

Medimate: A Platform for Peer-To-Peer Exchange of Compositionally Similar Medicines at Affordable Prices

Manasa Sandeep¹, Koustav Biswas², Ayush BR³, Anagha HP⁴, Amisha AR⁵, Chinmayi Padmaraj⁶

¹*Assistant Profesor, Department Of Computer Science And Engineering, Dayananda Sagar Academy Of Technology And Management, Bengaluru, Karnataka, India*

²*Former Undergraduate Student, Department of Computer Science and Engineering, Dayananda Sagar Academy of Technology and Management, Bengaluru, Karnataka, India.*

³⁻⁴⁻⁵⁻⁶ *Undergraduate Students, Department Of Computer Science And Engineering, Dayananda Sagar Academy Of Technology And Management, Bengaluru, Karnataka, India.*

Abstract—The rising cost of branded pharmaceuticals continues to be a significant barrier to fair healthcare access, especially for economically disadvantaged groups. Even with the availability of generic and equivalent medications, many people either do not know about these options or cannot afford them. To tackle this pressing issue, we present MediMate, a web application designed to connect users through a peer-to-peer marketplace for buying and selling medicines with similar chemical compositions at much lower prices. The platform uses a carefully selected pharmaceutical database that allows for accurate drug matching based on factors like active ingredients, dosage forms, and therapeutic categories. This ensures that users receive safe and effective alternatives to expensive branded medications. One of MediMate’s key innovations is its JavaScript Chatbot Assistant, which is crucial for user engagement and accessibility. The chatbot offers smart suggestions for equivalent drugs, guides users through the platform’s features, answers health-related questions, and provides step-by-step help for uploading prescriptions and managing transactions. This interactive assistant also helps users make informed choices by breaking down medical jargon and giving relevant responses based on their needs. By integrating Ajax support with an easy-to-use marketplace, MediMate not only helps lower the financial burden of medications but also tackles bigger issues like pharmaceutical waste, access to drugs, and digital literacy in healthcare. This research examines the system's design, main features, and MediMate’s potential to change how underserved communities access and manage essential medications in a digital world

Index Terms—Medicine affordability, therapeutic equivalence, drug composition matching, mobile health application, chatbot, pharmaceutical database, medicine

exchange platform, e-health, cost-effective medication, medicine marketplace.

I. INTRODUCTION

Access to affordable and effective medication is essential for public health, especially in developing areas. Here, high costs for branded drugs often lead to poor medication adherence and worse treatment outcomes. Even though there are generic and similar alternatives available, many patients cannot benefit from these options due to a lack of awareness, limited access, and broken distribution systems. To tackle this issue, we propose MediMate, a mobile health app that helps users buy and sell medicines with similar chemical compositions. The platform allows users to find cost-effective alternatives based on therapeutic equivalence and verified composition data, reducing the reliance on expensive branded medications. Unlike traditional e-pharmacy services, MediMate enables peer-to-peer transactions, creating a decentralized system where users can list or search for drugs based on active ingredients and formulations. A key feature of MediMate is its integrated chatbot assistant. This assistant offers an interactive way to improve user engagement and make interactions smoother. The chatbot helps users find suitable drug alternatives, answers questions about medications, guides them in uploading prescriptions, and ensures safe and accurate matches using regulatory-approved pharmaceutical databases. This conversational tool not only makes the experience easier but also encourages informed decision-making. The app focuses on security, usability, and scalability, ensuring that both buyers

and sellers are verified and transactions are clear. By combining strong search features, intelligent assistance, and a peer-driven marketplace, MediMate addresses the dual issues of medicine affordability and accessibility while helping to cut down on pharmaceutical waste. This research work outlines the system architecture, main features, implementation approach, and results from initial user testing of MediMate. It also analyzes its potential to change how underserved communities access medicine.

II. LITERATURE SURVEY

2.1 "Cause Analysis of High Price Differences in Drugs Before and After the Deregulation of Drug Price Control: Empirical Study with big data on drug price data of 16 provinces in China."

Zhang et al. [1] conducted a study to investigate the reasons behind significant drug price differences before and after China relaxed drug price controls. They used data from 16 provinces and examined how prices changed. The study identified important factors causing regional price differences, including a lack of standardized pricing, market fluctuations, and varying levels of competition. Their findings highlight the need for clear pricing systems and consistent regulations to ensure affordability. These insights are especially important for developing applications like MediMate, which aim to help users find similar medicines at lower prices through smart matching and marketplace methods.

2.2 "Price Trend Analysis and Its Implications for the Development of New Medical Technologies"

Brown et al. [2] examined historical price trends in the pharmaceutical sector and looked at their implications for developing and adopting new medical technologies. Their study highlighted how rising drug prices can serve as both a barrier and a motivator. Price increases can limit patient access while encouraging innovation and alternative treatment methods. The authors stressed the need to understand pricing behaviors to support sustainable technology development and healthcare policy. This work offers key insights for platforms like MediMate, which aim to reduce high drug costs by suggesting similar and affordable alternatives. This approach improves accessibility without sacrificing effectiveness.

2.3 "Human Centric Explainable AI for Personalized Educational Chatbots"

M. H T et al. [3] studied how to integrate human-centric explainable AI (XAI) into personalized educational chatbots. They highlighted the importance of transparency, trust, and adaptability in interactions between humans and computers. Their work introduced an AI architecture that not only provides accurate responses but also offers clear justifications tailored to the user's context and behavior. Although their focus was on education, the basic idea of explainable and user-adaptive conversational agents applies to healthcare and pharmaceutical settings as well. For example, in MediMate, a similar approach can build user trust and satisfaction. This happens when the chatbot assistant transparently explains why certain medicines, which have similar compositions, are recommended, based on ingredients, dosage, and user input. The use of explainable AI has great potential to enhance user engagement and decision-making in medical applications.

2.4 "Network-Based Drug-Target Interaction Prediction with Probabilistic Soft Logic"

Fakhraei et al. [4] proposed a new method for predicting drug-target interactions using a network-based approach supported by Probabilistic Soft Logic (PSL). Their model successfully combined various biological and chemical data sources to uncover potential interactions through soft logic rules. This approach provides a scalable and understandable framework for drug discovery. Mapping the relationships between drugs and their targets increased both prediction accuracy and clarity, which are vital for real-world biomedical uses. This work is relevant to platforms like MediMate, where understanding the therapeutic connections between drugs can help in reliably finding similar alternatives. Adding such predictive models could improve the decision support features of the application, especially when included in a chatbot interface.

2.5 "Implementing A Web-Based Application Integrated with OCR To Address Generic Medicine Unpopularity Issues"

Chandrashekhar and Monika [5] developed a web application that includes Optical Character Recognition (OCR) to tackle the common issue of low use of generic medicines. Their system extracts text

from prescriptions to identify branded drugs and suggests corresponding generic alternatives by searching a pharmaceutical database. This method addressed the problems of low awareness and limited digital access to generic options. It provided a user-friendly platform that promoted cost-effective medications. MediMate shares the same goal of promoting affordable, equivalent medicines. However, MediMate takes it a step further by adding chatbot-based support and peer-to-peer exchange features. This improves both accessibility and user engagement in real time.

III. METHODOLOGY

The development of MediMate uses a modular and user-focused design method, built on the Django web framework [1]. Django was picked for its strong Model-View-Template (MVT) structure, built-in security features, scalability, and support for quick development cycles [2]. The overall development process consists of five main phases: requirement analysis, system architecture design, module development, integration, and testing. Each phase focused on maintainability, performance, and user experience is shown in Figure 3.1 and Figure 3.2. The system architecture of MediMate is organized into four main components that work well together to offer an efficient user experience. The frontend interface uses HTML, CSS, and JavaScript integrated into Django templates. It provides an easy platform for users to search for medicines, upload prescriptions, and interact with the chatbot [3]. The backend engine, built on the Django framework, handles key features such as user authentication, business logic, API routing, and database tasks through Django's ORM. This ensures smooth communication with the data layer. The database layer uses SQLite to securely store important information like user profiles, medicine details, transaction records, prescription data, and chatbot interactions while maintaining data integrity and performance. Also, a chatbot module is implemented using JavaScript and custom-trained models [4]. It connects with the backend to allow natural language interactions, so users can receive personalized help effectively. MediMate's main features come from several important modules, each designed to meet specific user needs.

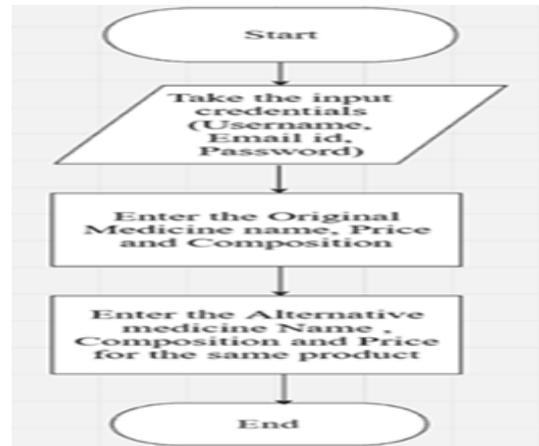


Figure 3.1 Drug Seller Side

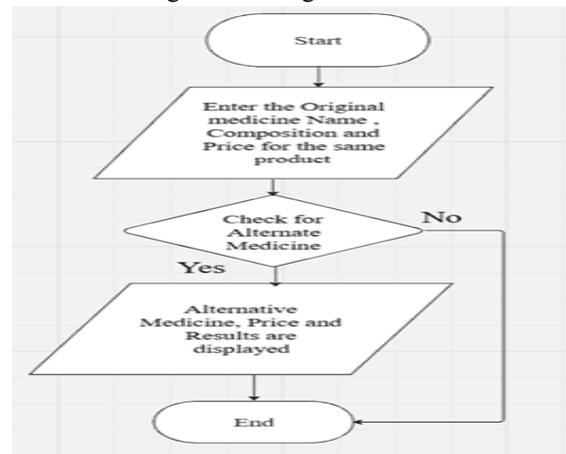


Figure 3.2 Drug Buyer Side

The Medicine Matching Engine is crucial because it uses a pharmaceutical database to find drugs with similar active ingredients and therapeutic equivalence. These names are then connected to the database for precise medicine suggestions [8]. Lastly, the Chatbot Assistant is embedded through Django Channels to enable asynchronous communication [5]. It helps users with tasks like listing medicines, finding alternatives, and answering common questions, which greatly improves engagement and usability. At the core of MediMate is its peer-to-peer marketplace, which connects users in a decentralized network for buying and selling medications based on verified chemical composition instead of just brand names. Users can list unused or extra medicines by providing detailed information such as drug name, active ingredients, dosage, expiry date, and price [6]. This information goes through automated expiry checks and manual approval for safety. Buyers can search for drugs by their composition, which helps them find

therapeutically equivalent alternatives that may cost less [7]. This builds trust within the community. By promoting the redistribution of medicines, the marketplace reduces pharmaceutical waste while improving access and affordability for underserved populations.

IV. RESULTS



Figure 4.1 shows the Medicines available in the stock

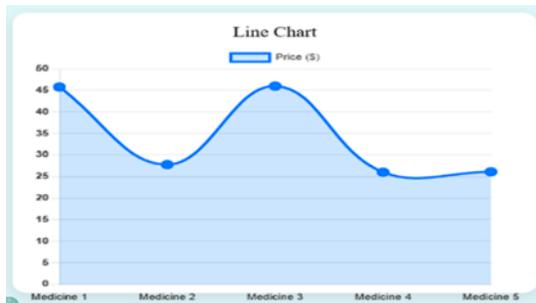


Figure 4.2 shows the Medicines prices of the available stock.

V. CONCLUSION AND FUTURE ENHANCEMENTS

MediMate tackles the important issues of medicine affordability and accessibility. It offers a user-friendly platform for buying and selling medicines with similar compositions directly between users. By using a strong medicine matching engine, integrated chatbot support, and secure user verification within a scalable Django framework, the app helps users make informed choices and find cost-effective alternatives to brand-name drugs. The addition of prescription OCR makes the user experience easier, lowering barriers to finding suitable medications. To boost MediMate's functionality and impact, several improvements are planned. Adding real-time location-based services can enhance local medicine exchanges and improve delivery logistics. Using machine learning algorithms

for personalized medicine recommendations based on user histories and health profiles would enhance accuracy and user satisfaction. Expanding the chatbot's abilities with natural language understanding and voice interaction will make assistance easier to access. Also, implementing blockchain technology could improve transaction transparency and security in the marketplace. Finally, working with certified pharmacies and healthcare providers could ensure regulatory compliance and enhance overall trust, expanding MediMate's reach and effectiveness in improving medicine access.

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