National University of Computer and Emerging Sciences

FYP Proposal Document

"MedTrove"
(Development)

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Supervisor: **Co-Supervisor:**

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Project Overview

Problem Statement & Motivation

"Healthcare should be a human right and not a commodity for sale."
- Jim Wallis

Unfortunately, the capitalisation of healthcare has become a pressing concern. Over the past few years, the cost of medications have skyrocketed making it increasingly difficult, for Pakistanis to afford, potentially life saving medicines.

In 2019, Drug Regulatory Authority of Pakistan (DRAP) had approved the increase of the prices of medicines by up to 15 percent. Hardship medicines which include medicines for heart patients and diabetics have increased up to 200%. [1]. In 2024, this trend continued as the caretaker federal cabinet approved a further increase in prices of an approximate 146 critical medications. [2]

Diabetes and heart disease are one of the more common health issues in Pakistan, given that 26.7% of Pakistanis are affected by diabetes [3]whereas 29% of deaths in Pakistan are due to heart diseases. [4]. Therefore, the increased cost of the related medicine proves to be threatening to public health.

It is absolutely imperative to also note that as of 2024, 40% of Pakistanis now live below the poverty line according to the World Bank making it even more difficult to afford life-saving medication. [5]

With sky high inflation rates and the tradition of bribery between doctors and pharmaceutical companies disguised as "academic activities "to manipulate doctors into prescribing overpriced medications, innovative solutions are required to bridge the gap between Pakistanis and their right, to affordable healthcare. [6]

Problem Solution

Our proposed solution to the problem statement above is MedTrove, a mobile application designed to empower underprivileged individuals by making medications more accessible and affordable. Creative solutions providing alternative options are desperately needed as evidenced by the recent approval of outrageous price increases for essential medications. [4] [5]

MedTrove will address this challenge by allowing users to search for cost-effective alternatives based on the active ingredients of medications. This feature enables individuals to find cheaper options without compromising on quality, and also reducing the financial burden associated with chronic health conditions. By promoting transparency in drug pricing. Our application will not only improve access to healthcare but also contribute to poverty alleviation by empowering individuals to manage their health effectively.

Moreover, to enhance the user experience MedTrove will allow to check for interactions between multiple drugs, providing personalised health insights such as reminders for medication that will help users to stay on track with their treatments.

Goals

- Streamlined medication management
- Informed decision making
- Personalised health insights

Stakeholders

- Our Team: Kissa Zahra, Hamna Sadia Rizwan and Aliza Ibrahim
- Supervisor: Mr. Bilal Khalid Dar
- Co-supervisor: Ms. Zoya Mahboob
- FAST-NUCES FYP committee ISB
- Patients
- Pharmacist

Project Scope

MedTrove will be a cross-platform application that users can download onto their mobile device. After downloading the app, our users can create their account or login.

If the user decides to manage their profile, they can change their credentials, profile picture, delivery address and save it. An option to delete the account will also be available.

If the user decides to search for some medication, they may get recommended searches based on their previous search/order history and alternative medication of their searched medication. The user may select a medicine to view it's detailed information such as its side effects, usage instructions including dosage, details on the diseases it is used to treat and compare it with other alternatives. An add to cart option will also be available.

Once they are finished, the user can checkout and begin the payment process. Payment can be made either by credit/debit card or JazzCash. Once completed, a verification message will pop up and the order will be sent.

Alternatively, the user may also choose to check for drug interactions using our drug interaction check feature. For this the user must enter two different types of medication and the result will be whether or not such medication can be taken together at once.
MedTrove also provides a chatbot called Medibot which will provide preliminary medical advice, information about medication and help break down difficult words doctors use in a friendly, conversational manner.

Finally, if the user has the means and is willing to, they can provide donations to help those who may not have the means to pay for their medication.

Modules

We have 10 different modules in our project, which are as follows:

1. Medi-bot

This module is designed to provide users with instant access to preliminary advice and detailed information about medications. This AI-powered assistant enhances user engagement by offering real-time guidance.

2. Substitute Drug Identifier

This module is designed to help users to find cost effective alternatives to their prescribed medications. This module leverages a comprehensive drug database to identify and suggest substitute drugs based on salt composition.

3. Smart Search and Recommendation

This module uses algorithms to analyse users search queries and previous orders to deliver recommendations for their specific needs. Along with this, it will also show the searched medication if available.

4. Substitute Comparison

This module is designed to provide users with a detailed analysis of a possible substitute medication. This module compares alternative medication based on several factors enabling users to make informed decisions.

5. Payment

The goal of this module is to simplify secure financial transactions for purchasing medications. This module will offer a speedy checkout process along with robust security features to protect user data.

6. Donation

This module is designed to help pay for users in need. This module will allow users to contribute into a fund that will be used to provide discounted medications for underprivileged individuals.

7. Drug Interaction Checker

This module will analyse the interactions between two medications and evaluate whether they are safe to take at a time or not.

8. Pharmacy Locator

The purpose of this module is to help users find pharmacies nearby. Users will have access to real-time information on pharmacy locations, contact details, and business hours.

9. Medication Reminder

This module is designed with the purpose of efficiently assisting users in managing their medication schedules. Users will receive timely reminders and notifications to help them take their prescribed medication and stay on top of their treatment plans.

10. Profile Management

This module is designed with the purpose of providing users a secure platform for managing their personal information. Users will be able to customise their profiles by managing their health data and access services.

Process-Flow

MedTrove will be designed using the Model-View-Controller (MVC) architecture to provide a personalised experience for each user.
The model will manage the app's data, the view would display this data and the controller would handle user input and update the model and view for each user.
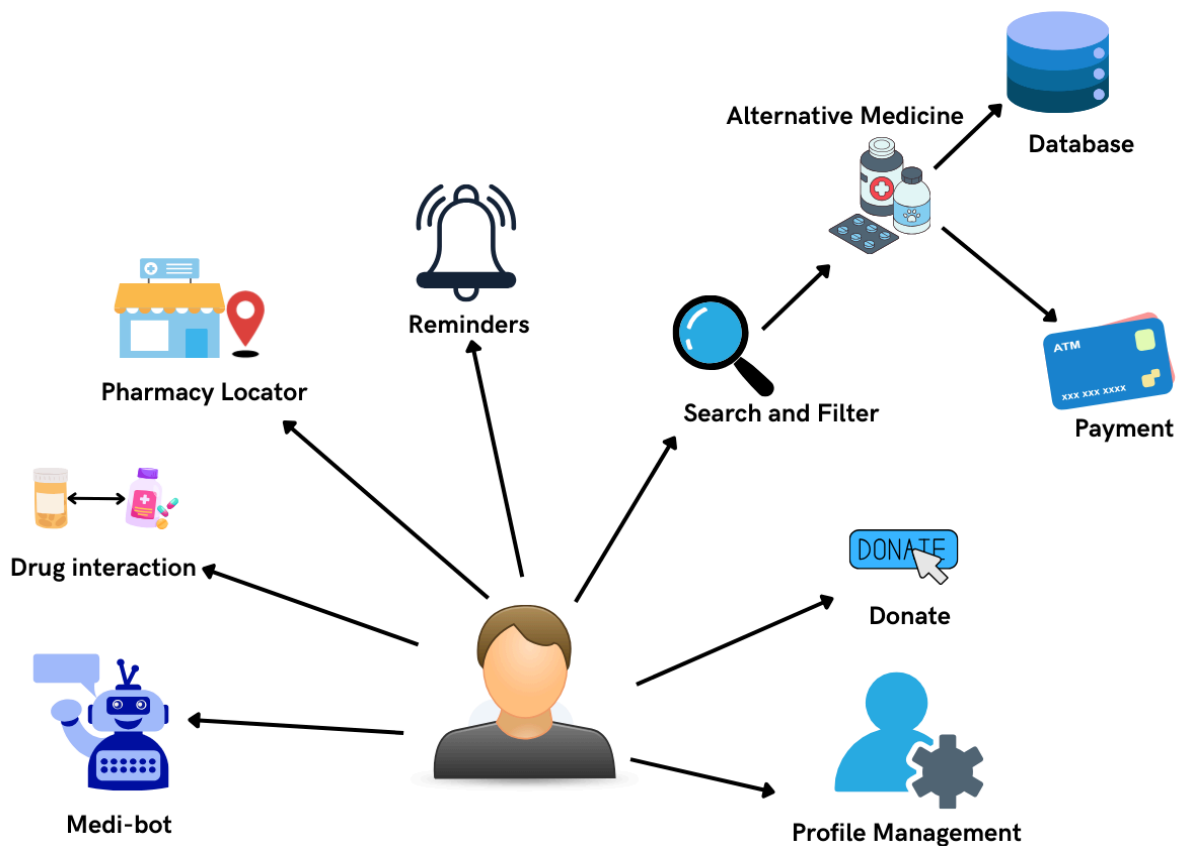
Process Flow Diagram

Figure 1: The Process Flow Diagram

Involved Tools and Technologies

Based on our learning and research up till now these are the tools, technologies and languages we might use:

Involved Languages

- **JavaScript:** The extensive available libraries and frameworks for react and node.js will allow us to develop our app.

- **Python:** It is a high-level language for programming with many libraries and built-in functions, making it useful for artificial intelligence.

- **MongoDB:** A no sql database to develop scalable applications with changing schemas.

Involved Tools

- **IDE: Visual Studio Code:** A lightweight code editor made for building and debugging applications, all while supporting a variety of languages.

- **IDE: Android Studio:** A code editor to design applications specifically for android mobiles.

- **Version Control: Github:** A widely-used control platform used for collaboration among developers to track changes and manage the code repository.

- **Project Management: Trello:** Its a project management tool that uses boards, lists and cards to help teams organise tasks.

- **Database Management: MongoDB:** These platforms will be used to maintain databases of our system.

- **UI/UX Design: Figma:** It's a collaborative UX/UX design tool that enables teams to design prototypes and share user interfaces.

Involved Technologies

Tools & Technologies	Kissa Zahra	Aliza Ibrahim	Hamna Sadia Rizwan
React Native	3	3	3
MERN	7	5	7
Figma	8	8	8
Database	7	8	8
Python	6	6	6
NLP	2	2	3
Data Security	4	5	5
Authentication	3	4	4
APIs	2	6	3
Trello	8	8	8
MS Excel	9	9	9
MS PowerPoint	9	9	9
GitHub	7	8	7
MS Word	9	9	9

Table 1: Expertise Table

Timeline and Work Division

Our project is divided into four iterations, with first iteration being from August to October, the next from November to January, then the third iteration from February to April and lastly, the fourth from May to July. The work is distributed equally amongst all the members.
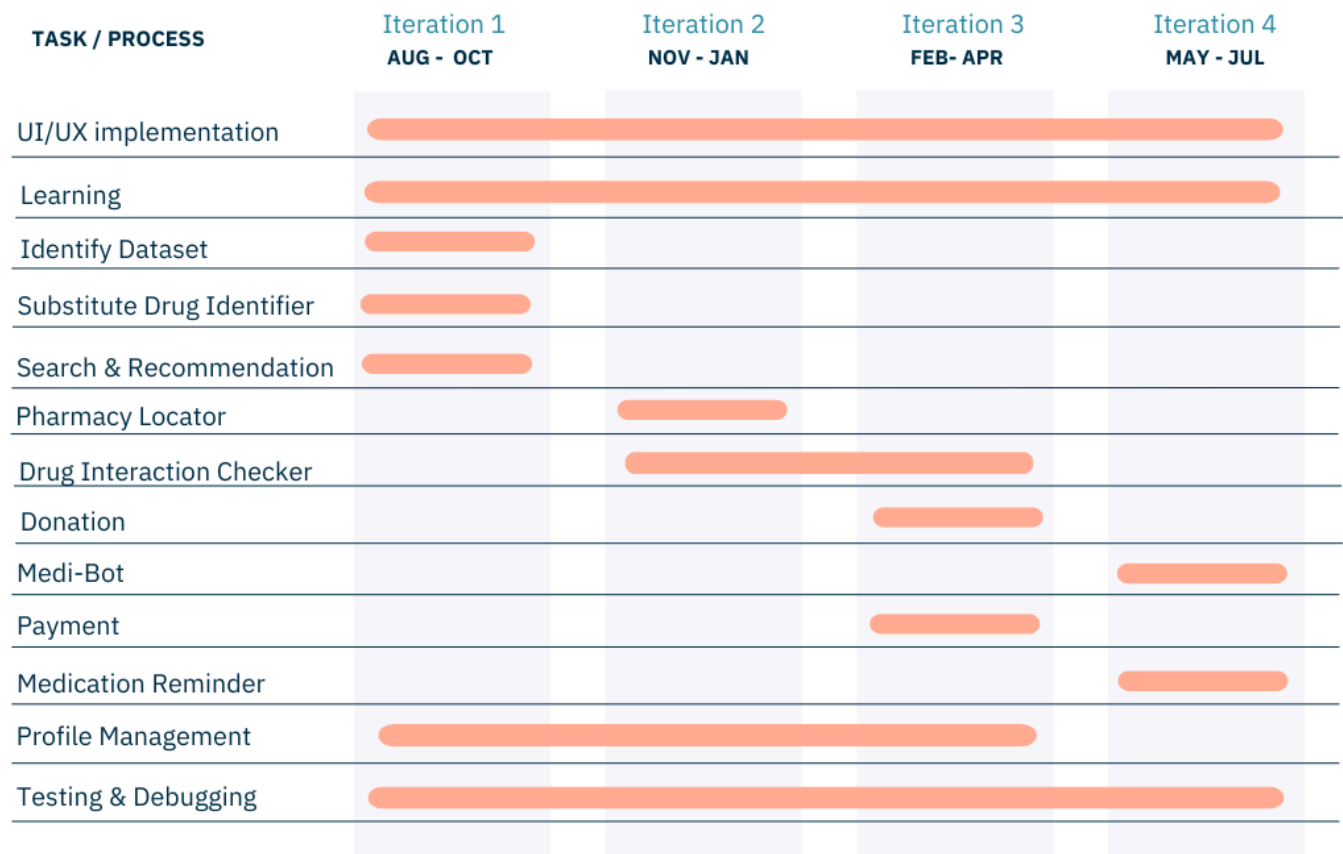
TASK / PROCESS	Iteration 1 AUG - OCT	Iteration 2 NOV - JAN	Iteration 3 FEB- APR	Iteration 4 MAY - JUL
UI/UX implementation	████████	████████	████████	████████
Learning	████████	████████	████████	████████
Identify Dataset	████			
Substitute Drug Identifier	████			
Search & Recommendation	████			
Pharmacy Locator		████		
Drug Interaction Checker		████████		
Donation			████	
Medi-Bot				████
Payment			████	
Medication Reminder				████
Profile Management	████████	████████	████	
Testing & Debugging	████████	████████	████████	████████

Figure 2: Timeline Gantt Chart

Kissa Zahra	Aliza Ibrahim	Hamna Sadia Rizwan
Medi-bot	Medi-bot	Medi-bot
Search and Recommendation	Substitute Comparison	Substitute Drug Identifier
Donation	Pharmacy Locator	Payment
Medication Reminder	Drug Interaction Checker	Profile Management

Table 2: Work-division table

Conclusion

As medical prices are getting higher day by day, we aim to make MedTrove a ray of hope for those struggling to manage their medical costs. By using technologies such as NLP and predictive analysis, MedTrove aims to empower users with medical accessibility and knowledge to make informed decisions regarding their healthcare.

Our Team sincerely believes that under the guidance of our esteemed supervisor, Sir *Bilal Khalid Dar* and our co-supervisor, Ms *Zoya Mahboob*, MedTrove will contribute to a healthier future for our country, Pakistan.

References

[1] F. Durrani, "Increase in drug prices highest in last 40 years," 8 April 2019. [Online]. Available: https://www.thenews.com.pk/print/454864-increase-in-drug-prices-highest-in-last-40-years. [Accessed 12 July 2024].

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[4] I. Junaidi and R. Zakaria, "'47 people die of heart attack every hour in Pakistan'," 30 September 2021. [Online]. Available: https://www.dawn.com/news/1649189. [Accessed 12 July 2024].

[5] "PAKISTAN: Implementing an Ambitious, Credible and Clearly Communicated Economic Reform Plan Critical for Robust Recovery, Poverty Reduction, says World Bank," 2 April 2024. [Online]. Available: https://www.worldbank.org/en/news/press-release/2024/04/01/pakistan-implementing-an-ambitious-credible-and-clearly-communicated-economic-reform-plan-critical-for-robust-recovery-p. [Accessed 12 July 2024].

[6] Dawn, "Big Pharma and Physicians," 6 October 2008. [Online]. Available: https://www.dawn.com/news/845158/big-pharma-and-physicians.