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# MediEthiCare - Application of Healthcare during Medical Emergencies

S L V V D Sarma, Sura Ramya, Pulagam Hema Sri, Kokkiligadda Jayanth, Pallegogu 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.

## 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. Building a 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.

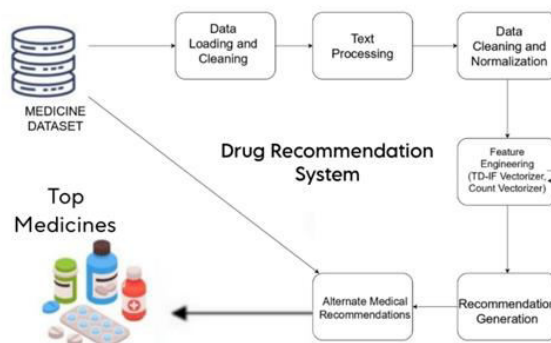


Fig 1 NLP Architecture

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.



### 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.

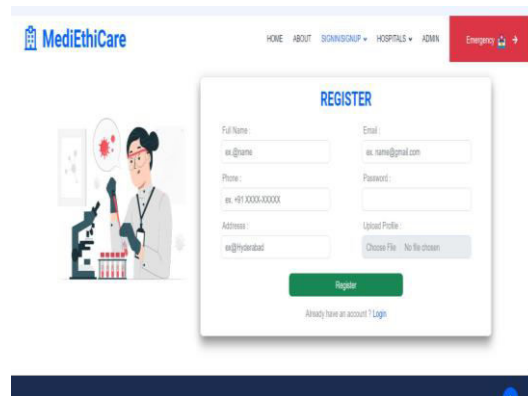


Fig 2 User Sign Up

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.

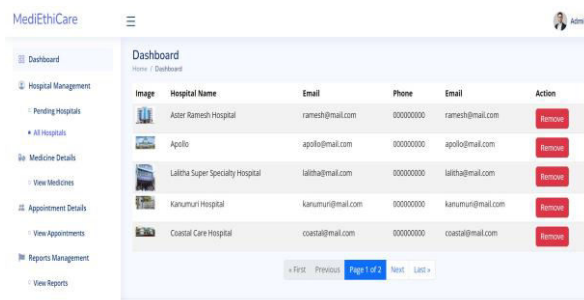


Fig 3 Admin Dashboard

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.

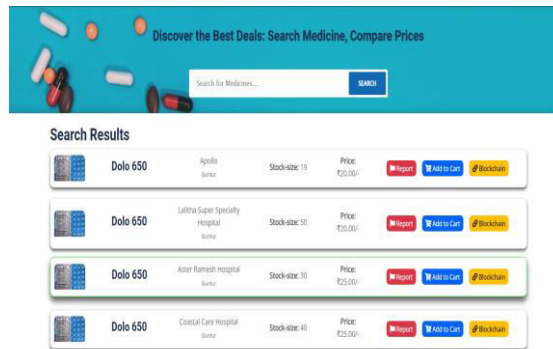


Fig 4 Medicine Procurement

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.

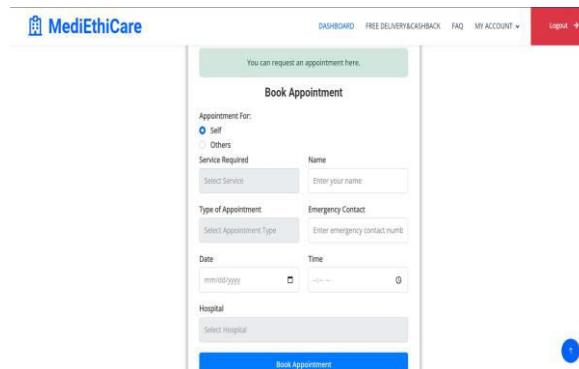


Fig 5 Appointment booking

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.



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.

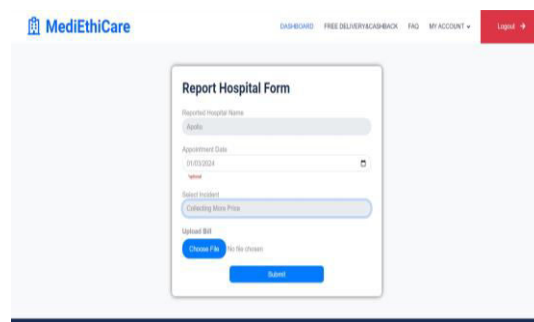


Fig 7 Complaint against Hospital

## 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.



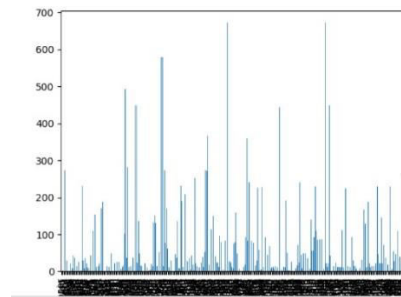


Fig 8 Unique Drugs

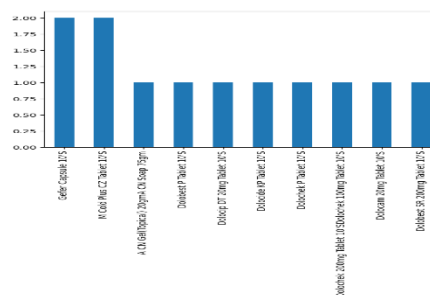


Fig 9 Common Drugs

## 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.

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