MEDIETHICARE - APPLICATION OF HEALTHCARE DURING MEDICAL EMERGENCIES

Submitted for partial fulfillment of the requirements

for the award of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE ENGINEERING – ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

by

SURA RAMYA	**-**	**20BQ1A4253**
PULAGAM HEMA SRI	**-**	**20BQ1A4244**
KOKKILIGADDA JAYANTH	**-**	**20BQ1A4228**
PALLEPOGU PRIESTLY	**-**	**20BQ1A4241**

Under the guidance of

Mr. S L V V D SARMA, M.Tech

Assistant Professor

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING – ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY

Permanently Affiliated to JNTU Kakinada, Approved by AICTE

Accredited by NAAC with 'A' Grade, ISO 9001:2008 Certified

NAMBUR (V), PEDAKAKANI (M), GUNTUR – 522 508

Tel no: 0863-2118036, url: www.vvitguntur.com

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Nambur, Pedakakani (M), Guntur (Gt) -522508

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING – ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

CERTIFICATE

This is to certify that this **Project Report** is the bonafide work of **Ms. Sura Ramya, Ms. Pulagam Hema Sri , Mr. Kokkiligadda Jayanth , Mr. Pallepogu Priestly** , bearing Reg. No. **20BQ1A4253, 20BQ1A4244, 20BQ1A4228, 20BQ1A4241** respectively who had carried out the project entitled **"MediEthiCare - Application of Healthcare during Medical Emergencies "** under our supervision.

Project Guide	**Head of the Department**
(Mr. S L V V D Sarma, Assistant Professor)	(Dr. K. Suresh Babu, Professor)

Submitted for Viva voce Examination held on _____

Internal Examiner	**External Examiner**

DECLARATION

We, Ms. Sura Ramya, Ms. Pulagam Hema Sri, Mr. Kokkiligadda Jayanth, Mr. Pallepogu Priestly hereby declare that the Project Report entitled **"MediEthiCare - Application of Healthcare during Medical Emergencies"** done by us under the guidance of Mr. S L V V D Sarma, Assistant Professor, Computer Science Engineering – Artificial Intelligence & Machine Learning at Vasireddy Venkatadri Institute of Technology is submitted for partial fulfillment of the requirements for the award of Bachelor of Technology in Computer Science Engineering – Artificial Intelligence & Machine Learning. The results embodied in this report have not been submitted to any other University for the award of any degree.

DATE :

PLACE : Nambur

SIGNATURE OF THE CANDIDATE (S)

Sura Ramya

Pulagam Hema Sri

Kokkiligadda Jayanth

Pallepogu Priestly

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Name (s) of Students

Sura Ramya

Pulagam Hema Sri

Kokkiligadda Jayanth

Pallepogu Priestly

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NOMENCLATURE

NLP	Natural Language Processing
TD-IDF	Term Frequency Inverse Document Frequency
NMF	Non-negative Matrix Factorization
UML	Unified Modelling Language
ER	Entity Relationship
DFD	Data Flow Diagram

ABSTRACT

Accessing urgent and affordable healthcare during medical emergencies remains challenging for many patients. This impedes access to affordable and timely treatment when it is needed most. The proposed application introduces real-time price monitoring, ensuring transparent and competitive pricing for medical services and supplies. It incorporates an emergency resource allocation algorithm that fairly distributes essential medical resources based on objective criteria, preventing hoarding and ensuring equitable access. The application addresses the lack of clarity on bed availability and treatment details by offering a comprehensive guide to various hospitals. This includes precise rates and available medical facilities, empowering citizens to access affordable medical emergency services based on their preferences and the current availability.

In order to make the application more accessible and engaging for users, the application is incorporated with scheduling appointments and procurement medicines through the platform the application streamlines the process and minimizes wait times. Patients can select appointments based on their convenience, empowering, them to take greater control of their healthcare. A robust complaint redressal system allows users to complaint against any price transparency and false practices in hospital. Furthermore, the application employs blockchain technology to safeguard data integrity. Users receive clear alerts regarding any tampering with medicine prices when accessing specific medications. Advanced algorithms are utilized to recommend alternative medicines based on patient descriptions and reasons, empowering patients to make informed healthcare decisions.

Keywords— HealthCare, Procuring Medicines ,Emergencies ,Appointment Booking, Medical Records, Block Chain ,Data Tampering ,Complaint against Price Transparency, Alternative medicines

CHAPTER 1
INTRODUCTION

Delving into the complexities of emergency healthcare often evokes feelings of discomfort and apprehension. At the core of our lives, the healthcare sector bears the potential responsibility for the repercussions stemming from errors in clinical services, which could lead to adverse effects or, in extreme situations, loss of life. Issues like convoluted pricing structures, uneven resource allocation, and the risk of exploitation can leave individuals feeling exposed, especially in the private healthcare sector where profit-driven practices might overshadow patient well-being.

In response to these challenges, this application proposes an innovative approach—an extensive web application dedicated to redefining emergency healthcare by prioritizing transparency, fairness, and user empowerment. At the core of this study is the development of a web-based application tailored to individuals grappling with medical emergencies. A significant focus is placed on ensuring fairness in service pricing, coupled with a unique functionality that allows users to report concerns about hospital pricing transparency. Our platform goes beyond mere procedural enhancements, aiming instead to equip users with the essential tools and understanding needed to navigate the healthcare landscape confidently**.**

Through a user-centric and informed decision-making approach, this initiative aims to shape a future where healthcare transcends its conventional role as a service, evolving into an empowering and supportive experience for users. This platform extends beyond its basic functionality; it signifies a transformation in the way users engage with healthcare, emphasizing the importance of informed choices and fostering a sense of empowerment through each interaction.

1.1 MOTIVATION OF THE PROJECT

The current state of the healthcare system poses formidable obstacles for individuals in need of timely and affordable emergency care. Across various regions, citizens encounter significant difficulties accessing crucial information, such as real-time bed availability across hospitals, transparent medical costs, and standardized details on medical facilities offered. This lack of transparency not only complicates decision-making processes but also leaves individuals vulnerable to exploitation, particularly

during times of crisis. Without access to reliable information, patients and their families often find themselves making uninformed choices, which can exacerbate existing health concerns and lead to unnecessary financial strain.

Moreover, the absence of a structured mechanism for the fair allocation of essential medical resources further compounds the challenges within the current healthcare landscape. In the absence of standardized protocols, there is a risk of hoarding vital supplies and prolonged wait times for critical treatments, ultimately impeding access to timely care. These shortcomings not only result in delays in receiving necessary medical attention but also contribute to increased financial burdens and pose a significant risk to patient well-being. Addressing these systemic deficiencies is imperative to ensure equitable access to emergency healthcare services and enhance the overall quality of patient care.

1.2 PROBLEM STATEMENT

The Covid-19 crisis has brought to light alarming instances of exploitation by private hospitals, which have taken advantage of panic conditions to charge exorbitant fees from patients, leading to unimaginable financial burdens for affected families. In numerous distressing cases, families have not only faced substantial financial losses but have also experienced the tragic loss of their loved ones. Some hospitals have even resorted to demandingclearance of pending bills before releasing the bodies of deceased patients to their grieving families. Moreover, amidst the chaos, there has been a glaring lack of transparency regarding the availability of beds and details of treatment provided, further exacerbating the challenges faced by individuals seeking emergency medical care.

To address this pressing issue and curb the exploitation by hospitals, there is an urgent need forthe development of an application that can effectively regulate these institutions and provide citizens with accurate information regarding rates and medical facilities available across them. Such an application would serve as a vital tool in empowering individuals to make informed decisions about their healthcare, enabling them to access affordable medical emergency servicestailored to their preferences and availability. By ensuring transparency and accountability within

the healthcare system, this application would play a crucial role in safeguarding the well-being of citizens and mitigating the financial hardships imposed by unscrupulous practices during times of crisis.

1.3 OBJECTIVE OF THE PROJECT

The primary objective for the project is to propose and develop a comprehensive web application to streamline and empower user experiences in emergency healthcare situations. Atits core, the application will enable users to conveniently book appointments, procure medications, and access their full medical records through an integrated portal. This aims to promote more proactive health management by placing tools and information at users' fingertips.The existing solution is addressing of appointment booking and medication purchases have streamlined access to crucial services, they often fall short in two critical areas: cost transparency and real time data. The limitations of comparing listed prices with actual costs leave room for discrepancies, potentially impacting user trust and informed decision-making. Additionally, concerns remain regarding the security of sensitive medical records stored withinthese systems

1. Develop a comprehensive web application to streamline user experiences in emergency healthcare situations.
2. Enable convenient booking of appointments, procurement of medications, and access to full medical records through an integrated portal.
3. Address shortcomings of existing solutions, particularly in terms of cost transparency and real-time data availability.
4. Implement features such as medicine price comparison and complaint filing to empower users and hold healthcare providers accountable.
5. Leverage Natural Language Processing for developing an alternative medicine recommendation system to enhance user awareness.
6. Utilize blockchain technology to ensure data integrity, particularly in safeguarding transparency in medicine pricing.
7. Provide clear alerts to users regarding any tampering with medicine prices, enhancing trust and transparency within the system.

1.4 SCOPE OF THE STUDY

The scope of the proposed project is extensive to a groundbreaking digital platform dedicated to streamlining emergency healthcare services for hospitals. Hospitals can register and access a suite of features designed to improve efficiency and user convenience. These features include online appointment booking, streamlined medication procurement, and secureaccess to medical records. This platform aims to enhance accessibility to crucial healthcare services, particularly in time-sensitive emergency situations. Furthermore, administrators will ensure the platform's smooth operation. This includes upholding regulatory compliance, managing hospital registrations, and facilitating user interactions. By leveraging blockchain technology, the platform can guarantee the integrity of medication pricing, fostering transparency and building trust among users. Additionally, the project intends to harness advancements in BERT models, a powerful Natural Language Processing technique. This will enable the platform to deliver accurate and personalized recommendations for alternative medicine, ultimately enhancing user satisfaction and the overall healthcare experience.

While the platform might offer suggestions for alternative medicine, a clear and prominent disclaimer will emphasize the utmost importance of consulting qualified healthcare professionals before undertaking any new treatment options. This underscores the platform's commitment to responsible healthcare practices and minimizes potential risks associated with self-medication. Furthermore, while blockchain technology significantly enhances transparency in medication pricing, it's crucial to acknowledge that it might not entirely eliminate the possibility of manipulation attempts. Therefore, the platform advocates for continued user vigilance. This highlights the project's dedication to fostering a safe and informed healthcare environment. Byacknowledging limitations and implementing safeguards, the platform strives to leverage technology effectively while prioritizing user well-being.

1.5 WORKFLOW OF THE PROJECT

Workflow diagram helps you visualize the process that underlies a larger projects. It also describe the order in which steps must be completed and help to determine specific activities ina structured, easy-to-follow format. These diagrams help you to easily identify and make changes within a process for greater efficiency.

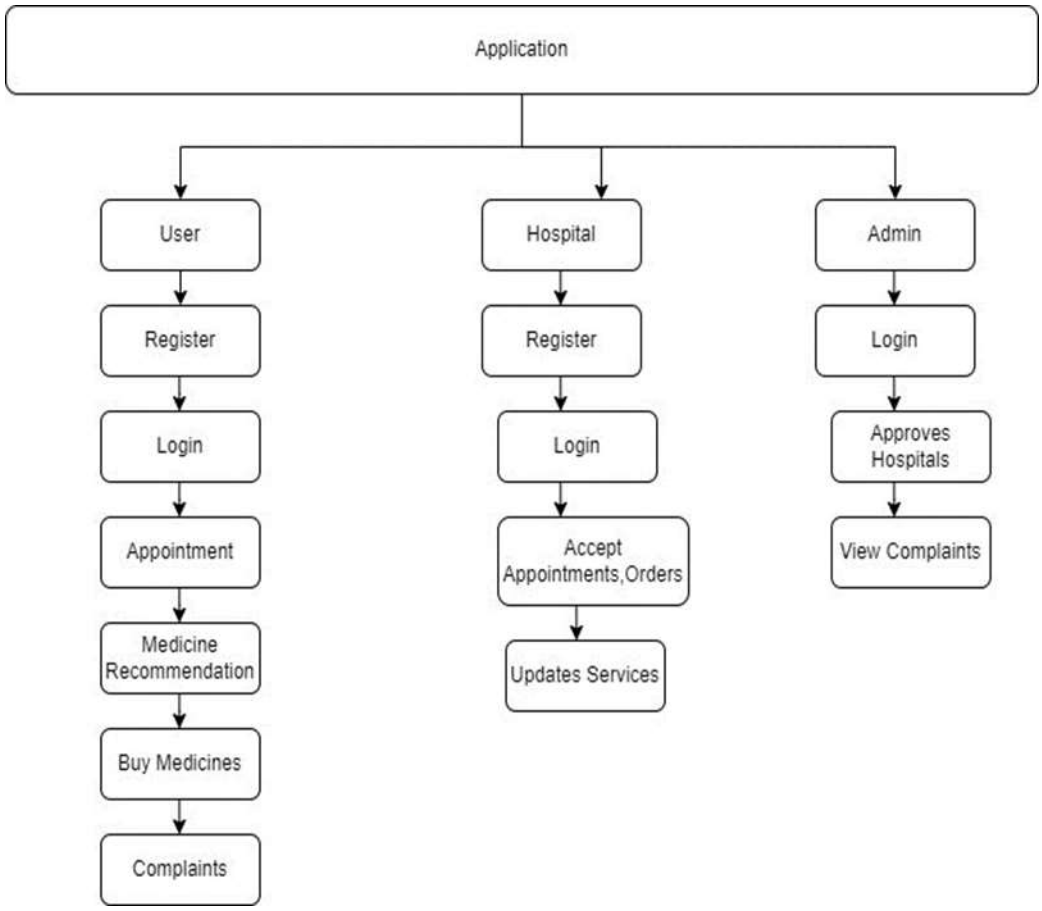

Fig 1.5 Application Work Flow

The workflow of the medical emergency application initiates with users registering their accounts or logging in if they're existing users. Upon logging in, users can access a range of services such as booking appointments with healthcare providers, procuring essential medicines, lodging complaints about service quality or pricing, and reviewing reports related to their medical history or previous transactions.For hospitals, the workflow begins with registration and subsequent login into their respective accounts. Once logged in, hospitals can manage

various aspects of their services, including adding or updating available medical services, managing appointment schedules, overseeing medicine inventory, processing orders, and addressing any complaints lodged by users.

Meanwhile, admins have a distinct set of responsibilities within the application. After logging in, admins can approve registrations from hospitals seeking to join the platform, ensuring they meet predefined criteria for inclusion. Additionally, admins can review and resolve complaints filed by users against hospitals or other parties, contributing to the platform's quality assurance and user satisfaction.

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CHAPTER 2
REVIEW OF LIERATURE

The digitalization of healthcare is rapidly transforming the landscape, with a multitude of platforms emerging to tackle various shortcomings in the existing system. This review embarks on a comprehensive exploration of these distinct areas, meticulously dissecting the potential benefits and inherent challenges associated with each. By delving into these diverse aspects, we aim to shed light on the opportunities and obstacles that lie ahead in the digitalization of healthcare. This analysis will not only serve to inform the ongoing development of these platforms but also provide valuable insights for stakeholders invested in ensuring a future where technology effectively augments and strengthens the healthcare ecosystem.

1 Specific Platforms and Technologies

Electronic Health Records (EHRs): Richard H. Kennedy, MD, and Blackford Middleton, MD, MPH, MSc, have conducted extensive research on the impact of Electronic Health Records (EHRs) **[4]** on healthcare quality and data sharing. Their studies have highlighted the benefits of EHRs in improving care coordination and patient outcomes, while also addressing challenges such as data security and interoperability issues.

Telemedicine and Virtual Care**[2]**: Joshua E. Richardson, PhD, and Karen Rheuban, MD, have explored the benefits of telemedicine in improving access to care, particularly in rural areas. Their research has focused on patient satisfaction with telemedicine services compared to traditional in-person visits**[6]**, as well as the challenges associated with reimbursement policies and ensuring the quality of virtual consultations.

Wearable Devices and Remote Patient Monitoring: Eric J. Topol, MD, and Joseph C. Kvedar, MD, have been influential in studying wearable devices and their role in remote patient monitoring**[3]**. Their work has highlighted the potential of wearables to empower patients to track their health metrics and facilitate remote monitoring by healthcare providers, while also addressing concerns around privacy and data security.

Artificial Intelligence (AI) in Healthcare**[9]**: Andrew L. Beam, PhD, and Suchi Saria, PhD, have conducted research on the application of artificial intelligence (AI) in healthcare, particularly in diagnostics, treatment planning, and drug discovery**[5]**. Their studies have explored the potential of AI to improve clinical decision-making and patient outcomes, while also addressing ethical considerations such as bias and transparency in AI algorithms.

2 Benefits and Challenges of Digitalization

Improved Patient Outcomes: David A. Asch, MD, and Rainu Kaushal, MD, MPH, have researched the impact of digital health interventions on patient outcomes. Their studies have demonstrated how digitalization can lead to earlier diagnoses**[3]**, better treatment adherence, and ultimately, improved patient outcomes, particularly in chronic disease management and preventative care**[1]**.

Data Security and Privacy: Latanya Sweeney, PhD, and Deborah L. McGuinness, PhD, have focused on addressing data security and privacy concerns in digital healthcare**[7] .** Their work has proposed innovative solutions such as blockchain technology and user-controlled data access models to protect sensitive patient information in a digital ecosystem.

Healthcare Disparities: Lisa G. Winston, MD, and Darrell M. West, PhD, have examined how digital health disparities can widen the gap in access to care for underserved communities. Their research has explored ways to bridge the digital divide and ensure equitable access to digital healthcare tools, emphasizing the importance of inclusive digital health solutions.

1. Implementation of a Patient Appointment and Scheduling System

In the current healthcare landscape, efficiency and patient satisfaction are paramount for optimal performance. However, outpatient clinics in many developing countries encounter a multitude of challenges that hinder the delivery of quality care. These challenges include overtime for doctors and nurses during clinic sessions, resulting in exhaustion and decreased effectiveness in patient care. Additionally, long waiting times for patients exacerbate dissatisfaction and contribute to decreased access to timely care**.** Furthermore, counter personneloften face peak workloads, leading to heightened stress levels and potential errors in administrative tasks.

These issues collectively pose a significant threat to the quality of healthcare delivery, necessitating innovative solutions to streamline processes and enhance efficiency.

This paper seeks to address these challenges by developing a web-based appointment system aimed at improving the efficiency and quality of healthcare delivery in outpatient clinics **.** By implementing such a system, clinics can reduce waiting times for patients, optimize the allocation of medical staff resources, and alleviate peak workloads for administrative personnel. Through the automation of appointment scheduling and management, the system aims to enhance clinic operations, minimize overtime for healthcare providers, and ultimately improve patient satisfaction. By focusing on enhancing the efficiency of outpatient clinic operations, this initiative aims to mitigate the strain on healthcare professionals and enhance the overall quality of care delivery.

2. Building a Comprehensive Healthcare Ecosystem

One ambitious proposal envisions a holistic platform incorporating user-centric design for an effortless user experience, seamless integration with existing systems to bridge data gaps, telemedicine functionalities to expand access to specialists especially in remote areas, and robust features for active patient engagement in their healthcare journey. This comprehensive approach empowers patients with informed decision-making through accessible information and personalized care plans, while streamlining communication across the healthcare ecosystem. However, ensuring equitable access for underserved communities lacking resources or technological infrastructure, and navigating the diverse needs of various stakeholders (patients, providers, policymakers, and developers) remain significant challenges that require a collaborative approach to bridge the gap and foster a truly inclusive healthcare landscape.

3. Medicines Procurement Made Easy

Navigating medication procurement can be a labyrinthine ordeal for patients. Limited access, particularly in remote areas, often leads to inflated costs due to opaque pricing structures. Furthermore, patients frequently grapple with a lack of clear information regarding medication details, potential side effects, and interactions with other drugs.

A proposed project aims to dismantle these barriers through a digital platform. Patients can conveniently locate pharmacies with the necessary medication and potentially even arrange home delivery in specific locations. Price transparency empowers individuals to compare costsacross vendors, potentially securing more affordable options. Additionally, the platform offersreadily available information on medication details, including their uses, potential side effects, and interactions with other medications**.**

4. Simplifying Appointment Scheduling

A proposed project envisions a secure and centralized electronic health record (EHR) system. This system empowers patients with immediate access to their medical history, allowing for seamless sharing with authorized providers, eliminating the need for physical copies and paper-based systems. Furthermore, healthcare providers gain a holistic view of a patient's medical journey, facilitating informed decision-making and streamlined care coordination across different institutions. Additionally, the system enhances efficiency by reducing administrative burdens associated with physical records and optimizing information retrieval. However, the project's success relies on addressing crucial aspects: ensuring ironclad data security and patient privacy, enabling seamless information exchange through standardized formats, and bridging the digital divide by providing user-friendly interfaces and support mechanisms for those with limited technological skills. By effectively navigating these challenges, this project has the potential to revolutionize healthcare record management, fostering improved accessibility, better care coordination, and increased efficiency within the healthcare landscape.

5. Alternative Medicine Recommendation System

The medicine recommendation system stands as a cutting-edge application of Natural Language Processing (NLP) technology within the healthcare domain. By harnessing cosine similarity metrics, this innovative system analyzes the relationship between a patient's symptoms and the effects of diverse medications, offering a novel avenue for suggesting alternative treatments. Operating on a foundation of extensive medication databases and symptom profiles, the system employs sophisticated vectorization and filtering algorithms to meticulously tailor

recommendations. Through this intricate process, medications with higher cosine similarity scores are prioritized, ensuring that patients receive personalized suggestions closely aligned with their specific medical needs and history.

In contexts where immediate access to healthcare professionals or prescribed medications is constrained, such as during medical emergencies or in remote locations, this recommender system emerges as a crucial lifeline. It empowers both healthcare providers and patients with the knowledge and guidance needed to make informed decisions regarding alternative medications, thereby mitigating the risk of adverse drug reactions and enhancing overall patient outcomes. Furthermore, by streamlining the process of identifying suitable alternatives, the system alleviates the burden on healthcare professionals, allowing them to allocate more time and resources toward delivering personalized care and addressing critical medical needs. Ultimately, the proposed medicine recommendation system represents a significant leap forward in patient-centered healthcare, offering a seamless and efficient approach to optimizing treatment strategies and elevating the quality of care delivery.

6. Securing the Fortress of Patient Data

The project prioritizes this by adhering to stringent regulations like HIPAA and implementing robust security measures. This includes training employees on data handling procedures and enforcing secure communication protocols. This unwavering commitment to data integrity and patient privacy is essential for building trust and ensuring the safe adoption of digital healthcare solutions. However, achieving this balance isn't without hurdles. Resource constraints can limit the implementation of top-tier security measures, while integrating seamlessly with existing healthcare systems necessitates meticulous planning to avoid disruptions and ensure efficient data exchange. Overcoming these challenges is paramount. By prioritizing robust security measures while navigating resource limitations and ensuring smooth integration, this project can foster a secure environment for patients, paving the way for the widespread adoption of digital healthcare solutions without compromising patient privacy.

7. Integrated Hospital Management System

The efficient management of hospital resources, especially during emergencies, relies heavily on accurate tracking of occupancy rates, staffing levels, and the availability of essential resources such as beds, equipment, and medications. The Emergency Data Exchange Language - Hospital Availability Exchange (EDXL-HAVE) standard plays a crucial role in facilitating interoperability and data exchange among different hospital resource management software systems. These systems, which implement the EDXL-HAVE standard, enable real-time monitoring of resource availability, automated calculation of staffing requirements, and seamless communication between departments and healthcare facilities. By providing a common language for exchanging critical information, such as patient census and acuity levels, these software solutions help hospitals optimize resource utilization, improve patient care, and enhance emergency preparedness. Despite challenges such as interoperability issues and data security concerns, the implementation of the EDXL-HAVE standard shows promise in revolutionizing hospital resource management and emergency response capabilities.

CHAPTER 3
PROPOSED SOLUTION

3.1 EXISTING SYSTEM :

The existing system contains hospital and admin logins serve as pillars supporting a wide arrayof healthcare services, marking a significant milestone in modern healthcare management. With tailored features such as customizable appointment scheduling, efficient medication procurement, and seamless billing management, hospitals experience enhanced operational efficiency. The integration of blockchain technology for medication price monitoring instills transparency and fosters trust, bolstering the system's integrity. Furthermore, , the system's online accessibility not only caters to a diverse user base but also catalyzes efficiency in healthcare delivery.

Furthermore, the system's comprehensive catalog of available healthcare services, complete with associated costs, empowers users to make well-informed decisions regarding their healthcare needs, fostering a proactive approach to health management. By providing a centralized platform for healthcare access, the system alleviates the strain on traditional healthcare infrastructure while offering users convenient and dependable services. This streamlined approach enables hospitals to optimize resource allocation and elevate patient careoutcomes, culminating in a more efficient and patient-centric healthcare ecosystem. In sum, theexisting system stands as a testament to the transformative power of healthcare technology, redefining the landscape of healthcare service access and management in the modern era.

3.1.1 DISADVANTAGES

The existing healthcare system, while offering numerous advantages, is not without its drawbacks, which require careful consideration and attention. Several notable disadvantages of the current system can be :

1. **Inaccurate Price Monitoring:** The system may lack the ability to accurately monitor medication prices, potentially resulting in discrepancies and inconsistencies in pricing data.
2. **Data Security Concerns:** Challenges in adequately securing patient data within the existing system may expose sensitive medical information to unauthorized access or cyber threats, compromising patient privacy.
3. **Limited finding in Alternative Medicine Recommendations:** Relying solely on Natural Language Processing (NLP) techniques for alternative medicine recommendations may lead to suboptimal suggestions due to the system's limitations inanalyzing individual patient needs and medical history.
4. **Lack of Comprehensive Healthcare Integration:** The existing system's limited integration with other healthcare platforms may hinder its ability to provide holistic solutions, resulting in fragmented care delivery and missed opportunities for coordinatedtreatment.
5. **User Accessibility Challenges:** Usability issues, such as complex interfaces or lack of user-friendly features, may discourage users, particularly those with limited digital literacy or accessibility needs, from fully utilizing the system's capabilities.

3.2 PROPOSED SYSTEM

The proposed solution offers a significant improvement over the existing system by addressing key shortcomings and introducing innovative features to enhance user experience and transparency in healthcare management. One of its primary advantages is the incorporation of a robust mechanism for lodging complaints against any lack of transparency or discrepancies in hospital services. This empowers users to voice their concerns and hold healthcare providers accountable, thereby fostering a culture of transparency and trust within the healthcare ecosystem. Additionally, the system's ability to enable users to verify the authenticity of provided medications helps mitigate the risks associated with tampered or counterfeit drugs, ensuring patient safety and well-being.

Moreover, the proposed solution goes beyond addressing grievances by offering a comprehensive alternative medicine recommendation feature. By leveraging advanced algorithms and vast datasets, the system provides users with tailored recommendations for alternative medications, enhancing their knowledge and enabling informed healthcare decisions. Furthermore, the application's user-friendly interface and diverse functionalities make it highly accessible and appealing to a wide range of users. With features designed to streamline appointment booking, medication procurement, and medical record access, the proposed solution aims to revolutionize emergency healthcare management, promoting proactive health management and empowering individuals to take control of their well-being.

3.2.1 ADVANTAGES

1. **Proactive Complaint Handling:** The proposed system facilitates proactive complaint handling against any transparency issues in hospital services.
2. **Medication Quality Assurance:** With the ability to verify the authenticity of provided medications, the proposed system ensures medication quality assurance.
3. **Precise Alternative Medicine Recommendations**: By utilizing advanced algorithms and comprehensive datasets, the proposed system provides precise recommendations for alternative medicines.
4. **Robust Data Security:** The proposed system addresses data security concerns by implementing advanced security measures to safeguard patient data, thereby enhancing privacy and confidentiality.
5. **Improved Patient Engagement:** With its user-friendly interface and interactive features, the proposed system promotes patient engagement and empowerment. By allowing users to actively participate in their healthcare decisions, access their medical records, and receive personalized recommendations.

3.3 ARCHITECTURE OF THE PROPOSED SYSTEM

The software architecture diagram is a visual presentation of all of the aspects that constitute a system, either in part or whole. It is a depiction of a set of concepts that comprise architecture, such as its principles, components, and materials. It is also a system diagram used to abstract the general layout of the software system as well as the interactions, limitations, and limits between parts. Also, an architecture diagram is a network map used to describe the general structure of a software program as well as the interactions, restrictions, and limits between elements. It is a significant tool since it offers a broader picture of the computer underlying physical installation as well as its development plan.

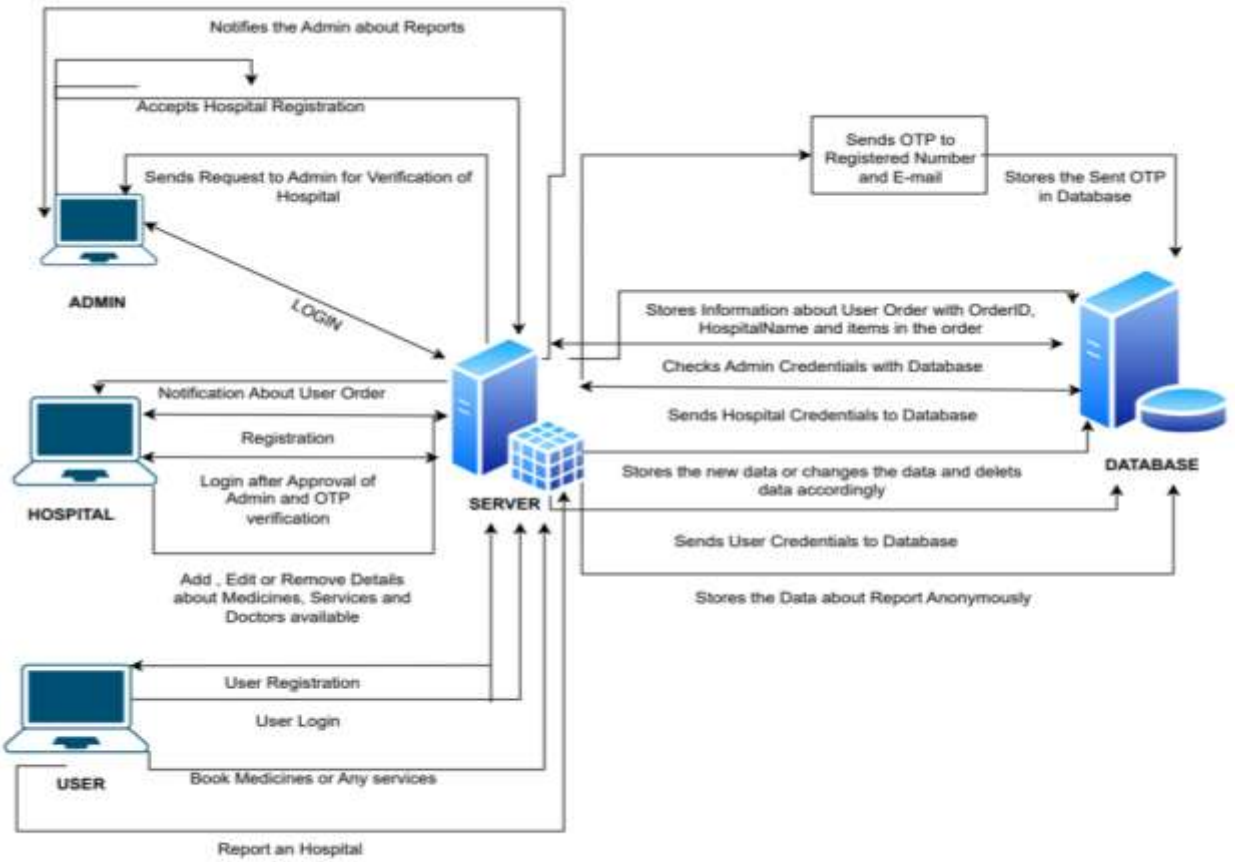


Fig 3.3 System Architecture

The hospital user management system with OTP verification is designed to facilitate secure interactions between patients and hospitals while ensuring authenticity and data integrity. The system begins with user registration, where individuals can sign up by providing their details. To maintain security, new user registrations require admin approval. Once approved, users undergo a two-step verification process during login, where they enter their credentials followedby a unique, one-time password (OTP) sent to their registered phone number or email address. Logged-in users gain access to various functionalities, including appointment booking, issue reporting, and information management. They can schedule appointments for medical services,report problems encountered at the hospital, and manage personal information such as prescribed medications and preferred doctors. Administrators play a crucial role in overseeing system security and efficiency. They review and approve hospital registration requests, verify hospital credentials, and handle notifications about user orders and reports submitted by users. Admins are also responsible for storing and managing user order information within the systemfor record-keeping purposes**.**

Hospitals can initiate the registration process by submitting a request to system administrators. Once verified and approved, hospitals provide necessary details stored securely within the system's central database. The database serves as the core of the system, securely storing user information, registered hospitals, and user orders. Additionally, it likely maintains a record of sent OTPs for security purposes. While not explicitly shown, an OTP server likely operates behind the scenes, generating unique OTPs and sending them to users upon request.

3.4 REQUIREMENT ANALYSIS

Requirement analysis is a crucial phase in software development that involves gathering, documenting, and analysing the needs and constraints of stakeholders to define the scope of a project. It helps in understanding what the system should do and how it should behave to meetthe objectives of the stakeholders. This process typically results in the identification of functional and non-functional requirements.

3.4.1 FUNCTIONAL REQUIREMENTS

Functional requirements specify what the system should do and describe the specific behaviors and functionalities it must possess to meet user needs and business objectives. Theserequirements outline the features, capabilities, and tasks that the system should support,

including user interactions, data processing, and system outputs. Functional requirements are typically expressed through use case scenarios, user stories, or feature lists, and they serve as the foundation for system design, development, and testing. some examples of functional requirements could include:

1. **User Registration:** Allow users to create an account by providing necessary information such as username, email, and password.
2. **Appointment Booking:** Enable users to schedule appointments with healthcareproviders based on availability.
3. **Medicine Procurement:** The medicine procurement platform facilitates a seamless online ordering process for users.
4. **Beds & Services Availability**: This feature focuses on providing real-time informationon bed availability and detailed medical services across various hospitals.
5. **Complaint Management:** Implement a system for users to file complaints about service quality or pricing issues.
6. **Alternative Medicine Recommendation :** Through advanced algorithms, application recommends alternative medicines referred to user medicines.
7. **Admin Approval:** Allow administrators to approve or reject hospital registrations

3.4.2 NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements describe how the system should perform and encompass quality attributes such as performance, reliability, security, usability, and scalability. These requirements focus on the system's characteristics, constraints, and quality standards rather than specific functionalities. Non-functional requirements specify criteria related to system performance, availability, security measures, user experience, and compliance with regulations or standards. They ensure that the system meets performance expectations, operates reliably, remains secure, and delivers a satisfactory user experience under various conditions and user loads.

1. **Performance:** Ensure that the application can handle a certain number of concurrent users without significant degradation in response time.
2. **Security:** Implement authentication and authorization mechanisms to protect user data and prevent unauthorized access.

3. **Usability:** Design the user interface to be intuitive and user-friendly, facilitating easy navigation and interaction.
4. **Reliability:** Ensure that the system is available and reliable, with minimal downtime and data loss.
5. **Scalability:** Design the system to accommodate future growth in terms of users, hospitals, and features without requiring significant changes to the architecture.

3.5 SYSTEM REQUIREMENTS

3.5.1 SOFTWARE REQUIREMENTS

1. **IDE (Integrated Development Environment) :** Visual Studio
2. **Front-End Development :** HTML5, CSS3, JavaScript
3. **Back-End Development :** Python, Django
4. **Database Management :** MYSQL
5. **Technologies :** NLP, Blockchain

3.5.2 HARDWARE REQUIREMENTS

1. **Processor:** A modern multicore processor (e.g., Intel Core i5 or AMD Ryzen 5) with a clock speed of at least 2.5 GHz or higher.
2. **RAM:** 8GB to 32GB of RAM.
3. **Storage:** An SSD (Solid State Drive) with at least 500GB of storage space.
4. **Graphic Card:** A dedicated graphics card (e.g., NVIDIA GeForce GTX or RTX series) with at least 4GB of VRAM.
5. **Operating System:** Windows 10, macOS, or a popular Linux distribution (e.g., Ubuntu, CentOS)

3.6 SYSTEM DESIGN

System design integrates input and output design to optimize user interaction, streamlining data exchange and feedback mechanisms for enhanced user experience and system efficiency.

3.6.1 INPUT DESIGN

Input design is a fundamental aspect of software development, especially in applicationslike a medical emergency system, where accuracy, efficiency, and ease of use are paramount. Input design refers to the process of creating user interfaces and mechanisms through which users interact with the system to input data or commands. In the context of a medical emergency application, input design plays a crucial role in enabling users to register, book appointments, procure medicine, view medical reports, and perform other essential tasks seamlessly and accurately.

Effective input design is essential for ensuring that users can input data quickly, accurately, and intuitively, without encountering errors or confusion. It involves designing user-friendly interfaces, incorporating validation checks, providing feedback mechanisms, and optimizing accessibility for diverse users. By focusing on input design, the medical emergency application can enhance user experience, streamline data entry processes, minimize errors, and ultimately improve the overall efficiency and effectiveness of the system.

Benefits of Good Input design :

1. Increased User Satisfaction: Easy-to-use input fields and clear instructions lead to a smoother experience for users. This reduces frustration and keeps them engaged with the application.
2. Improved Data Quality: Validation checks and clear input formats ensure users enter data correctly. This leads to more reliable information for further analysis or processing.
3. Reduced Development Costs: An intuitive design minimizes the need for user training or support, reducing overall development and maintenance costs.
4. Faster Task Completion: Streamlined input processes allow users to complete tasks quickly, which is beneficial in any situation.

3.6.2 OUTPUT DESIGN

Output design is as crucial as input design in a medical emergency system. Imagine a user reporting symptoms but receiving a confusing response. Effective output ensures clarity and accuracy of information, presented in a way that's easy to understand even in stressful situations.

Timeliness is key - the system needs to deliver critical details promptly to facilitate quick decisions. Most importantly, the output should be actionable, providing clear next steps or emergency information. A well-designed output can even reduce user anxiety by presenting information calmly and guiding them through the crisis. This focus on user-friendly output delivery ultimately leads to better outcomes in medical emergencies.

The essence of effective output transcends mere information dissemination; it embodies a beacon of guidance, offering clear next steps and emergency protocols tailored to the user's unique situation. A well-crafted output not only informs but also serves as a calming presence, soothing frayed nerves and guiding individuals through the storm with unwavering composure. By placing a premium on user-friendly output delivery, the system not only enhances user experience but also cultivates a sense of trust and confidence in times of crisis.

Benefits of Good Output design :

1. Increased Accuracy and Reduced Errors: By guiding users with clear prompts, validationchecks, and intuitive interfaces, good input design minimizes the chance of mistakes during data entry. This is crucial in medical emergencies where accurate information canbe lifesaving.
2. Improved Efficiency and Speed: Well-designed input processes allow users to provide information quickly and easily. This reduces frustration and saves valuable time in critical situations.
3. Enhanced User Experience: A user-friendly input system makes interacting with the application a smooth and positive experience. This can be especially important in stressful situations like medical emergencies.
4. Streamlined Data Processing: When data is entered correctly and consistently, it simplifies processing for the system. This leads to more reliable outputs and better overall system performance.
5. Reduced Development and Maintenance Costs: By preventing errors from the start, goodinput design can minimize the need for rework and troubleshooting later in the development process.

3.7 UML DIAGRAMS

Unified Modeling Language (UML) is a general-purpose modeling language. The main aim of UML is to define a standard way to visualize the way a system has been designed. It is quite similar to blueprints used in other fields of engineering. UML is not a programming language, it is rather a visual language. We use UML diagrams to portray the behavior and structure of a system. UML helps software engineers, businessmen, and system architects with modeling, design, and analysis. Unified Modeling Language (UML) diagrams are graphical representations used to visualize, specify, construct, and document the artifacts of a software system. Unified Modeling Language is the term for UML. It defines a specific architecture, design, and implementation of a complex software system. UML is a visual representation of a software program that uses a series of diagrams. By using standard engineering practices that have proved effective over the years, large and complex systems can be effectively modeled.

In UML diagrams, a general-purpose language, or model, is used to communicate software design. It simplifies communication and allows you to visualize the model. Software systems have many subcomponents and thousands of lines of code, making it difficult to keep track of their relationships. Unified Modeling Language diagrams enable you to see these relationships. An object-oriented and software development process cannot be successful without the UML. Software project designs are expressed in the UML mainly via graphical notations. The UML facilitates communication, exploration of potential designs, and validation of the software architecture design. They provide a standardized way to depict the different aspects of a system's architecture, design, and behavior, making it easier for stakeholders to understand, communicate, and collaborate on software development projects.

3.7.1 USE CASE DIAGRAM

Use Case Diagrams are used to depict the functionality of a system or a part of a system. They are widely used to illustrate the functional requirements of the system and its interaction with external agents(actors).A use case is basically a diagram representing different scenarios where the system can be used. A use case diagram gives us a high level view of what the systemor a part of the system does without going into implementation details.

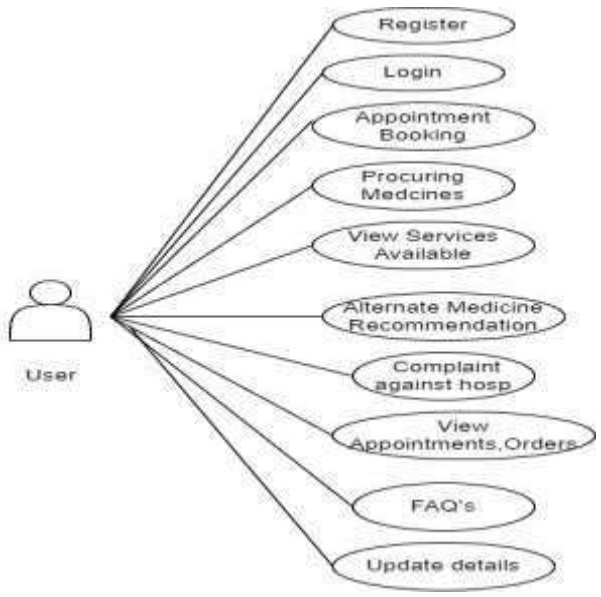


Fig 3.7.1.1 User Use Case Diagram

Users begin by logging in, ensuring secure access. Following a successful login, a critical featureis the ability to request an ambulance in case of an emergency. The system dispatches an ambulance to the user's location based on the request. In some scenarios, hospitalization mightbe required, represented by an optional state. Finally, users have the option to log out at any point, concluding their interaction with the application.

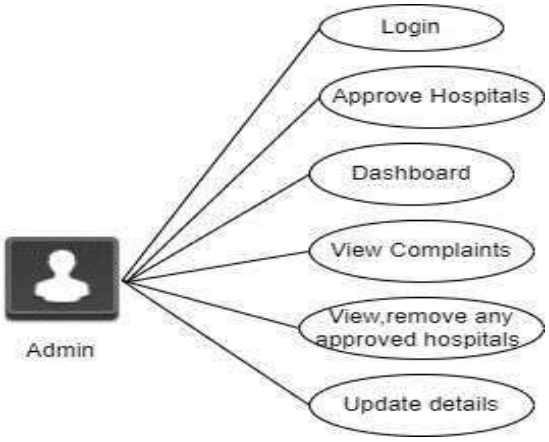


Fig 3.7.1.2 Admin Use Case Diagram

The hospitals register to the application follows login and approves pending appointments, orders and add any type of services or medicines. The admin login to the application and approves registered hospitals and view the complaints against hospitals.

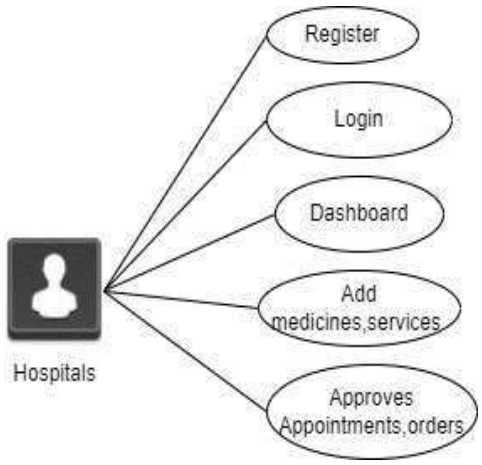


Fig 3.7.1.3 Hospital Use Case Diagram

3.7.2 CLASS DIAGRAM

The most widely use UML diagram is the class diagram. Class diagram consists of classes, interfaces, associations, and collaboration. It is the building block of all object-orientedsoftware systems. We use class diagrams to depict the static structure of a system by showing system's classes, their methods and attributes. Class diagrams also help us identify relationship between different classes or objects. Active class is used in a class diagram to represent the concurrency of the system. Class diagram represents the object orientation of a system. Hence, it is generally used for development purpose. This is the most widely used diagram at the time of system construction.

Class notation is a graphical representation used to depict classes and their relationships in object-oriented modeling.

1. **Class Name:** The name of the class is typically written in the top compartment of the class box and is centered and bold.
2. **Attributes:** Attributes, also known as properties or fields, represent the data members of the class. They are listed in the second compartment of the class box and often include

the visibility (e.g., public, private) and the data type of each attribute.

3. **Methods:** Methods, also known as functions or operations, represent the behavior or functionality of the class. They are listed in the third compartment of the class box and include the visibility (e.g., public, private), return type, and parameters of each method.

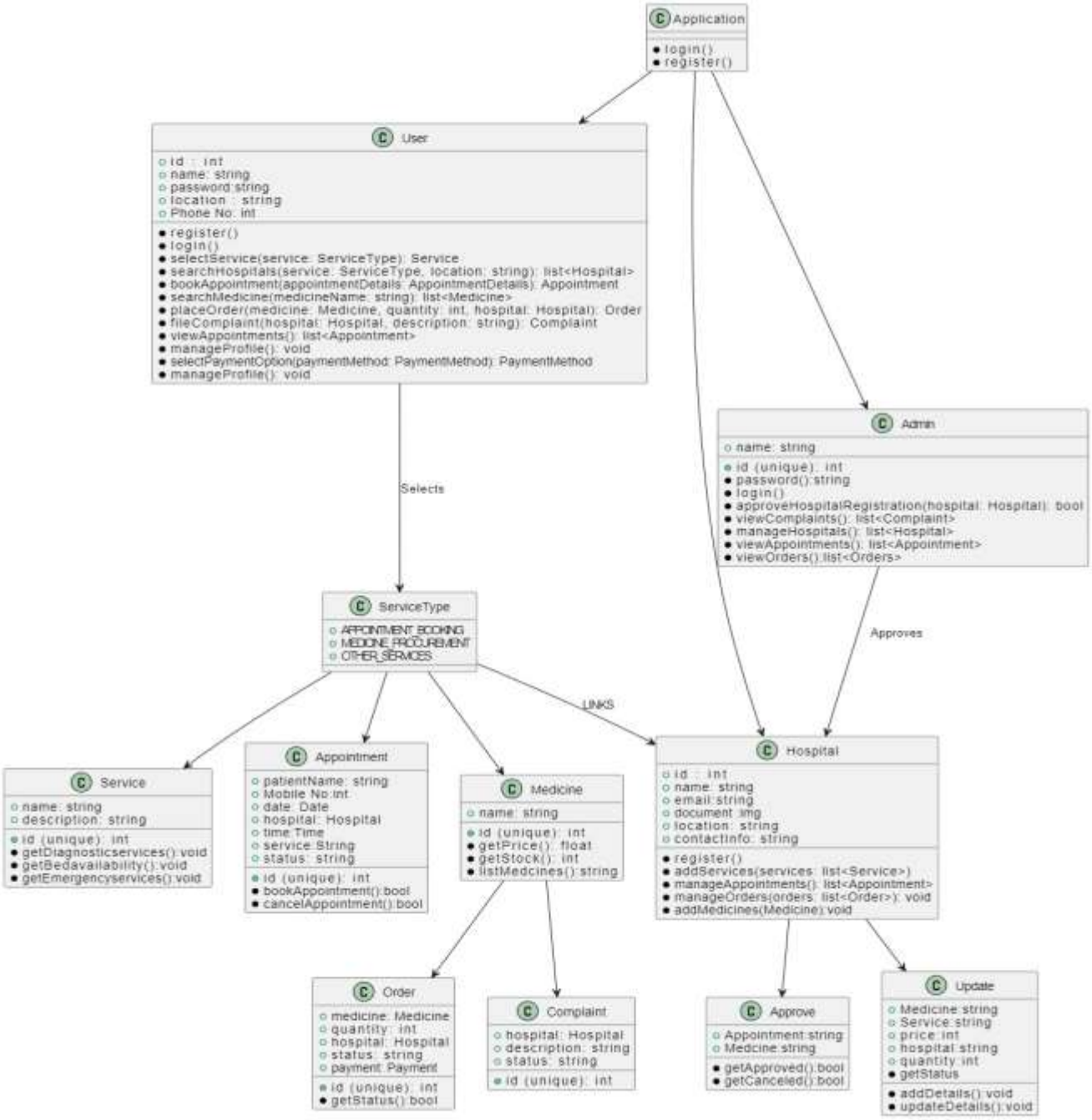


Fig 3.7.2 Class Diagram

3.7.3 SEQUENCE DIAGRAM

A sequence diagram is an interaction diagram. From the name, it is clear that the diagram deals with some sequences, which are the sequence of messages flowing from one object to another. Interaction among the components of a system is very important from implementation and execution perspective. Sequence diagram is used to visualize the sequence of calls in a system to perform a specific functionality.

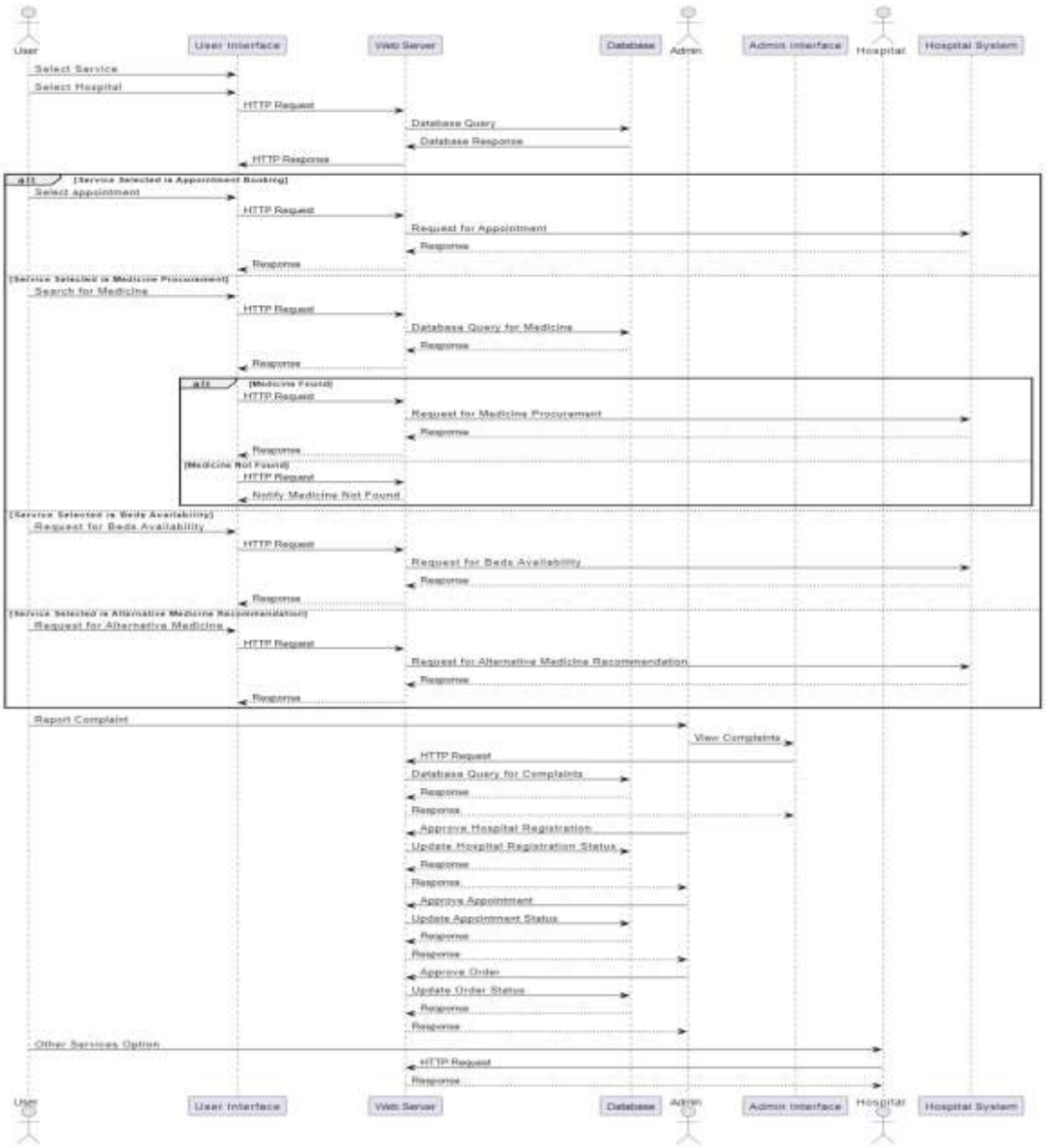


Fig 3.7.3 Sequence Diagram

1. A sequence diagram simply depicts interaction between objects in a sequential order i.e. the order in which these interactions take place.
2. We can also use the terms event diagrams or event scenarios to refer to a sequence diagram.
3. Sequence diagrams describe how and in what order the objects in a system function.

3.7.4 ACTIVITY DIAGRAM

Activity diagram is used to illustrate the flow of control in a system. It consists of activities and links. The flow can be sequential, concurrent, or branched. Activities are nothing but the functions of a system. Numbers of activity diagrams are prepared to capture the entire flow in a system. Activity diagrams are used to visualize the flow of controls in a system. This is prepared to have an idea of how the system will work when executed. We can also use an activity diagram to refer to the steps involved in the execution of a use case.

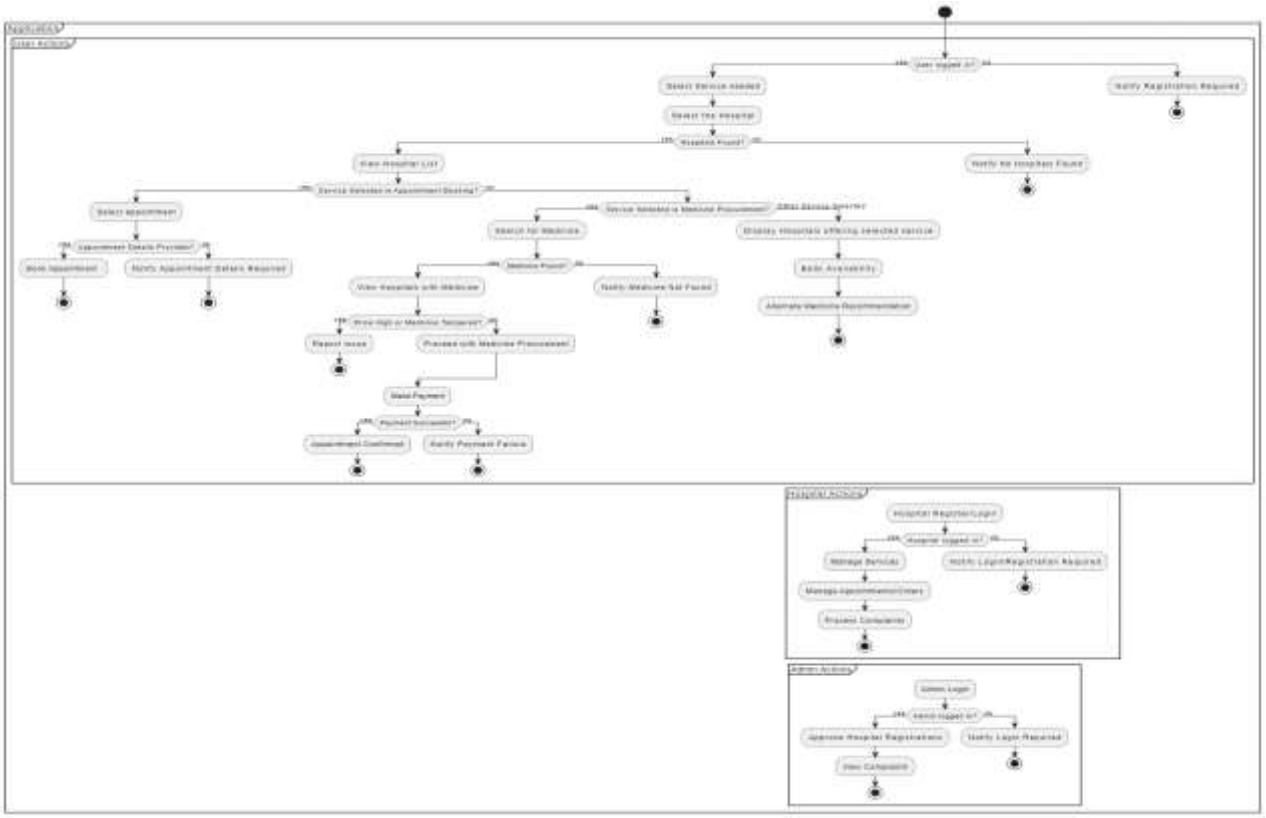


Fig 3.7.4 Activity Diagram

We can also use an activity diagram to refer to the steps involved in the execution of a

use case.

1. We model sequential and concurrent activities using activity diagrams. So, we basically depict workflows visually using an activity diagram.
2. An activity diagram focuses on condition of flow and the sequence in which it happens.
3. We describe or depict what causes a particular event using an activity diagram.

3.7.5 STATECHART DIAGRAM

A state diagram is used to represent the condition of the system or part of the system at finite instances of time. Any real-time system is expected to be reacted by some kind of internal/external events. These events are responsible for state change of the system. State chart diagram is used to represent the event driven state change of a system. It basically describes the state change of a class, interface, etc. State chart diagram is used to visualize the reaction of a system by internal/external factors. It's a behavioral diagram and it represents the behavior using finite state transitions.

- State diagrams are also referred to as State machines and State-chart Diagrams
- These terms are often used interchangeably. So simply, a state diagram is used to model the dynamic behavior of a class in response to time and changing external stimuli.

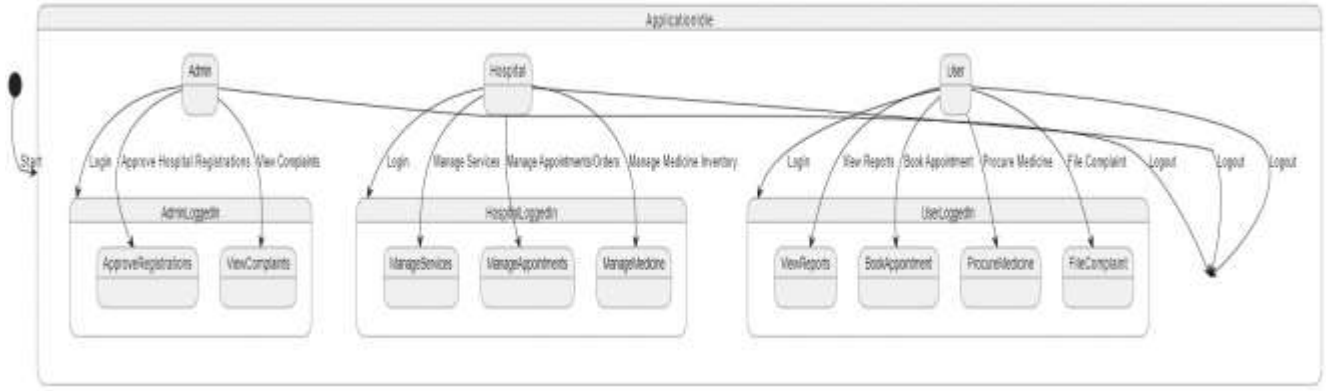


Fig 3.7.5 Statechart Diagram

3.7.6 DEPLOYMENT DIAGRAM

Deployment diagrams are used for visualizing the deployment view of a system Deployment diagrams are a set of nodes and their relationships. These nodes are physical entities where the components are deployed. This is generally used by the deployment team. Deployment Diagrams are used to represent system hardware and its software .It tells us what hardware components exist and what software components run on them.

1. We illustrate system architecture as distribution of software artifacts over distributed targets.
2. An artifact is the information that is generated by system software.
3. They are primarily used when a software is being used, distributed or deployed over multiple machines with different configurations.

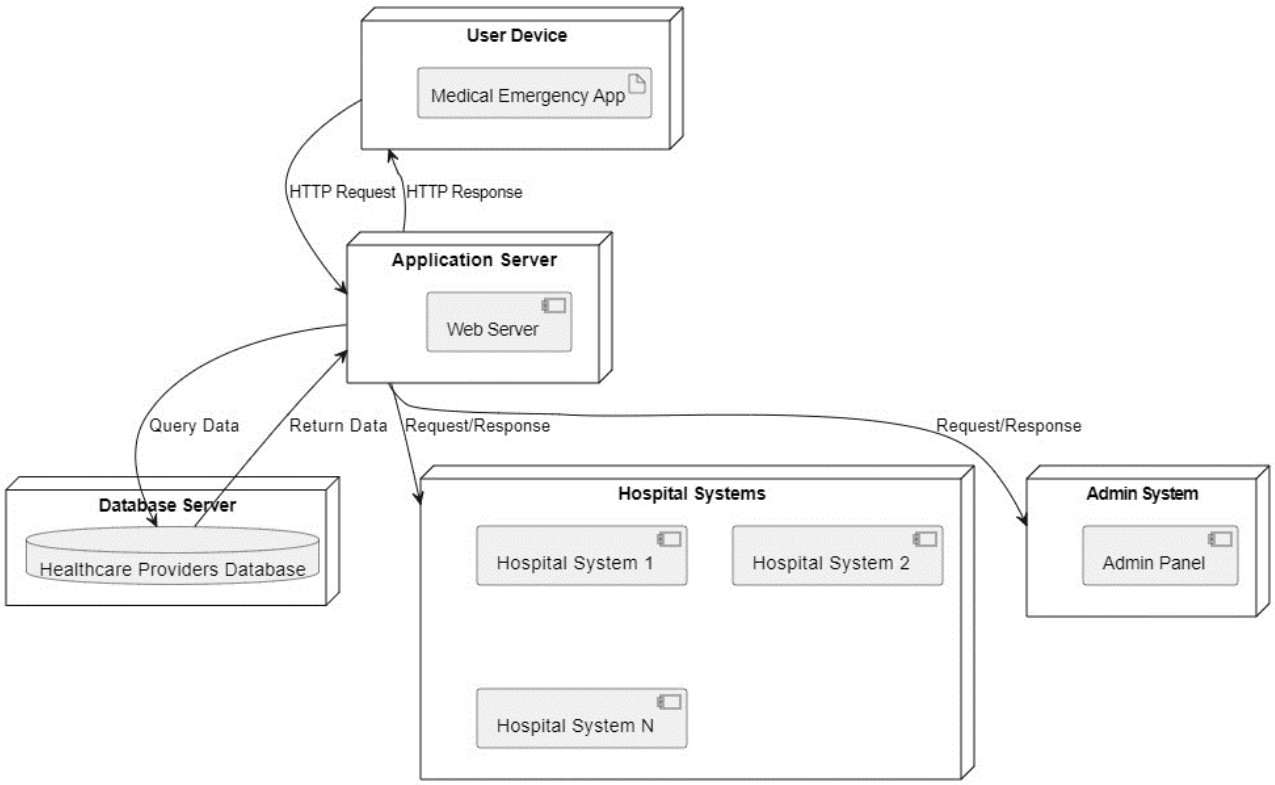


Fig 3.7.6 Deployment Diagram

3.7.7 COMPONENT DIAGRAM

Component diagrams are used to represent how the physical components in a system have been organized. Component diagrams represent a set of components and their relationships. These components consist of classes, interfaces, or collaborations. Component diagrams represent the implementation view of a system. During the design phase, software artifacts (classes, interfaces, etc.) of a system are arranged in different groups depending upon their relationship. Now, these groups are known as components. Finally, it can be said component diagrams are used to visualize the implementation.

We use them for modelling implementation details.

1. Component Diagrams depict the structural relationship between software system elements and help us in understanding if functional requirements have been covered by planned development.
2. Component Diagrams become essential to use when we design and build complex systems.
3. Interfaces are used by components of the system to communicate with each other.

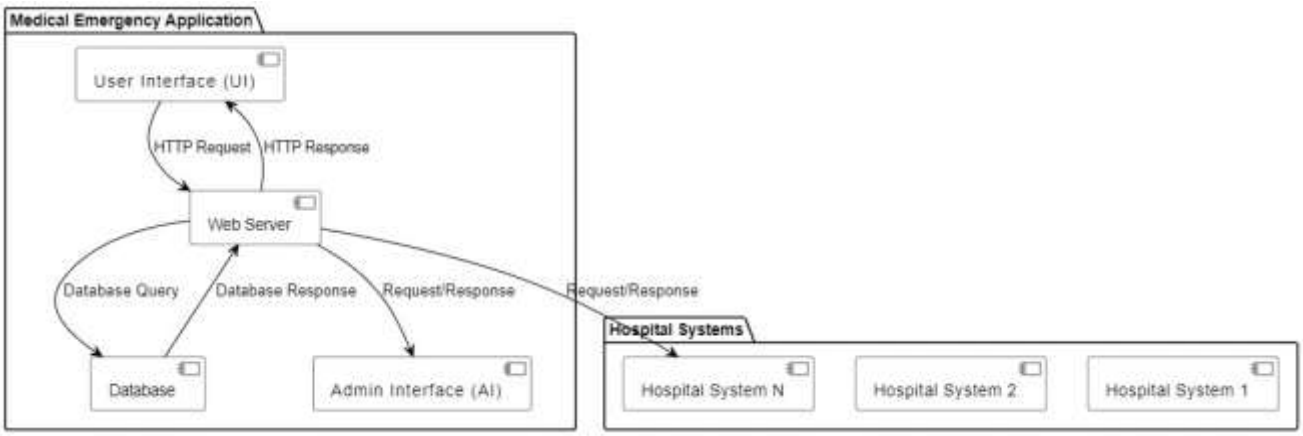


Fig 3.7.7 Component Diagram

3.7.8 ER DIAGRAM

ER Model stands for Entity Relationship Model is a high-level conceptual data model diagram. ER model helps to systematically analyze data requirements to produce a well-designed database. The ER Model represents real-world entities and the relationships between them. Creating an ER Model in DBMS is considered as a best practice before implementing your database.ER Modeling helps you to analyze data requirements systematically to produce a well-designed database. So, it is considered a best practice to complete ER modeling before implementing your database. Entity Relationship Diagram (ER Diagram or ERD) is a pictorial or visual representation of classifying groups or entities of common interest and defining the relationship between these groups. Hence, a structure is created with various symbols of different shapes and sizes so that it can be used as a model to depict the internal structure & relationship.

Main reasons for using the ER Diagram :

1. Helps you to define terms related to entity relationship modeling.
2. Provide a preview of how all your tables should connect, what fields are going to be on each table.
3. Helps to describe entities, attributes, relationships.
4. ER diagrams are translatable into relational tables which allows you to build databases quickly.
5. ER diagrams can be used by database designers as a blueprint for implementing data in specific software applications.
6. The database designer gains a better understanding of the information to be contained in the database with the help of ERP diagram.
7. ERD Diagram allows you to communicate with the logical structure of the database to users.

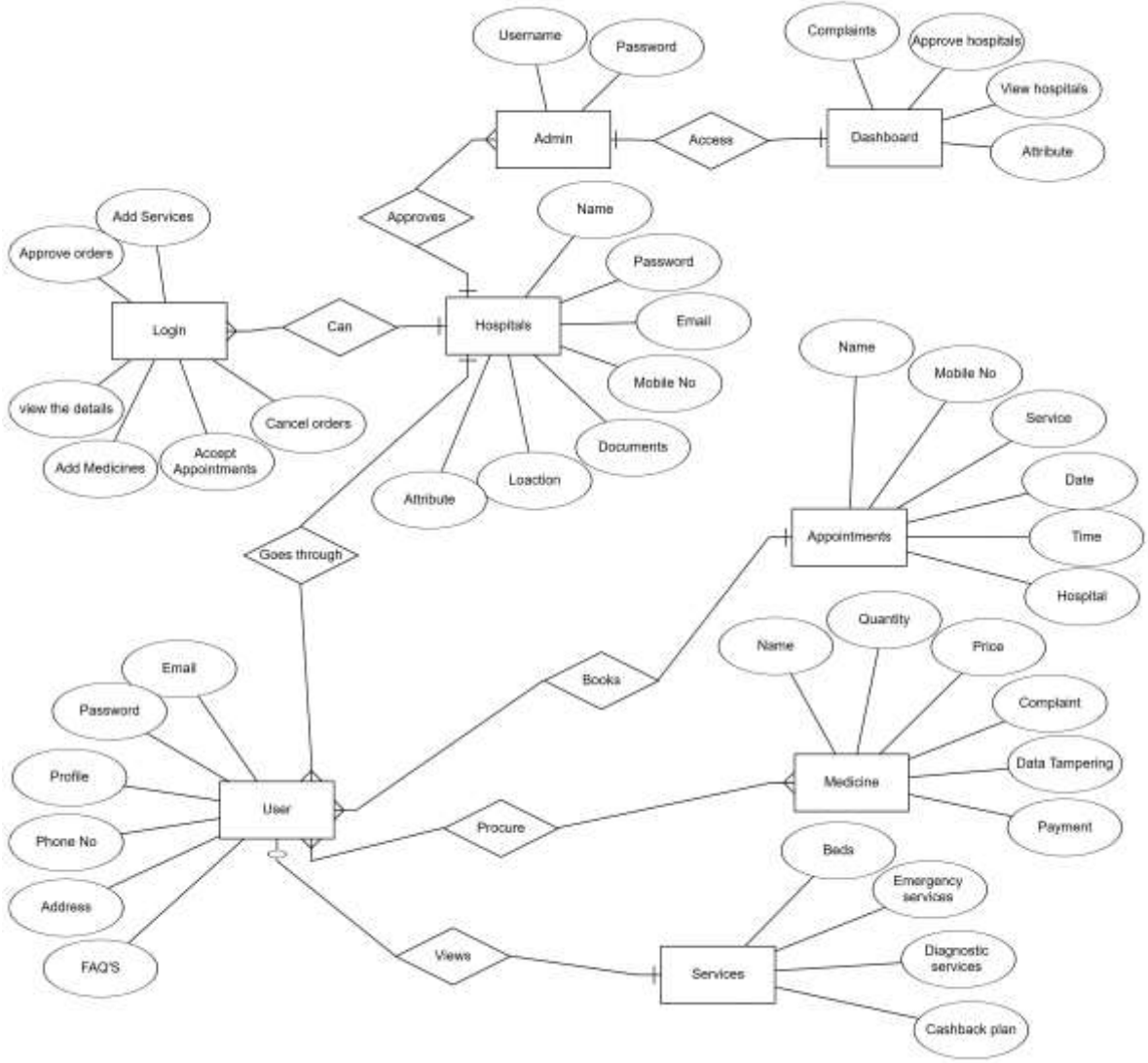


Fig 3.7.8 ER Diagram

3.7.9 DFD Diagram

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It can be manual, automated, or a combination of both. It shows how data enters and leaves the system, what changes the information, and where data is stored.

The objective of a DFD is to show the scope and boundaries of a system as a whole. It may be used as a communication tool between a system analyst and any person who plays a part in the order that acts as a starting point for redesigning a system. The DFD is also called as a data flow graph or bubble chart.

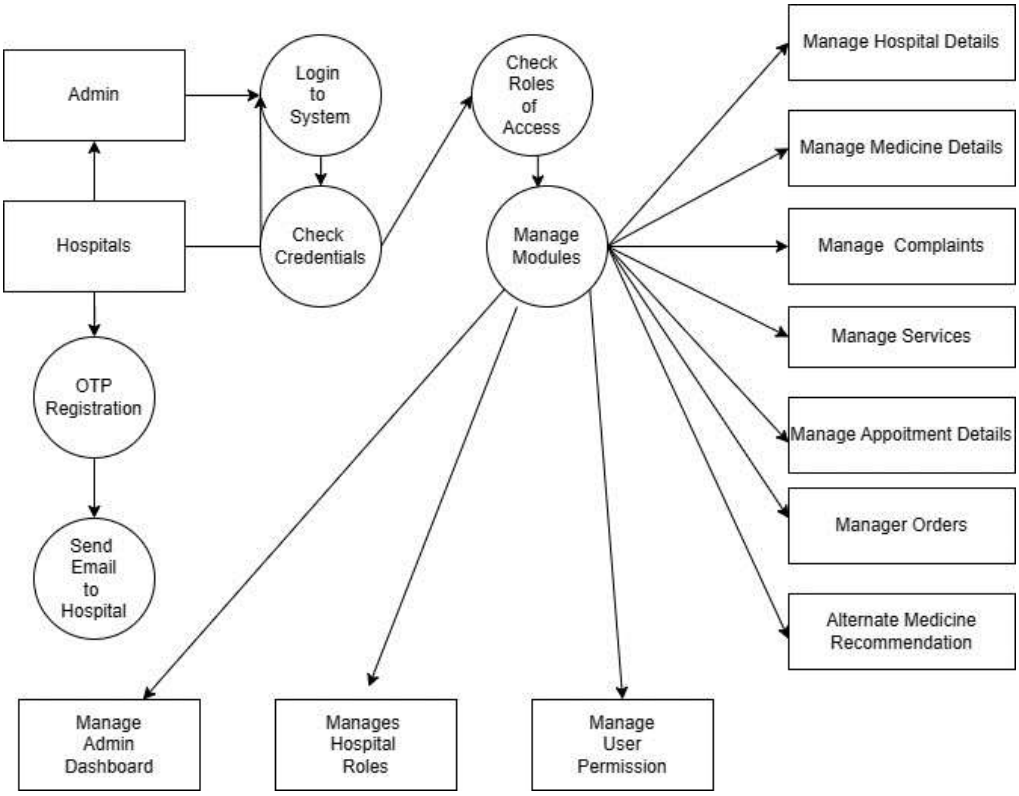


Fig 3.7.9 DFD Diagram

CHAPTER 4

IMPLEMENTATION

4.1 NATURAL LANGUAGE PROCESSING

Natural language processing (NLP) is a form of machine learning which enables the processing and analysis of free text. There are challenges to the use of NLP in medicine. Unbiased training data is an essential requirement if the conclusions reached by NLP algorithms are to be trusted. Natural language processing (NLP) is the discipline of building machines that can manipulate human language — or data that resembles human language — in the way that it is written, spoken, and organized. It evolved from computational linguistics, which uses computer science to understand the principles of language, but rather than developing theoretical frameworks, NLP is an engineering discipline that seeks to build technology to accomplish useful tasks. NLP can be divided into two overlapping subfields: natural language understanding (NLU), which focuses on semantic analysis or determining the intended meaning of text, and natural language generation (NLG), which focuses on text generation by a machine. NLP is separate from — but often used in conjunction with — speech recognition, which seeks to parse spoken language into words, turning sound into text and vice versa.

NLP-BASED RECOMMENDATION APPROACHES

Text Similarity:

This technique can be used to find similarities between different articles, research papers, or user queries related to alternative medicines. By measuring the similarity between texts, you can recommend alternative medicines based on their similarity to ones the user is already interested in or has found effective. Techniques such as cosine similarity, Jaccard similarity, or embeddings-based approaches (like Word2Vec or BERT) can be used to compute text similarity.

Topic Extraction:

Topic extraction can be used to identify the main themes or topics discussed in articles, forums, or user queries related to alternative medicines. Topic extraction aims to identify the main themes or topics discussed in a piece of text using techniques like Latent Dirichlet Allocation (LDA), Non-negative Matrix Factorization (NMF), or neural topic modeling. By understanding the topics, you can recommend alternative medicines that are relevant to the user's interests or health concerns.

Keyword Extraction:

Keyword extraction can identify important words or phrases related to alternative medicines within text. These keywords can then be used to match user queries with relevant articles or information about alternative medicines. Keyword extraction involves identifying important words or phrases from a piece of text that best represent its content. Techniques such as TF-IDF (Term Frequency-Inverse Document Frequency) or Text Rank can be used for keyword extraction. When recommending alternative medicines, keyword extraction can identify relevant terms or phrases related to alternative health practices.

Medicine Description Dataset

The medicine description dataset comprises drug names, descriptions, and reasons for use, facilitating analysis and recommendation through cosine similarity. The Medicine Description dataset consists of 22481 different drug names with it's reason and description to use . Utilizing cosine similarity, similar descriptions and reasons can be identified, aiding in the discovery of alternative medicines. Furthermore, leveraging cosine similarity, alternative medicines can be suggested based on their similarity to the given medicine's description and reason for use, enhancing decision-making in medication selection. By identifying akin descriptions and reasons for use, as well as suggesting alternative medicines based on such similarities, healthcare professionals can foster informed decision-making and enhance patient care. Moreover, this approach aids in recognizing trends and relationships within medication data, enabling pharmacovigilance efforts and promoting personalized treatment strategies.

Drug_Name	Reason	Description
A CN Gel(Topical) 20gmA CN Soap 75gm	Acne	Mild to moderate acne (spots)
A Ret 0.05% Gel 20gmA Ret 0.1% Gel 20gmA Ret 0.025% Gel 20gm	Acne	A RET 0.025% is a prescription medicine that is used to reduce fine wrinkles
Zyclin Nano Gel 15gm	Acne	treatment of dry scaly skin disorders of the scalp
Addnok Tablet 20'S	Adhd	combined with anti-acne actives of both natural and synthetic origin
Armod 150mg Tablet 10'SArmod 50mg Tablet 10'S	Adhd	treatment of dry scaly skin disorders of the scalp
Adril Lotion 100ml	Allergies	treat the most severe form of acne (nodular acne)
Afineday Tablet 10'S	Allergies	treat acne vulgaris
Airitis 5mg Tablet 10'SAiritis Syrup 30ml		treat mild to moderate acne(spots)
Unicholin 500mg Injection 2ml	Alzheimer	treat Alzheimer, weak and, in severe cases, the muscles may become paralysed
Orthokind 200mg Tablet 10'S	Arthritis	reduces friction in the joints and also relieves pain and inflammation
Amicline Tablet 10'S	Amoebiasis	used to treat acute and chronic intestinal amoebiasis
Angicam 2.5mg Tablet 15'S	Angina	prevent angina pectoris and pain in chest
Anax 0.25mg Tablet 10'SAnax 0.5mg Tablet 10'S	Anxiety	reduction of preoperative anxiety
Arirazo 5mg Tablet 10'S	Depression	depressive disorder and depression
Pacimol 650mg Tablet 10'S	Fever	used to treat headache migraine, fever, post-operative pain, dental pain, musculoskeletal and joint disorders

Table 4.1 Medicine Description Dataset

4.1.1 ALGORITHMS

The initial phase involves cleansing and restructuring the medicine descriptions for machine learning ingestion, followed by encoding the text into numerical representations via advanced weighting schemes such as TF-IDF to calculate relevancy. The dataset is then partitioned into separate training and test sets to facilitate algorithm learning and performance evaluation. Models are trained on the training data to statistically learn latent patterns within medicine traits, enabling them to predict similarities. Various methodologies are tested on isolated test samples, with the most effective one selected. The final model is rigorously examined using fresh datasets to confirm the broader relevance of the identified relationships among medicine characteristics. With a fully validated model capable of discerning nuanced connections, users' medicine queries are converted into numerical vectors and then utilized as inputs to recommend alternative medicines with similar characteristics, thereby leveraging algorithms and data to uncover substitute medicines tailored to users' needs and preferences.

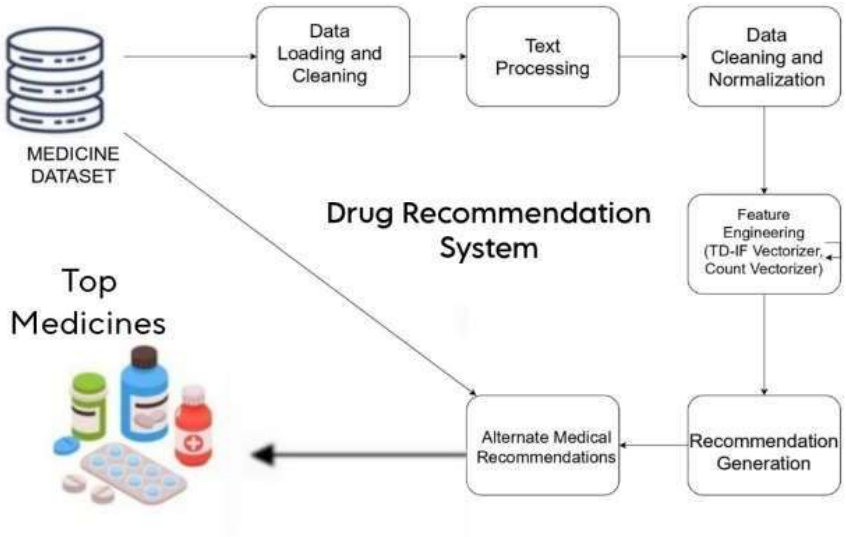


Fig 4.1.1 NLP Architecture

1, Count Vectorizer :

Count Vectorizer operates efficiently even with large datasets, making it suitable for processing extensive text corpora. Its simplicity and computational efficiency make it an excellent choice for initial exploratory data analysis or as a baseline model in natural language processing

pipelines. Furthermore, by providing a direct count of word occurrences, the Count Vectorizer enables straightforward interpretation and analysis of text data, facilitating insights into the vocabulary and word usage patterns within the corpus. As users input drug names, the Count Vectorizer swiftly analyzes their occurrences, providing a direct count of word occurrences. Its versatility extends to various text mining tasks, including topic modeling, text classification, and information retrieval. Thus, the Count Vectorizer serves as a fundamental tool in extracting meaningful features from text data for a wide range of applications in machine learning and text analytics.

2, TD-IDF Vectorizer :

The TF-IDF Vectorizer is used to reflect the importance of each word in a document relative to the entire dataset. TFIDF stands for Term Frequency-Inverse Document Frequency, and it calculates a value for each word based on how often it appears in a document (term frequency) and how rare it is across the entire corpus (inverse document frequency). where users input drug names, leveraging the TF-IDF vectorizer enables the discovery of similar drugs from a dataset. Initially, the user's drug name input undergoes preprocessing to ensure alignment with the TF-IDF format. Subsequently, the TF-IDF vectorizer, previously trained on a dataset containing drug names, transforms the input into a numerical vector representation, reflecting the significance of each term relative to the entire dataset. Utilizing a similarity metric like cosine similarity, the application computes the resemblance between the input drug's TF-IDF vector and those of all drugs in the dataset. Through this process, drugs are ranked based on their similarity scores, with those exhibiting the highest scores deemed the most similar and subsequently recommended to the user. By employing TF-IDF in this manner, the application facilitates efficient drug discovery and recommendation, enhancing user experience and aiding in medical decision-making.

4.2 VISUAL STUDIO CODE

Visual Studio, developed by Microsoft, is a comprehensive integrated development environment (IDE) catering to the needs of software developers across various platforms and programming languages. It offers a plethora of features to streamline the development process,

including code editing, debugging, testing, and deployment tools. With its extensive support for multiple programming languages such as C#, C++, Visual Basic, JavaScript, and Python, Visual Studio accommodates a wide range of development scenarios, from desktop applications to web and cloud-based solutions. Its rich set of built-in templates, code snippets, and IntelliSense functionality significantly boost developer productivity by providing context-aware suggestions and automating repetitive tasks. Visual Studio also incorporates robust debugging capabilities, allowing developers to efficiently identify and resolve issues in their code. Furthermore, its seamless integration with version control systems like Git facilitates collaborative development workflows, enabling teams to work together effectively on projects of any scale. Overall, Visual Studio stands as a versatile and powerful IDE that empowers developers to create high-quality software solutions with efficiency and ease. Facilitating project management, VS Code offers a robust suite of capabilities tailored to streamline development workflows. By consolidating essential functions within the editor, VS Code enhances productivity and workflow cohesion, enabling developers to maintain focus and momentum. Moreover, the integration of version control systems, notably Git, elevates collaboration and code management to new heights. Through seamless integration, developers can navigate repositories, commit changes, and resolve conflicts directly within the editor. This integration not only simplifies project coordination but also promotes version control best practices, ensuring project integrity and facilitating agile development methodologies. Further enhancing project management capabilities are VS Code's robust debugging tools and task automation features. With integrated debugging functionality, developers can diagnose and rectify issues efficiently, minimizing downtime and accelerating development cycles.

VS Code is a popular source-code editor developed by Microsoft for Windows, Linux, and macOS. It's renowned for its simplicity, speed, and powerful features, making it a top choice for developers across various programming languages and projects. Visual Studio Code (VS Code) is a versatile and powerful source-code editor that serves various purposes and goals for developers. Here are some of its key uses and goals:

1. Code Editing: At its core, VS Code provides robust code editing features for a wide range of programming languages. Its intuitive interface, syntax highlighting, and code completion capabilities make it ideal for writing and editing code efficiently.

2. Cross-Platform Development: One of the primary goals of VS Code is to offer a consistent development experience across different operating systems. Whether you're using Windows, macOS, or Linux, VS Code ensures that developers can work seamlessly across platforms.

3. Customization and Extensibility: VS Code aims to be highly customizable and extensible to accommodate diverse developer preferences and workflows. Through its vast ecosystem of extensions and themes, developers can tailor the editor to their specific needs, adding support for additional languages, tools, and functionalities.

4. Integrated Development Environment (IDE) Features: Despite being lightweight, VS Code offers many features typically found in full-fledged IDEs. These include debugging tools, version control integration, terminal access, and task automation capabilities, providing a comprehensive development environment within a single editor.

5. Productivity and Efficiency: VS Code aims to enhance developer productivity by offering features like IntelliSense, which provides context-aware code suggestions and completions, and built-in Git support for version control operations directly within the editor. These features help streamline the development workflow and reduce the time spent on repetitive tasks.

6. Support for Modern Development Workflows: VS Code is designed to support modern development practices, such as containerization, cloud-native development, and serverless computing. It integrates seamlessly with tools and services commonly used in these workflows, empowering developers to build and deploy applications with ease.

7. Community Collaboration: VS Code fosters a vibrant and active community of developers who contribute to its ongoing development and improvement. The open-source nature of the project encourages collaboration, feedback, and the sharing of knowledge and resources among developers worldwide.

8. Accessibility: Another goal of VS Code is to be accessible to developers of all backgrounds and abilities. It provides features and settings to accommodate various accessibility needs, ensuring that developers with disabilities can use the editor effectively.

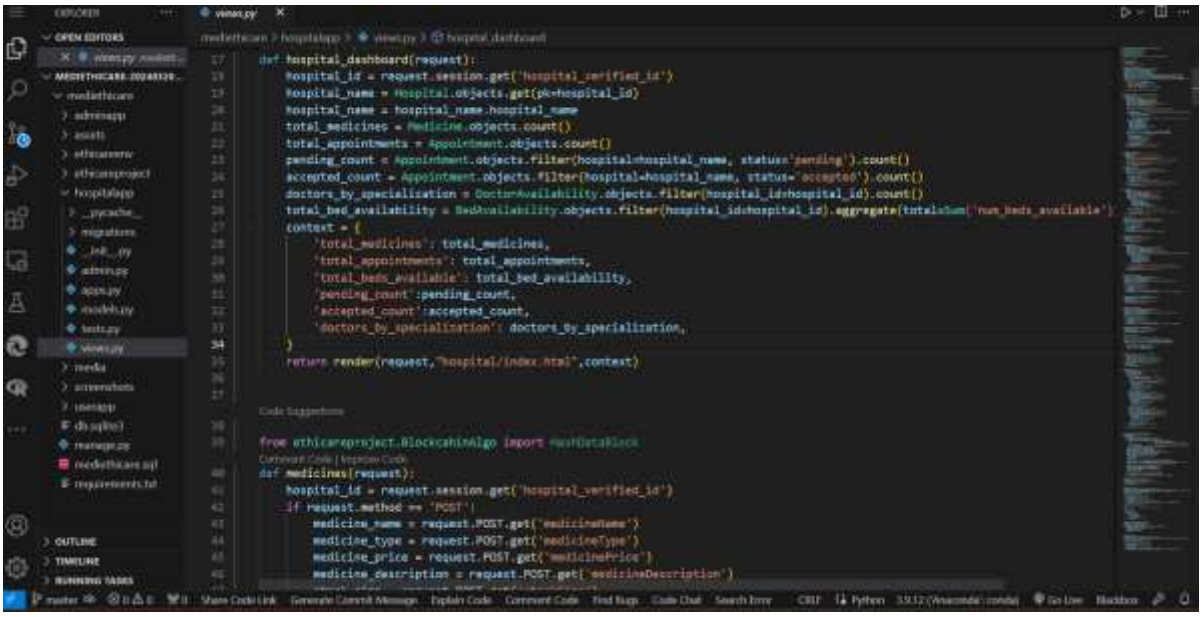


Fig 4.2 VS Code Interface

4.3 JUPYTER NOTEBOOK

Jupyter Notebook is an interactive computing environment popular for data analysis, visualization, and code experimentation. It supports various programming languages, including Python, R, and Julia, making it versatile for different tasks. With its web-based interface, users can create and share documents containing live code, equations, and explanatory text. Jupyter's integration with Django allows developers to interact with the backend environment, access Django models, and perform data analysis directly within the notebook environment. This integration streamlines the development process by providing a unified platform for frontend and backend development tasks.

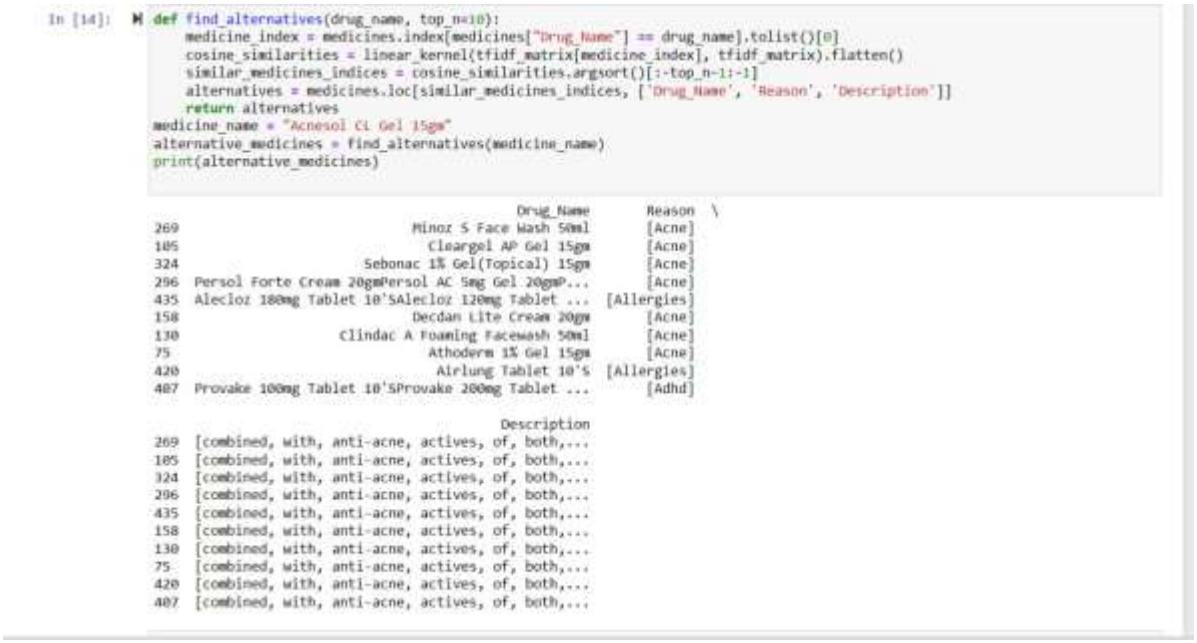
Code :

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.metrics.pairwise import linear_kernel
from sklearn.metrics import accuracy_score, precision_score, recall_score, f1_score
from sklearn.linear_model import LogisticRegression

df = pd.read_csv("Medicine_description.csv", encoding='latin1')
df['Description'] = df['Description'].fillna('')
X = df[['Description', 'Reason']]
y = df['Drug_Name']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
print(X_train)
print(X_test)
print(y_train)
print(y_test)
df['Description'] = df['Description'].fillna('')
vectorizer = TfidfVectorizer(stop_words='english')
tfidf_matrix = vectorizer.fit_transform(df['Description'])

def find_alternatives(drug_name, top_n=10):
    medicine_index = df.index[df["Drug_Name"] == drug_name].tolist()[0]
    cosine_similarities = linear_kernel(tfidf_matrix[medicine_index], tfidf_matrix).flatten()
    similar_medicines_indices = cosine_similarities.argsort()[:-top_n-1:-1]
    alternatives = df.loc[similar_medicines_indices, ['Drug_Name', 'Reason', 'Description']]
    return alternatives
medicine_name = "Acnesol CL Gel 15gm"
alternative_medicines = find_alternatives(medicine_name)
print(alternative_medicines)
```



```
In [14]: def find_alternatives(drug_name, top_n=10):
             medicine_index = medicines.index[medicines["Drug_Name"] == drug_name].tolist()[0]
             cosine_similarities = linear_kernel(tfidf_matrix[medicine_index], tfidf_matrix).flatten()
             similar_medicines_indices = cosine_similarities.argsort()[:-top_n-1:-1]
             alternatives = medicines.loc[similar_medicines_indices, ['Drug_Name', 'Reason', 'Description']]
             return alternatives
         medicine_name = "Acnesol Ci Gel 15gm"
         alternative_medicines = find_alternatives(medicine_name)
         print(alternative_medicines)

                                                Drug_Name       Reason  \
269                                Minoz S Face Wash 50ml       [Acne]
105                                  Cleargel AP Gel 15gm       [Acne]
324                          Sebonac 1% Gel(Topical) 15gm       [Acne]
296  Persol Forte Cream 20gmPersol AC 5mg Gel 20gmP...       [Acne]
435  Alecloz 180mg Tablet 10'SAlecloz 120mg Tablet ...  [Allergies]
158                                Decdan Lite Cream 20gm       [Acne]
130                     Clindac A Foaming Facewash 50ml       [Acne]
75                                  Athoderm 1% Gel 15gm       [Acne]
420                                  Airlung Tablet 10'S  [Allergies]
407  Provake 100mg Tablet 10'SProvake 200mg Tablet ...       [Adhd]

                                           Description
269  [combined, with, anti-acne, actives, of, both,...
105  [combined, with, anti-acne, actives, of, both,...
324  [combined, with, anti-acne, actives, of, both,...
296  [combined, with, anti-acne, actives, of, both,...
435  [combined, with, anti-acne, actives, of, both,...
158  [combined, with, anti-acne, actives, of, both,...
130  [combined, with, anti-acne, actives, of, both,...
75   [combined, with, anti-acne, actives, of, both,...
420  [combined, with, anti-acne, actives, of, both,...
407  [combined, with, anti-acne, actives, of, both,...
```

Fig 4.3 Medicine Recommendation Output

4.4 DJANGO FRAMEWORK

Django is a Python-based web framework that allows you to create efficient web applications quickly. It is also called batteries included framework because Django provides built-in features for everything including Django Admin Interface, default database – SQLlite3, etc. In the development of MediEthicare, Django serves as the backbone for creating a reliable and efficient backend system tailored to healthcare management. Django's robust features enable the implementation of secure user authentication and authorization, ensuring the protection of sensitive patient data. With Django's powerful ORM, managing complex medical information such as patient records, appointments, and prescriptions becomes streamlined and efficient. The built-in admin interface facilitates easy management of healthcare-related data, simplifying administrative tasks for the platform. Leveraging Django's rapid development capabilities, developers can focus on implementing specific healthcare functionalities while benefiting from Django's extensive ecosystem of libraries and tools. Overall, Django plays a pivotal role in building MediEthicare, providing a solid foundation for creating a secure, scalable, and user-friendly healthcare management platform.

4.5 MYSQL

In the MediEthiCare project, MySQL is for storing crucial data related to registrations, login credentials, booked appointments, and orders. MySQL's relational database model provides a structured and organized approach to managing this diverse set of information. For instance, user registration details, including personal information and authentication credentials, can be securely stored in MySQL tables. By leveraging MySQL's robust security features, such as encryption and user authentication mechanisms, sensitive user data remains protected from unauthorized access.

Moreover, MySQL efficiently handles the storage and retrieval of booked appointments,enabling seamless management of scheduling and availability for healthcare services. MySQLplays a pivotal role in managing orders placed within the platform, such as medicationprescriptions or medical equipment requests. By storing order details in MySQL tables, including item information, quantities, and delivery addresses, MediEthiCare can ensureaccurate processing and fulfillment of orders. MySQL's transactional support ensures theintegrity of order data, preventing inconsistencies or data loss during concurrent operations.

The need for using MySQL in MediEthiCare arises from its reliability, scalability, and performance characteristics. MySQL's proven track record in handling large volumes of data and supporting concurrent user access makes it an ideal choice for storing cri tical healthcare information. Furthermore, MySQL's compatibility with popular programming languages and frameworks, including Python (utilized in Django), ensures seamless integration with the project's backend infrastructure. Overall, MySQL's role in storing registration details, appointments, and orders in MediEthiCare is essential for maintaining data integrity, facilitating efficient data management, and ensuring a seamless user experience within the healthcare platform.

CHAPTER 5

RESULTS

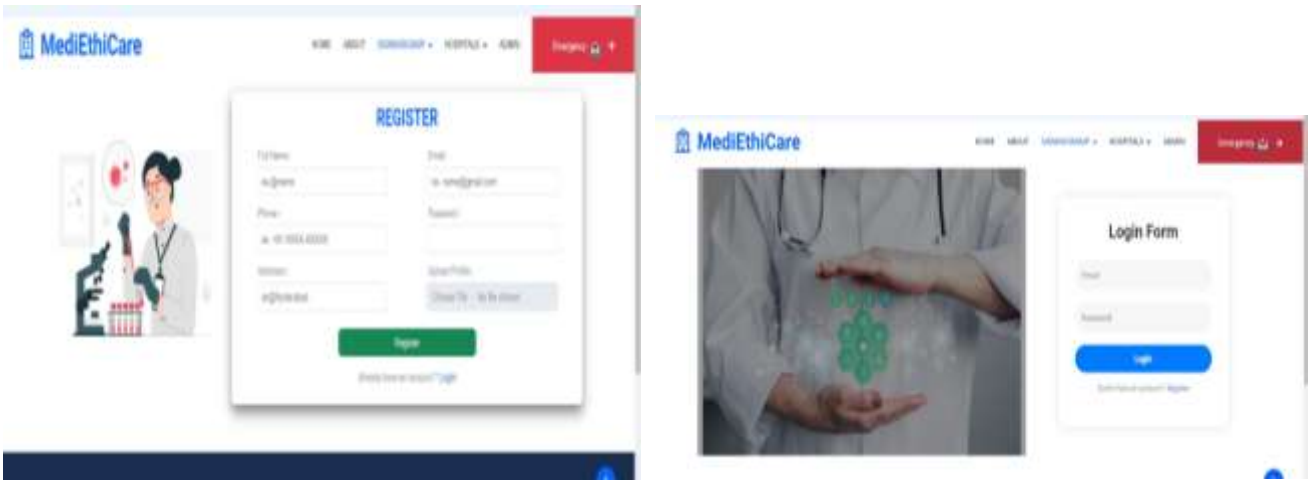


Fig 5.1 Sign Up/Sign In

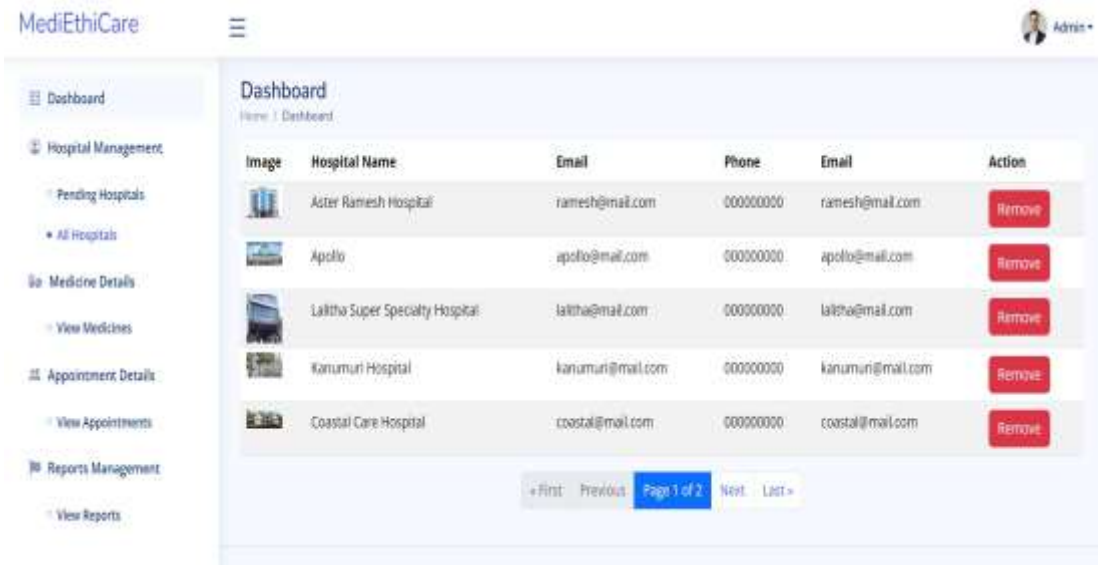


Fig 5.2 Admin Dashboard

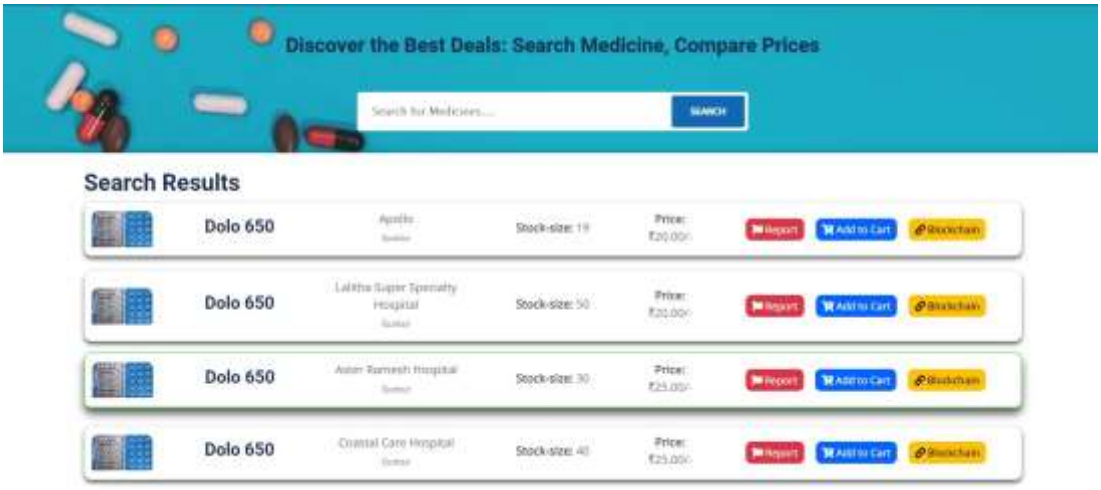


Fig 5.3 Medicine Procurement

Fig 5.4 Appointment Booking

Fig 5.5 Alternative Medicine Recommendation

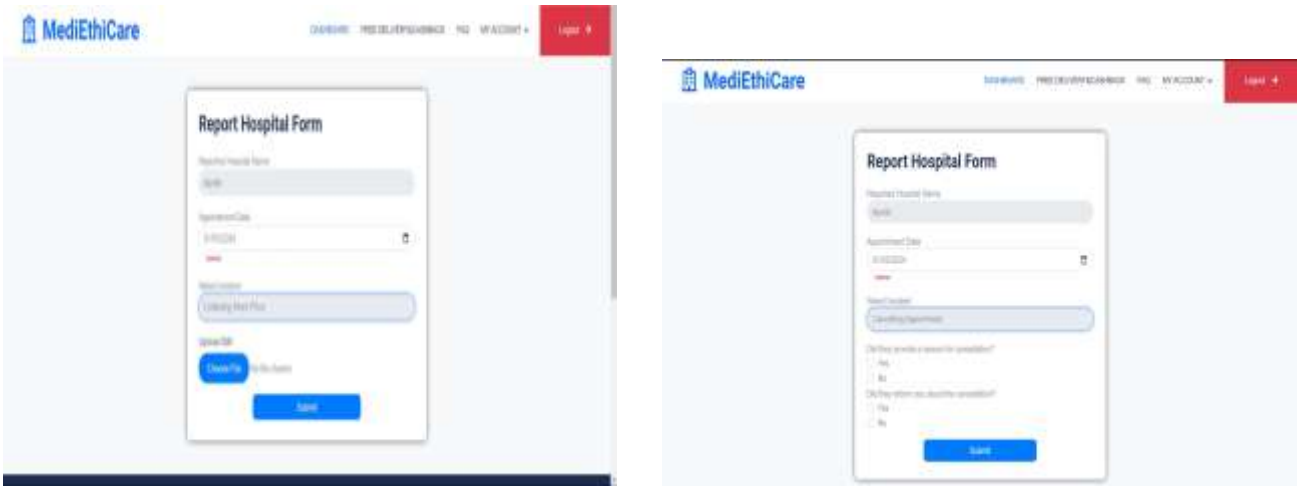


Fig 5.6 Complaint against Hospital

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

CONCLUSION

The healthcare application, beyond its core functionalities, offers supplementary services to enrich the user experience and facilitate comprehensive healthcare management. Users benefit from healthcare navigation assistance, accessing information on nearby facilities and specialist clinics, empowering informed decisions. The application developed for medical emergencies, incorporating features such as appointment booking, real-time medicine availability updates, and service information, serves as a critical resource in optimizing patient care and streamlining healthcare services. It involves implementing a robust complaint system and ensuring data integrity through mechanisms to prevent tampering, the application prioritizes patient safety and satisfaction. The proposed healthcare application addresses the challenges patients face in accessing urgent and affordable care during medical emergencies. Also, The Platform offers a safe harbor, built on transparency, empowerment, and efficient delivery. The application can help the people with fair prices for their needs Utilizing the TD-IDF (Term Frequency-Inverse Document Frequency) vectorizer for the medicine recommendation algorithm significantly enhances the precision and relevance of suggested alternative medications by extracting the importance of medical terms in patient descriptions, ensuring informed healthcare decisions.

FUTURE SCOPE

Towards the future, the integration of blockchain technology presents promising opportunities to further enhance the security and accessibility of patient records. By leveraging blockchain's decentralized and immutable ledger, the application can ensure the integrity and traceability of patient data, while also enabling secure sharing of medical information across healthcare providers and institutions. And integrating advanced technologies like artificial intelligence (AI) and machine learning (ML) to personalize healthcare recommendations and improve predictive analytics. AI algorithms can analyze patient data to identify patterns, predict health risks, and tailor treatment plans to individual needs. Additionally, the project could explore the implementation of wearable devices and IoT (Internet of Things) sensors to gather real-time health data, enabling proactive monitoring and early intervention.

CHAPTER 7

REFERENCES

[1] D. Gupta and B. Denton, 2008"Appointment scheduling in health care: Challenges andopportunities," IIE Trans., vol. 40, no. 9, pp. 800–819- https://www.researchgate.net/publication/228628013_Appointment_scheduling_in_health_care_Challenges_and_opportunities

[2] M. Firdaus and M. Naser, "Pharmacy Management System Medicine Selector For MinorIllness And Stock Alert System," 2008.- https://www.semanticscholar.org/paper/Pharmacy-Management-System-Medicine-Selector-For-Firdaus-Naser/7b947eb6e822f8923e9cde05f54d08d64317e864

[3] S. Sri Gowthem, & K.P. Kaliyamurthie ,2015 ,Smart Appointment Reservation System, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4,Issue .- https://www.ijirset.com/upload/2015/june/35A_065_Sri_Gowthem_1.pdf

[4] Keenan, C. R., Nguyen, H. H., & Srinivasan, M. (2006). Electronic medical records andtheir impact on residents and medical student education. Academic Psychiatry. 30(6), 522- 527. doi:10.1176/appi.ap.30.6.522.

[5] M. Firdaus and M. Naser, "Pharmacy Management System Medicine Selector For MinorIllness And Stock Alert System," 2008.- https://www.scribd.com/document/86035782/Pharmacy-Management-System-Medicine-Selector-for-Minor-Illness-and-Stovk-Alert-System-Muhammad-Firdaus-b-Mohammad-Naser-QA76-9-S88-M44-2008

[6] Azaria A, Ekblaw A, Vieira T, Lippman A. Medrec: Using blockchain for medical data access and permission management. In 2016 2nd International Conference on Open and Big Data (OBD) 2016 Aug;:25–30.- https://ieeexplore.ieee.org/document/7573685

[7] Nazia S, Ekta Sarda,2014,Online Appointment Scheduling System forHospitals–An Analytical Study,International Journal of Innovations in Engineering and Technology (IJIET)- http://ijiet.com/wp-content/uploads/2014/12/4.pdf

[8] A Smart Recommendation System for Medicine using Intelligent NLP Techniques, 2022 International Conference on Automation, Computing and Renewable Systems (ICACRS)- https://www.researchgate.net/publication/368342243_A_Smart_Recommendation_System_for_Medicine_using_Intelligent_NLP_Techniques

[9] Keenan, C. R., Nguyen, H. H., & Srinivasan, M. (2006). Electronic medical records andtheir impact on residents and medical student education. Academic Psychiatry. 30(6), 522- 527. doi:10.1176/appi.ap.30.6.522. https://www.researchgate.net/publication/6659949_Electronic_Medical_Records_and_Their_Impact_on_Resident_and_Medical_Student_Education

[10] Shuaib K, Saleous H, Shuaib K, Zaki N. Blockchains for secure digitized medicine. J PersMed. 2019 Jul 13;9(3):35. doi: 10.3390/jpm9030035. https://www.mdpi.com/2075- 4426/9/3/35/htm .jpm9030035 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

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MediEthiCare - Application of Healthcare during Medical Emergencies

S L V V D Sarma, Sura Ramya, Pulagam Hema Sri, Kokkiligadda Jayanth, Pallepogu Priestly

Assistant Professor, Department of CSE-AI&ML, Vasireddy Venkatadri Institute of Technology, Guntur, A.P., India

Department of CSE-AI&ML, Vasireddy Venkatadri Institute of Technology, Guntur, A.P., India

Department of CSE-AI&ML, Vasireddy Venkatadri Institute of Technology, Guntur, A.P., India

Department of CSE-AI&ML, Vasireddy Venkatadri Institute of Technology, Guntur, A.P., India

ABSTRACT: Accessing urgent and affordable healthcare during medical emergencies remains challenging for many patients. This impedes access to affordable and timely treatment when it is needed most. The proposed application introduces real-time price monitoring, ensuring transparent and competitive pricing for medical services and supplies. It incorporates an emergency resource allocation algorithm that fairly distributes essential medical resources based on objective criteria, preventing hoarding and ensuring equitable access. The application addresses the lack of clarity on bed availability and treatment details by offering a comprehensive guide to various hospitals. This includes precise rates and available medical facilities, empowering citizens to access affordable medical emergency services based on their preferences and the current availability. In order to make the application more accessible and engaging for users, the application is incorporated with scheduling appointments and procurement medicines through the platform the application streamlines the process and minimizes wait times. Patients can select appointments based on their convenience, empowering, them to take greater control of their healthcare. A robust complaint redressal system allows users to complaint against any price transparency and false practices in hospital. Furthermore, the application includes a cashback incentive program to encourage user participation and loyalty. Advanced algorithms are utilized to recommend alternative medicines based on patient descriptions and reasons, empowering patients to make informed healthcare decisions.

KEYWORDS: HealthCare, Procuring Medicines ,Emergencies ,Appointment Booking, Medical Records, Block Chain ,Data Tampering ,Complaint against Price Transparency, Alternative Medicines

I. INTRODUCTION

Delving into the complexities of emergency healthcare often evokes feelings of discomfort and apprehension. At the core of our lives, the healthcare sector bears the potential responsibility for the repercussions stemming from errors in clinical services, which could lead to adverse effects or, in extreme situations, loss of life. Issues like convoluted pricing structures, uneven resource allocation, and the risk of exploitation can leave individuals feeling exposed, especially in the private healthcare sector where profit-driven practices might overshadow patient well-being.

In response to these challenges, this application proposes an innovative approach—an extensive web application dedicated to redefining emergency healthcare by prioritizing transparency, fairness, and user empowerment. At the core of this study is the development of a web-based application tailored to individuals grappling with medical emergencies. A significant focus is placed on ensuring fairness in service pricing, coupled with a unique functionality that allows users to report concerns about hospital pricing transparency. Our platform goes beyond mere procedural enhancements, aiming instead to equip users with the essential tools and understanding needed to navigate the healthcare landscape confidently.

Through a user-centric and informed decision-making approach, this initiative aims to shape a future where healthcare transcends its conventional role as a service, evolving into an empowering and supportive experience for users. This platform extends beyond its basic functionality; it signifies a transformation in the way users engage with healthcare, emphasizing the importance of informed choices and fostering a sense of empowerment through each interaction.

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II. LITERATURE SURVEY

The digitalization of healthcare is unfolding rapidly, with diverse platforms seeking to address various pain points. This review delves into four distinct areas, revealing both the potential and challenges within each

1.Buildinga Comprehensive Healthcare Ecosystem:

One project envisions a holistic platform encompassing user-centered design, seamless integration with existing healthcare systems, telemedicine capabilities, and robust patient engagement features[21]. This ambitious approach promises to empower patients through informed choices and personalized care plans, while also[24] streamlining communication and data exchange across the healthcare ecosystem. However, ensuring equitable access, particularly for underserved communities, and navigating the diverse needs of various stakeholders will be crucial challenges to overcome[15].

2. Medicines Procurement Made Easy:

Another project focuses on simplifying the often-complex process of medication procurement[4]. By leveraging digital tools and potentially integrating with existing healthcare platforms,[5] this approach aims to improve accessibility, affordability, and transparency for patients. Ensuring data security and patient privacy while addressing potential disparities in digital literacy remain key considerations for successful implementation[5]

3. Simplifying Appointment Scheduling:

[1]Streamlining appointment booking is another focus area, with one project proposing a user-friendly and secure web-based interface with SMS notification features[2]. This emphasis on accessibility and convenience empowers patients and reduces administrative burden on healthcare providers. However, catering to users with limited technological skills and ensuring system scalability to handle increased demand are potential hurdles to address[3].

4. Securing the Fortress of Patient Data:

Data security is paramount in any healthcare platform, and one project emphasizes compliance with regulations like HIPAA and implementation of robust security measures like employee training and secure communication protocols. This focus on data integrity and patient privacy is crucial for building trust and ensuring safe adoption of digital healthcare solutions. However, balancing security measures with resource constraints and ensuring seamless integration with existing systems can pose implementation challenges.

III. METHODOLOGY

This innovative healthcare web application aims to empower both patients and hospitals by streamlining crucial services. Users can conveniently schedule appointments, procure medicines, and access medical records through an integrated portal promoting proactive health management. The solution further assists patients by compiling availability and pricing information across hospitals for transparent decision-making when urgently required care. Its bed availability feature enables locating services during critical situations while machine learning generated alternative medicine suggestions foster informed patient choices. Although not intended to replace physician judgment, this feature expands perspectives. For enrolled hospitals, the application bolsters accessibility to more patients by publicly listing their services and real-time capacity across departments. Moreover, administrators manage digital facilities to engage with forthcoming appointment requests and user complaints regarding discrepancies in advertised pricing or services. By cultivating accountability and transparency between patients and healthcare institutions, the platform signifies a patient-centric advancement. The multi-stakeholder system grants accessible dashboards for users to unlock healthcare navigation while opening hospitals to augment community care outreach, backed by oversight ensuring reliability. Through conscientious use and constructive responses to responsible complaints, hospitals also broadcast good faith efforts toward equitable delivery. With cooperation, the application can proliferate trust and mutually favourable healthcare experiences.

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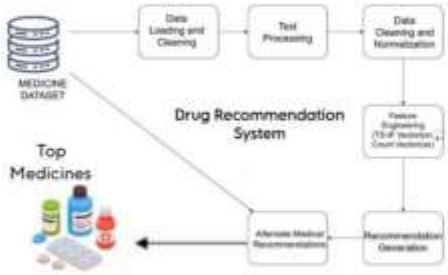

Fig 1 NLP Architecture

The initial phase involves cleansing and restructuring the medicine descriptions for machine learning ingestion, followed by encoding the text into numerical representations via advanced weighting schemes such as TF-IDF to calculate relevancy. The dataset is then partitioned into separate training and test sets to facilitate algorithm learning and performance evaluation. Models are trained on the training data to statistically learn latent patterns within medicine traits, enabling them to predict similarities. Various methodologies are tested on isolated test samples, with the most effective one selected. The final model is rigorously examined using fresh datasets to confirm the broader relevance of the identified relationships among medicine characteristics. With a fully validated model capable of discerning nuanced connections, users' medicine queries are converted into numerical vectors and then utilized as inputs to recommend alternative medicines with similar characteristics, thereby leveraging algorithms and data to uncover substitute medicines tailored to users' needs and preferences.

Text Similarity:

This technique can be used to find similarities between different articles, research papers, or user queries related to alternative medicines. By measuring the similarity between texts, you can recommend alternative medicines based on their similarity to ones the user is already interested in or has found effective. Techniques such as cosine similarity, Jaccard similarity, or embeddings-based approaches (like Word2Vec or BERT) can be used to compute text similarity.

Topic Extraction:

Topic extraction can be used to identify the main themes or topics discussed in articles, forums, or user queries related to alternative medicines. Topic extraction aims to identify the main themes or topics discussed in a piece of text using techniques like Latent Dirichlet Allocation(LDA), Non-negative Matrix Factorization(NMF),or neural topic modelling. By understanding the topics, you can recommend alternative medicines that are relevant to the user's interests or health concerns.

Keyword Extraction:

Keyword extraction can identify important words or phrases related to alternative medicines within text. These keywords can then be used to match user queries with relevant articles or information about alternative medicines. Keyword extraction involves identifying important words or phrases from a piece of text that best represent its content. Techniques such as TF-IDF(Term Frequency-Inverse Document Frequency) or Text Rank can be used for keyword extraction. When recommending alternative medicines, keyword extraction can identify relevant terms or phrases related to alternative health practices.

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1, Count Vectorizer :

Count Vectorizer operates efficiently even with large datasets, making it suitable for processing
extensive text corpora. Its simplicity and computational efficiency make it an excellent choice for initial exploratory data analysis or as a baseline model in natural language processing
pipelines. Furthermore, by providing a direct count of word occurrences, the Count Vectorizer enables straightforward interpretation and analysis of text data, facilitating insights into the vocabulary and word usage patterns within the corpus. As users input drug names, the Count Vectorizer swiftly analyses their occurrences, providing a direct count of word occurrences. Its versatility extends to various text mining tasks, including topic modeling, text classification, and information retrieval. Thus, the Count Vectorizer serves as a fundamental tool in extracting meaningful features from text data for a wide range of applications in machine learning and text analytics.

2,TD-IDF Vectorizer :

The TF-IDF Vectorizer is used to reflect the importance of each word in a document relative to the entire dataset. TF-IDF stands for Term Frequency-Inverse Document Frequency, and it
calculates a value for each word based on how often it appears in a document (term frequency) and how rare it is across the entire corpus(inverse document frequency). where users input drug names, leveraging the TF-IDF vectorizer enables the discovery of similar drugs from a dataset.
Initially, the user's drug name input undergoes preprocessing to ensure alignment with the TF IDF format. Subsequently, the TF-IDF vectorizer, previously trained on a dataset containing drug names, transforms the input into a numerical vector representation, reflecting the significance of each term relative to the entire dataset. Utilizing a similarity metric like cosine similarity, the application computes the resemblance between the input drug's TF-IDF vector and those of all drugs in the dataset. Through this process, drugs are ranked based on their similarity scores, with those exhibiting the highest scores deemed the most similar and subsequently recommended to the user. By employing TF-IDF in this manner, the application facilitates efficient drug discovery and recommendation, enhancing user experience and aiding in medical decision-making.

IV. IMPLEMENTATION

This web application combines the most recent technology to create a robust and user-friendly experience. The client side of the application boasts a striking design, made using the latest combination of HTML5, CSS3, and JavaScript. By ensuring that the user experience is seamless across devices, these technologies establish a foundation for engaging interactions. Django, a Python-based framework that is known for its flexibility and effectiveness, is utilized by the application on the server side. Django adeptly manages the application's logic, guaranteeing seamless functionality and data exchange. To ensure the integrity and accessibility of the data in the application, we've implemented a dual database strategy: MySQL with strong transactional capabilities and MongoDB with flexible handling of different data types. With care, this carefully selected tech stacks produce an enthralling web app that is both user-friendly and reliable.

The user signup process collects personal details to enable customized services while users create secure passwords and email verification adds security; registered users can login by entering credentials. The healthcare application mandates user sign up and secure login to verify individuals before permitting transactions. This feature not only maintains user privacy but also streamlines communication by facilitating medical records of the user such as the appointments and order he have placed. Hospital registration involves providing organizational information, credentials and catalog details for verified profiles after vetting; authorized hospital admins then login to securely manage accounts and update information .Multi-factor authentication and biometrics enhance security across user and hospital logins. The goal is seamless user experiences and water-tight hospital account controls.

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Fig 2 User Sign Up

The hospital registration and login system allows hospitals to enter the application by uploading relevant documents and information. Once registered, the hospital can add details about the medicines, services, and types of beds they have available. The admin plays a crucial role here, as they need to approve the registered hospitals to be included in the application. If the admin does not accept a hospital, it will not be visible to users. The admin can also view the list of hospitals that have been accepted and any complaints raised against them. This process ensures that users have access to reliable and approved healthcare services, while the admin maintains oversight and can address any issues that may arise in the application.

Fig 3 Admin Dashboard

The medicine procurement feature within the application benefits the way users obtain essential pharmaceuticals. By integrating with multiple hospitals, users can seamlessly search for medicines and easily compare prices, promoting transparency and empowering users to make informed decisions. Should users identify exploitative pricing, the application offers a platform to raise complaints, effectively holding hospitals accountable for fair pricing practices. Once users choose their preferred options, the process of checking out medicines is streamlined through integrated payment gateways, ensuring a seamless and secure transaction process. After hospitals accept placed orders, customers can choose to have their purchases delivered or opt for collection by checking the orders that has been placed with in their profile. It helps in user to know about medicines and their availability in various hospitals.

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Fig 4 Medicine Procurement

The appointment booking feature within our application serves as an essential tool in the healthcare landscape, streamlining a traditionally complex process. Our user-centric approach allows users to fill out a simple form with their details, specify the type of appointment and service they require, and select a preferred date, time, and hospital. Once the form is submitted, it is promptly received by the respective hospital, which conducts a swift availability check. Should the date and time align, the hospital seamlessly accepts the appointment. Hospital administrators are empowered through an hospital login to oversee and manage all incoming appointments, ensuring they can effectively accommodate only those they can handle. This not only ensures a smoother flow of appointments but also maintains transparency in the scheduling process. Meanwhile, users can effortlessly track their appointments across various hospitals through the "My Appointments" section in their profiles. This intuitive feature facilitates a user-friendly experience, allowing individuals to easily schedule and manage their appointments while hospitals efficiently handle incoming bookings. Through this thoughtful integration, our application enhances the overall healthcare experience, making the process of booking appointments more efficient and transparent for both users and healthcare providers.

Fig 5 Appointment booking

The application also features an alternative medicine recommendation tool, providing users with options when they enter a specific medication. Upon inputting a medicine, the application offers suggestions for alternative remedies that could be used interchangeably based on similar indications and descriptions. This functionality serves to broaden users' options and provide them with a range of alternatives that may align with their needs, preferences, or medical circumstances. By offering alternative medicines with comparable reasons for use and descriptions, the application aims to enhance users' access to diverse therapeutic options while promoting informed decision-making regarding their healthcare choices.

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Fig 6 Alternative Medicine Recommendation

The complaint feature in our application is crucial in maintaining user satisfaction and ethical standards in hospital services. Users can lodge complaints against hospitals through various avenues, be it regarding appointments or purchases of medicines. When encountering instances of perceived cost transparency issues, users have the option to upload the relevant bill as evidence, which serves as the foundation for their complaint. Furthermore, users can report cases where hospitals cancel appointments without due notification. By providing the hospital's name and the date of the missed appointment, users can ensure their grievances are documented and addressed. Users can also leverage the application to cross-reference the availability and pricing of services they require. If a service is advertised but not provided upon inquiry, or if pricing appears unjustified, users can promptly report the issue, encouraging hospitals to be more upfront and considerate of their users' needs. Moreover, the feature caters to the user's ability to report any instances of unethical behaviour demonstrated by hospital staff. Whether it's unprofessional conduct or lack of respect towards patients, users are encouraged to highlight these incidents by providing relevant staff and hospital details.

The complaints lodged against hospitals are meticulously monitored by the admin, who then takes appropriate actions to ensure that user complaints are addressed and resolved efficiently. This intricate system fosters accountability, transparency, and ultimately enhances user satisfaction within the healthcare sector, reinforcing the importance of user-centric service delivery and ethical standards in medical care.

Fig 7 Complaint against Hospital

V. RESULTS

The Count Vectorizer provides a simple and direct representation of word counts, while the TF-IDF Vectorizer can be more sophisticated in capturing the importance of each word in a specific document relative to the entire dataset. So, TF-IDF Vectorizer could be more suitable the uniqueness and relevance of words are critical and can be used in our recommendation. The below plots show about most unique drugs and 10 most common drugs from the dataset and recommendation is done using TF-IDF Vectorizer and Cosine Similarity model.

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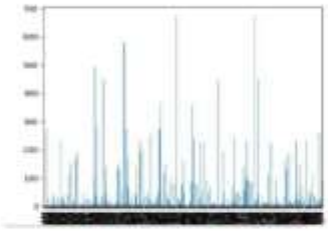

Fig 8 Unique Drugs

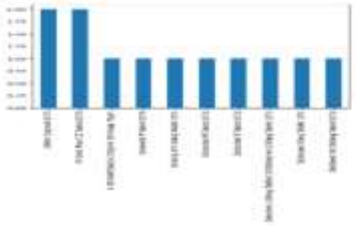

Fig 9 Common Drugs

VI. CONCLUSION

The healthcare application, beyond its core functionalities, offers supplementary services to enrich the user experience and facilitate comprehensive healthcare management. Users benefit from healthcare navigation assistance, accessing information on nearby facilities and specialist clinics, empowering informed decisions. The application developed for medical emergencies, incorporating features such as appointment booking, real-time medicine availability updates, and service information, serves as a critical resource in optimizing patient care and streamlining healthcare services.

It involves implementing a robust complaint system and ensuring data integrity through mechanisms to prevent tampering, the application prioritizes patient safety and satisfaction. The proposed healthcare application addresses the challenges patients face in accessing urgent and affordable care during medical emergencies. Also, The Platform offers a safe harbour, built on transparency, empowerment, and efficient delivery. The application can help the people with fair prices for their needs Utilizing the TD-IDF (Term Frequency-Inverse Document Frequency) vectorizer for the medicine recommendation algorithm significantly enhances the precision and relevance of suggested alternative medications by extracting the importance of medical terms in patient descriptions, ensuring informed healthcare decisions as we proceed.

REFERENCES

[1] D. Gupta and B. Denton, 2008"Appointment scheduling in health care: Challenges and opportunities," IIE Trans., vol. 40, no. 9, pp. 800–819

[2] Xiaojun Zhang,2012,Developing an online patient Appointment Scheduling system based on web services architecture, Chinese Academy of Sciences EET ALAPAMI 2012 Conference Proceedings

[3] S. Sri Gowthem, & K.P. Kaliyamurthie ,2015 ,Smart Appointment Reservation System, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Issue .

[4] S. Goundrey-Smith, "Examining the role of new technology in pharmacy: now and in the future," FOCUS: COMMUNITY PHARMACY, 11 FEB 2014 2014.

[5] R. P. Robert Oscar, "Mobile Technology Improves Pharmacy Utilization, Cuts Health Care Costs," May 6, 2013 2013.

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[6] M. Firdaus and M. Naser, "Pharmacy Management System-Medicine Selector For Minor Illness And Stock Alert System," 2008.

[7] Jonathan P. F. Strahl,2015 ,Patient appointment scheduling system: with supervised learning prediction' Aalto, University School of Science, Master's Programme in Machine Learning and Data Mining

[8] Nazia S, Ekta Sarda,2014,Online Appointment Scheduling System forHospitals–An Analytical Study,International Journal of Innovations in Engineering and Technology (IJIET)

[9] Anwar Islam, Tuhin Biswas. Health System in Bangladesh: Challenges and Opportunities. American Journal of Health Research.Vol. 2, No. 6, 2014, pp. 366- 374. doi: 10.11648/j.ajhr.20140206.18

[10] Keenan, C. R., Nguyen, H. H., & Srinivasan, M. (2006). Electronic medical records and their impact on residents and medical student education. Academic Psychiatry. 30(6), 522-527. doi:10.1176/appi.ap.30.6.522.

[11] Xiaojun Zhang , Dr. Ping Yu , Dr. Jun Yan , Hongxiang Hu , and Dr. Niraj Goureia,2012,

[12] Peng Zhao, Illhoi Yoo, , Jaie Lavoie, Beau James Lavoie, and Eduardo Simoes, 2017, Web-Based Medical Appointment Systems: A Systematic Review Vol 19, No 4 (2017): April

[13] Azaria A, Ekblaw A, Vieira T, Lippman A. Medrec: Using blockchain for medical data access and permission management. In 2016 2nd International Conference on Open and Big Data (OBD) 2016 Aug;:25–30.

[14] [16] A. Dubovitskaya, Z. Xu, S. Ryu, M. Schumacher, and F. Wang, "Secure and Trustable Electronic Medical Records Sharing Using Blockchain," in AMIA (American Medical Informatics Association) Annual Symposium Proceedings ,2017

[15] Nakamoto, "Bitcoin: A peer-to-peer electronic cash system," White Paper, 2008.

[16] Wood, "Ethereum: A secure decentralised generalized transaction ledger," Ethereum Project Yellow Paper, 2014.

[17] Rabah KVO. Challenges & opportunities for blockchain powered healthcare systems: A review. Mara Res J Med Health Sci. 2017;1(1):45–52. [Google Scholar]

[18] McGhin T, Choo KR, Liu CZ, He D. Blockchain in healthcare applications: Research challenges and opportunities. J Netw Comput Appl. 2019 Jun;135:62–75. doi: 10.1016/j.jnca.2019.02.027. [CrossRef] [Google Scholar]

[19] Vazirani AA, O'Donoghue O, Brindley D, Meinert E. Implementing blockchains for efficient health care: Systematic review. J Med Internet Res. 2019 Feb 12;21(2):e12439. doi: 10.2196/12439. https://www.jmir.org/2019/2/e12439/ v21i2e12439 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[20] Zhang R, George A, Kim J, Johnson V, Ramesh B. Benefits of blockchain initiatives for value-based care: Proposed framework. J Med Internet Res. 2019 Sep 27;21(9):e13595. doi: 10.2196/13595. https://www.jmir.org/2019/9/e13595/ v21i9e13595 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[21] Shuaib K, Saleous H, Shuaib K, Zaki N. Blockchains for secure digitized medicine. J Pers Med. 2019 Jul 13;9(3):35. doi: 10.3390/jpm9030035. https://www.mdpi.com/2075-4426/9/3/35/htm .jpm9030035 [PMC free article] [PubMed] [CrossRef] [Google Scholar]