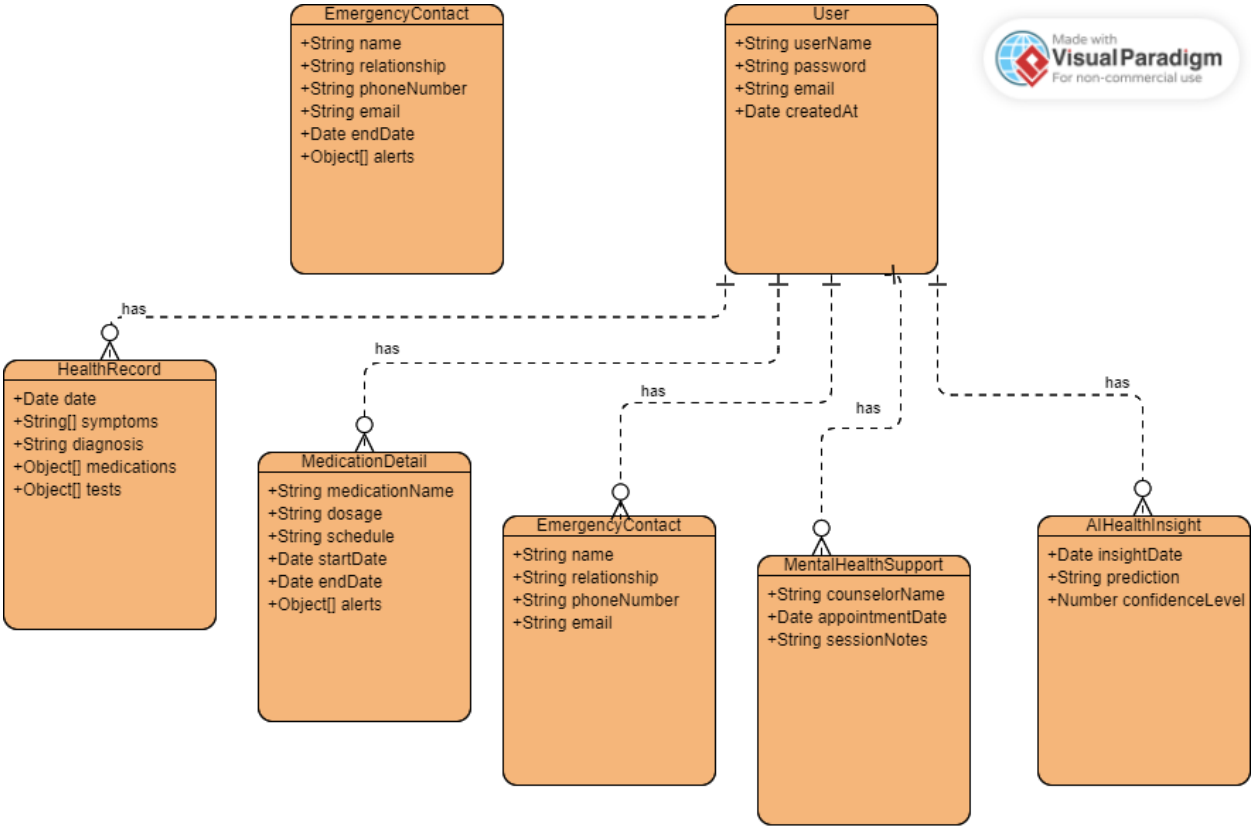

User
Server
Database
Upload medical records, lab results, and imaging reports
Store medical records, lab results, and imaging reports
Access and share records with healthcare providers
User
Server
Database


User
Server
EmergencyServices
FirstAidGuides
Tap emergency contact button
Share location
Access First Aid guides
User
Server
EmergencyServices
FirstAidGuides


User
Medication Interaction Checker
Add medications
Check for interactions
Display alerts
User
Medication Interaction Checker


User Preferences
Customizable
Health Reminders
Timely
Vaccines
Events
Notifications
D
E

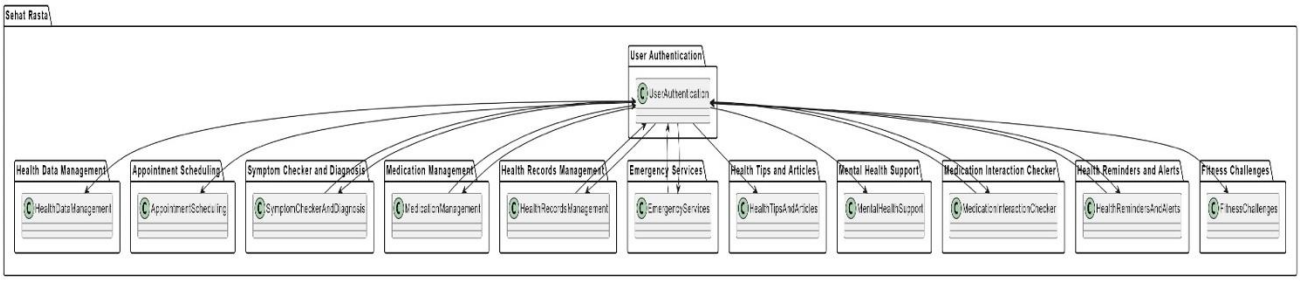
4.2 Class Diagram



4.3 Architectural Style

The chosen architectural style for Sehat Rasta is a Client-Server Architecture. The client side will be implemented using React Native for both iOS and Android platforms, while the server side will be powered by Node.js. This architecture ensures seamless communication between the mobile app and the backend.

4.4 Identifying Subsystems



4.5 Mapping Subsystems to Hardware

Client Side (Mobile App): React Native on iOS and Android devices.
Server Side (Backend): Node.js on a dedicated server.

4.6 Persistent Data Storage

Database Schema

Collections:

1. Users

- Fields:
- _id (ObjectID): Unique identifier for each user.
- username (String): User's username.
- password (String): Encrypted password for user authentication.
- email (String): User's email address.
- createdAt (Date): Timestamp for user registration.

2. HealthRecords

- _id (ObjectID): Unique identifier for each health record.
- userId (ObjectID): Reference to the user associated with the health record.
- date (Date): Date of the health record entry.
- symptoms (Array of Strings): Symptoms reported by the user.
- diagnosis (String): Diagnosis information.
- medications (Array of Objects): Details of prescribed medications, including name, dosage, and schedule.
- tests (Array of Objects): Information on conducted tests, including type and results.

3. MedicationDetails

- _id (ObjectID): Unique identifier for each medication detail entry.
- userId (ObjectID): Reference to the user associated with the medication detail.
- medicationName (String): Name of the medication.
- dosage (String): Dosage information.
- schedule (String): Medication schedule.
- startDate (Date): Date when the medication started.
- endDate (Date): Date when the medication is supposed to end.
- alerts (Array of Objects): Alerts for medication interactions or renewals.

4. EmergencyContacts

- _id (ObjectID): Unique identifier for each emergency contact.
- userId (ObjectID): Reference to the user associated with the emergency contact.
- name (String): Name of the emergency contact.
- relationship (String): Relationship to the user (e.g., family, friend).
- phoneNumber (String): Emergency contact's phone number.
- email (String): Emergency contact's email address.

5. HealthTips

- _id (ObjectID): Unique identifier for each health tip.
- title (String): Title of the health tip.
- content (String): Detailed content providing health advice.
- category (String): Categorization of the health tip (e.g., nutrition, exercise).

6. MentalHealthSupport

- _id (ObjectID): Unique identifier for each mental health support entry.
- userId (ObjectID): Reference to the user seeking mental health support.
- counselorName (String): Name of the mental health counselor.
- appointmentDate (Date): Scheduled appointment date and time.
- sessionNotes (String): Notes from the counseling session.

7. AIHealthInsights

- _id (ObjectID): Unique identifier for each AI health insight.
- userId (ObjectID): Reference to the user associated with the health insight.
- insightDate (Date): Date when the health insight was generated.
- prediction (String): AI-driven prediction or analysis.
- confidenceLevel (Number): Confidence level associated with the prediction.

8. FitnessChallenges

- _id (ObjectID): Unique identifier for each fitness challenge.
- title (String): Title of the fitness challenge.
- description (String): Description outlining the challenge.
- startDate (Date): Start date of the fitness challenge.
- endDate (Date): End date of the fitness challenge.

participants (Array of ObjectIDs): Participants enrolled in the challenge.

4.7 Network Protocol

HTTP/HTTPS for communication between the mobile app and the server. RESTful APIs will be implemented for data exchange.

4.8 Global Control Flow

1) Execution Orderness: The app follows an event-driven approach, allowing for real-time updates and interactions.

2) Time Dependency: Timers are used for features such as Health Reminders and Fitness Challenges.

3) Concurrency: The system supports multiple threads to handle simultaneous user interactions.

4.9 Hardware/Software Requirements

Mobile App (Client): React Native on iOS 14 and Android 10 or later.
Backend (Server): Firebase
Database: Firebase

5. Algorithms and Data Structures

Algorithms:

1. **Symptom Checker Algorithm:**
    - Utilizes a rule-based system to match reported symptoms with potential health conditions.
    - Incorporates machine learning techniques for continuous improvement based on user interactions.
2. **Medication Interaction Checker Algorithm:**
    - Analyzes medication details using a database of known drug interactions.
    - Alerts users about potential interactions and provides recommendations.
3. **AI-Health Insights Algorithm:**
    - Employs machine learning models to analyze user health data and generate personalized insights.
    - Adapts and improves over time with user feedback and updated medical knowledge.
4. **Emergency Assistance Algorithm:**
    - Utilizes geolocation services to determine the user's location in emergencies.
    - Integrates with emergency services for one-tap calling and location sharing.

Data Structures:

1. **Health Records Storage:**
    - Utilizes a document-based model in MongoDB to store health records efficiently.
    - Arrays for symptoms, medications, and tests within each health record entry.
2. **MedicationDetails Storage:**

- Documents store details about medications, including dosage, schedule, and alerts.
- Utilizes arrays to manage alerts for potential interactions or renewals.

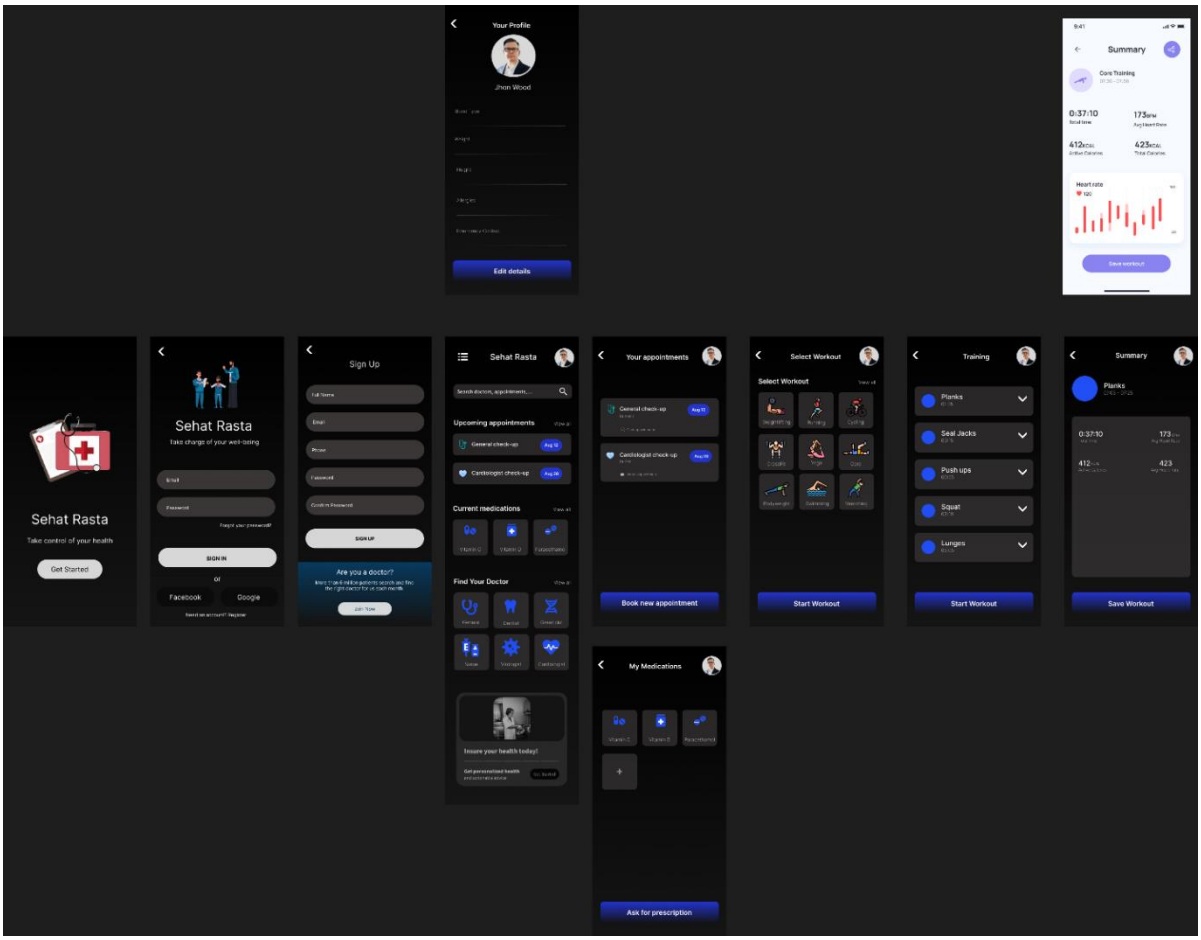
3. **AI-Health Insights Storage:**
    - Stores insights generated by the AI system as documents.
    - Uses structured fields for prediction, confidence level, and relevant user information.
4. **Fitness Challenges Data Structure:**
    - Implements a tree structure to represent hierarchical relationships in fitness challenges.
    - Participants are linked to challenge nodes through ObjectIDs.

6. User Interface Design and Implementation

Sehat Rasta prioritizes a user-friendly interface to enhance ease of use. The initial user interface design includes:

- **Unified Dashboard:** Provides a central hub for accessing various features, such as Symptom Checker, Medication Management, Emergency Assistance, and more.
- **Intuitive Navigation:** Implements a navigation system that follows established mobile app design principles, ensuring users can easily navigate between sections.
- **Personalization:** Allows users to customize their dashboard, emphasizing features relevant to their health needs.
- **Clear CTA (Call to Action):** Utilizes prominent buttons and icons for emergency assistance and important health-related tasks.
- **Responsive Design:** Ensures a consistent and responsive experience across iOS and Android platforms.
- **User Feedback Integration:** Implements feedback mechanisms to gather user input on the app's usability, which is used for iterative improvements.
- **Adaptation to Platform Guidelines:** Adheres to platform-specific design guidelines (iOS Human Interface Guidelines, Android Material Design) for a cohesive and native feel on both platforms.
- **Usability Testing and Iteration:** Conducts usability testing to identify areas for improvement, leading to iterative updates for enhanced user experience.

This user-centric approach ensures that Sehat Rasta not only provides a comprehensive set of health features but also prioritizes an intuitive and accessible user interface for a positive user experience.



Figma Link:
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7. Design of Tests

Test Cases:

TC # 1 – USER LOGIN

Table 1 – user login

TEST UNIT	TEST CASE	RESULT
Log In Button	An invalid username(which is the e-mail id in this case) or password is entered by the user	The system generates a message saying " invalid user id" or invalid password, whichever is the case.
Log In Button	A valid username and password is entered by the user	The system logs on the user and transfers him to the booking page

TC # 2 - USER REGISTRATION

Table 2 - user registration

TEST UNIT	TEST CASE	RESULT
New User button (Used for Register)	Wrong format entered in the input fields of the registration page	The system prompts a message to the user saying that he has entered a wrong format in the input fields.

New User button	Passwords and Confirm Password fields do not match in the registration page	The system generates a message to the user saying “please enter the confirm password field” again.

New User button	Data Fields left out empty in the registration page.	The system prompts a message to the user asking him to fill the empty fields he has left out.
New User button	Correct data entered into the fields in the register page	The system accepts the details of the customer and then logs him onto the system and displays the page where he can search and book for flights,packages and hotels.

TC # 3 – SETTING REMINDERS

Table 3 – setting reminders

TEST UNIT	TEST CASE	RESULT
Check if reminders are set for the correct time and date.	1. User navigates to the medication management section. 2. User selects a medication. 3. User sets a reminder for a specific time and date. 4. Confirm the saved reminder details.	The reminder is correctly set for the specified time and date.
Check if reminders are correctly updated when medication schedules change.	1. User navigates to the medication management section.	The reminder reflects the changes in the medication schedule.

	2. User modifies the schedule of a medication. 3. Confirm that the associated reminder is automatically updated.	
Check if reminders can be easily deactivated and reactivated.	1. User navigates to the medication management section. 2. User selects a medication with an active reminder. 3. User deactivates the reminder and then reactivates it. 4. Confirm the status of the reminder.	The reminder can be successfully deactivated and reactivated without issues.

4– EMERGENCY ASSISTANCE

Table 4 – emergency assistance

TEST UNIT	TEST CASE	RESULT
User taps the emergency contact button without enabling location.	1. User opens the Emergency Assistance feature. 2. User attempts to tap the emergency contact button without enabling location. 3. Observe the system response.	The system should display an error message or provide a prompt indicating that location services need to be enabled.

User taps the emergency contact button with location enabled but without adding emergency contacts.	1. User opens the Emergency Assistance feature. 2. User enables location services. 3. User attempts to tap the emergency contact button without adding emergency contacts. 4. Observe the system response.	The system should display an error message or prompt the user to add emergency contacts.
User successfully taps the emergency contact button and share's location.	1. User opens the Emergency Assistance feature. 2. User enables location services. 3. User taps the emergency contact button. 4. Confirms location sharing.	The system should successfully share the user's location with emergency services, and if configured, notify designated emergency contacts.
User taps the emergency contact button, shares location, and confirms First Aid guides access.	1. User opens the Emergency Assistance feature. 2. User enables location services. 3. User taps the emergency contact button. 4. Confirms location sharing. 5. Accesses and navigates through the provided First Aid guides.	The system should not only share the user's location but also allow seamless access to step-by-step First Aid guides during critical situations.

TC # 5 – HEALTH RECORDS CENTRALIZATION

Table 5 – health records centralization

TEST UNIT	TEST CASE	RESULT
User attempts to upload medical records with an unsupported file format.	1. User navigates to the Health Records Centralization feature. 2. User selects a file with an unsupported format (e.g., a file not in PDF, JPEG, or other supported formats). 3. User attempts to upload the file.	The system should display an error message indicating that the selected file format is not supported.
User successfully uploads medical records, lab results, and imaging reports.	1. User navigates to the Health Records Centralization feature. 2. User selects valid medical records, lab results, and imaging reports in supported formats. 3. User uploads the selected files.	The system should successfully upload and store the medical records, lab results, and imaging reports in the user's health records repository.
User attempts to access and share medical records without uploading any.	1. User navigates to the Health Records Centralization feature. 2. User attempts to access and share records without uploading any files.	The system should display a message indicating that no medical records are available for sharing and prompt the user to upload documents.

User successfully accesses and shares medical records with a healthcare provider.	1. User navigates to the Health Records Centralization feature. 2. User uploads medical records, lab results, and imaging reports. 3. User accesses the records and initiates the sharing process with a healthcare provider.	The system should allow the user to easily access and share the uploaded medical records with a healthcare provider, ensuring a streamlined process for sharing relevant health information.

8. Contributions

Naseer

- UI Development: 60%
- AI Model: 40%
- Medication Reminders

Moosa

- UI Development: 40%
- AI Model: 60%

Agha

- Health Records Centralization
- Medication Interaction Checker

Saad

- Emergency Assistance
- Pregnancy and Parenting Tools

Mubeen

- Mental Health Support
- Fitness and Well-being Goals

Initial Documents

- Proposal, SRS, and SD: Equally divided among all team members.

9. Conclusions and Future Work

Sehat Rasta has demonstrated significant potential as a comprehensive health management application, leveraging AI to provide personalized health assessments and improve healthcare delivery. Through its integration of secure medical record storage, telehealth services, mental health support, and preventive health tools, Sehat Rasta aims to enhance user well-being and streamline healthcare processes. The project has successfully addressed key challenges such as data security, interoperability, and user accessibility, positioning it as a valuable tool for patients, healthcare providers, and institutions.

The next step for Sehat Rasta is to improve the accuracy of AI-based diagnosis and extend AI technologies for forecasting health conditions. We plan to develop telemedicine features, including video consultations and remote monitoring. Future growth will focus on international expansion, considering local regulations and cultures. We will enhance health insights through advanced data analytics and integration with electronic health records. Additionally, user engagement will be improved with educational and wellness features, while mental health support will be expanded through AI-driven assessments and professional collaborations. Tailored assistance for pregnancy and baby development will also be enhanced. Integration with academic and research institutions will maintain the app’s relevance and efficiency.

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