## B. E. Dissertation on

## "Medi-Price Assistant"

The project report is submitted to

# Cummins College of Engineering for Women, Nagpur RTM Nagpur University

in partial fulfillment of the requirement for the award of the degree of

#### **Bachelor of Engineering in Computer Engineering**

-: Submitted by:-

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-: Guided by:-

**Prof. Shailesh Sahu** 



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Academic Year 2022-2023

## **CERTIFICATE**

This is to certify that the Project Report on "Medi-Price Assistant" is a bonafide work and it is submitted to the Department of Computer Engineering of Cummins college of Engineering for Women, Nagpur by

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For partial fulfillment of the **Bachelor of Engineering in Computer Engineering**Academic year 2022-2023 under the guidance of

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## **DECLARATION**

#### We declare that:

- a. The work contained in this project has been done by us under the guidance of our supervisor(s).
- b. The work has not been submitted to any other Institute for any Degree earlier.
- c. We have followed the guidelines provided by the Institute in preparing the project report.
- d. We have conformed to the norms and guidelines given in the Ethical Code of Conduct of the Institute.
- e. Whenever we have used materials (data, theoretical analysis, figures, and text) from other sources, we have given due credit to them by citing them in the text of the report and giving their details in the references.

Further, we have taken permission from the copyright owners of the sources, whenever necessary.

Miss. Amruta Kashikar

## **ACKNOWLEDGEMENT**

We express our sincere gratitude to all those people who have been associated with this project and have held us with it and made it a worthwhile experience. We extend our thanks to various people who have shared their opinion and experiences through which we received the required information crucial for our project.

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We would like to extend our sincere thanks to our project guide Prof. Shailesh Sahu, who gave us this opportunity to learn the subject in a practical approach and gave us valuable suggestions regarding the project.

## **ABSTRACT**

"Medi-Price Assistant" is an <u>android application</u> that is developed in order to <u>regulate the private healthcare sector</u> from exploiting people, especially during medical emergencies and pandemic situations. A lot of user trust issues revolve around the "genuineness" of the hospital and the "correctness" of the prices charged.

This android application can solve a lot of individual queries and complaints and change the confidence of users in a large way. During any medical emergency or pandemic since most hospitals are busy and crowded, it becomes difficult for them to manage the help desk and provide correct details to patients and their family members.

A proper application with correct details of medical services and their prices can help users find a hospital suiting their needs in a quicker and more efficient way. Since most of the users of smartphones in India use Android phones, we have decided to make an android application that can help reach more users.

We chose to make our project as an Android Application as it is open-source and provides more flexibility for customization and making functions that users need. In this project we have developed an android application so that users could interact with the hospitals/admin through the app and we have focused on the user requirements like information on medical facilities available and their respective prices.

## TABLE OF CONTENT

	CONTENTS	PAGE NUMBER
I.	TITLE	
II.	ACKNOWLEDGEMENT	03
III.	ABSTRACT	04
IV.	LIST OF FIGURES	06
1.	INTRODUCTION	07
	1.1. Project Motivation and Outline	08
	1.2. Problem Statement	08
	1.3. Existing System	09
2.	LITERATURE SURVEY	11
3.	PROPOSED METHODOLOGY	13
	3.1. System Analysis	13
	3.1.1. Existing System	16
	3.1.2. Product Features	16
	3.2. Data Flow Diagram	18
	3.3. Technologies Used	19
4.	RESULT AND DECISION	20
5.	CONCLUSION AND FUTURE SCOPE	26
6	REFERENCES AND RIRLIOGRAPHY	28

## LIST OF FIGURES

FIGURES		PAGE NUMBER
1.	Mind map	13
2.	Use Case Diagram	14
3.	Data Flow Diagram	17
4.	Hospital Search for Users	20
5.	<b>Hospital Create Account Page</b>	21
6.	Login Page for Hospital or Admin	22
7.	Patient Bed Request Approve or Reject	23
8.	Nearby Hospitals List for Users	24
9.	Recent bookings for Users	25

### 1. Introduction:

In view of the COVID-19 pandemic and the resulting chaos regarding the hospital services and their charges, it had become a necessity to regulate the private healthcare centers from exploiting people. In medical emergencies, due to lack of resources, the patients and their family members often find it difficult to find an appropriate hospital providing the services they require, at a reasonable and affordable cost. Most individuals doubt the "genuineness" of the hospitals and the prices charged are unimaginable, but due to lack of information available, they are forced to avail the services the hospital provides at the cost that the hospital decides.

Even for routine procedures, prices for healthcare services vary widely between providers, making it challenging for patients to estimate their out-of-pocket expenses prior to receiving treatment. Health care providers charge different payers different prices for the same services, patients rarely know what they will pay for services until after they have received them, and privately insured patients pay more to make up for the shortfalls left by uninsured patients. Even for routine procedures like lab tests or mammograms, prices for healthcare services vary widely between providers. However, there is no reliable data demonstrating a correlation between price and quality. Consumer advocates, some employers, and health plans are advocating for greater price transparency due to these factors. They contend that consumers would seek out low-cost providers if they knew they could get high-quality services from them. This could then promote competition between providers based on the quality of care provided, as opposed to just reputation and market share.

We have decided to make an android application that would list out different hospitals and the services that they provide with a fixed cost that would be verified by a third party admin and the hospitals would need proper reason and permission if they want to edit the prices for the services they provide. This app would hence act as a platform for users to compare different hospitals and the services they provide, and select the one that caters to their needs, and fits their budget. This application is designed to help encourage consumers to select low-cost, high-quality providers and to foster competition based on the value of care provided.

### 1.1. Project Motivation And Outline:

The application is developed for the users so that they can easily find a nearby hospital that provides the medical facility they need at a reasonable cost that they can afford. The user can also raise a complaint if they find that a hospital has charged them more than the price stated in the application with proper document proof. Our application would also need hospitals to register, and upload the information about the medical facilities that they provide and the costs that they charge and provide justification for the costs they are charging.

To regulate the healthcare sector from exploiting people, we would also need a third party admin who will constantly monitor the hospitals and their prices and if any user has a complaint, then the role of the admin is to look into the complaint and resolve the issue as soon as possible.

The application has is divided into three interfaces:

- User Interface
- Hospital Interface
- Admin Interface (third party/government)

The application will provide the provisions for the following:

- To view the hospital details about the medical facilities they provide and their respective prices and to raise a complaint for the users.
- To create an account and on being approved, to add details of medical facilities and their respective prices with proper justification of the price for hospitals.
- To approve hospital accounts and grant price editing permissions and complaint management for admin.

#### 1.2. Problem Statement:

To come up with a solution that would help regulate the private health care sector from exploiting people, especially during pandemic / medical emergencies and to make it easier for users to find, compare and select the best hospital near them providing services suitable to their needs, at the price convenient for them.

### 1.3. Existing System:

With the integration of technology, the healthcare sector has recently undergone a rapid evolution. One such innovation that has transformed healthcare is the use of mobile health applications. Users can access healthcare services whenever it is convenient for them thanks to these applications. In this review of the literature, we'll look at the various features of an app that lets users compare the costs of various hospital services.

The existing applications are under the United States market, with applications that help book appointments, to applications that help compare services of various hospitals. But these applications have not come under the Indian market and Medi-Price Assistant is an attempt at introducing the convenience of mobile applications in the medical and healthcare sector.

Some of the crucial features necessary for the application that we would try to integrate in our application are:

- Healthcare Costs: Consumers have been extremely concerned about the cost of healthcare. Finding affordable options can be difficult for customers because healthcare costs vary widely between hospitals. The Commonwealth Fund reported that the cost of healthcare in the United States is the highest in the world. An app that enables users to contrast the various services offered by hospitals with their prices can therefore be a useful tool for consumers.
- Patient Satisfaction: A crucial aspect of healthcare is patient satisfaction. Patients who are happy with the care they received are more likely to follow their treatment plans and experience better health outcomes. A study that appeared in the Journal of Medical Internet Research claims that patient satisfaction can be raised by mobile health applications. Patients can make more educated healthcare decisions and experience higher levels of satisfaction by using an app that compares the various services offered by hospitals with their prices.
- Transparency: In the medical field, transparency is crucial. Patients have a right to information about the services they are paying for and will receive. Transparency in healthcare can be improved by an app that lets users compare the various services and costs charged by hospitals. A study that appeared in Health Affairs found that greater healthcare transparency can result in lower costs and better health outcomes.

Accessibility: The ability to access healthcare is essential. Access to healthcare
services may be improved by mobile health applications. Users can find
accessible healthcare options in their area by using an app that compares the
various services offered by hospitals with their prices. A study that appeared in
the Journal of Medical Internet Research claims that mobile health applications
can increase underserved populations' access to healthcare services.

> The only drawback of the existing system is that it caters only to the users in the United States of America. There does not exist any such application or website that meets the needs of the users in India.

In conclusion, a mobile app that enables users to contrast the various services offered by hospitals with their costs can be a useful resource for customers. It can boost healthcare accessibility, increase healthcare transparency, and enhance patient satisfaction. An app that compares hospital services and costs is a step in the right direction because mobile health applications have the potential to revolutionize healthcare. To encourage consumers to select low-cost, high-quality providers and to foster competition based on the value of care, some consumer advocates, employers, and health plans are pushing for increased reporting of the costs of health care services. Despite the difficulties, the rising number of health care consumers who are being asked to pay a larger portion of their medical bills may be the driving force behind price transparency.

## 2. Literature Survey:

Because of the complexity of the healthcare sector, it can be challenging for patients to compare the services offered by various hospitals and the costs associated with them. With the incorporation of technology, the healthcare sector has been evolving quickly in recent years. One such innovation that has transformed healthcare is the use of mobile health applications. Users can access healthcare services whenever it is convenient for them thanks to these applications. Many mobile applications have been created in recent years to assist patients in comparing the services and costs provided by hospitals. This review of the literature looks at the state of the art in research on hospital comparison apps, as well as their strengths and weaknesses.

In an effort to shed light on information that will enable us to predict the future of medical healthcare services research, this paper investigates the existence of Android applications for medical literature. In order to adhere to the literary conventions of mainstream literature, the primary goal of this research is to examine the growth of online medical healthcare facilities and other related areas. We now have a better understanding of how little progress has been made in the field thanks to the analysis of the literature. Although there are many applications available that are only for certain hospitals, none of them offer a platform for users to view and compare all hospitals in the area, check the services they offer, compare prices, and choose the hospital that best suits their needs and their budget. In this review of the literature, we'll look at the various features of an app that lets users compare the costs of various hospital services.

According to the research, hospital comparison apps can be a useful tool for patients to use when choosing their healthcare providers. In a study conducted in Saudi Arabia to assess the effectiveness of a hospital comparison app, Ahmad et al. (2020) discovered that users were better informed and happier with their healthcare choices than non-users. A hospital comparison app improved patient satisfaction and decision-making in the United States, according to a study by Skiba et al. (2019). The literature does, however, also point out some restrictions on hospital comparison apps. A lack of transparency in the data used by some hospital comparison apps, according to a study by Parnia et al. (2019), may cause patients to receive inaccurate or deceptive information. Similar findings were made by Peters et al. (2018) who discovered that some hospital comparison apps did not include all pertinent data, including hospital care quality.

From the literature survey we have come to a conclusion that such an android application has not been created for the hospital and the services they provide with the prices they charge. Hence it becomes very difficult for any individual to gather the data. Searching for nearby hospitals and enquiring about the medical facilities and their prices in a medical crisis or otherwise becomes very much difficult for an individual and there is no way to regulate the healthcare sector. When a patient comes with their requirement for a specific service the hospital provides, it becomes difficult for the patient to tell whether that particular service charge that the hospital states is genuine or he is being charged extra unnecessarily. Also in many cases, the hospitals don't provide the details of the facilities provided and their charges and just state a total amount to be paid by the patient. Hence this project ensures transparency between the hospital and the patients. Healthcare requires a high level of transparency. Patients have a right to information about the services they will receive and the costs involved. Transparency in healthcare can be improved by an app that enables users to compare the various services offered by hospitals with their prices. Transparency in healthcare can result in lower healthcare costs and better health outcomes, according to a study published in the journal Health Affairs.

Healthcare must prioritize patient satisfaction. Patients who are happy with their medical care are more apt to follow their treatment plans, which leads to better health outcomes. Mobile health apps can raise patient satisfaction, according to research published in the Journal of Medical Internet Research. Patients can make better decisions about their healthcare and experience overall with the aid of an app that compares the various services offered by hospitals with their prices.

Overall, the research points to hospital comparison apps as a useful tool for patients to use when selecting their medical providers. However, it's crucial to make sure that the information patients receive from these apps is accurate and clear. To determine any potential drawbacks or restrictions of these tools, as well as to assess the long-term effectiveness of hospital comparison apps, more research is required.

## 3. Proposed Methodology:

### 3.1. System Analysis:

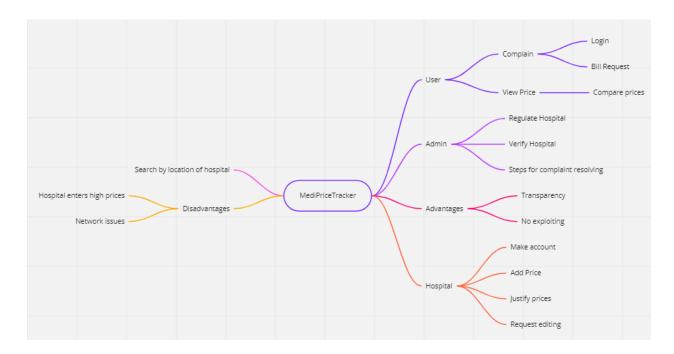


Fig 1: Mind Map

There are three key variables used in the project. They are:

#### 1. User

- It consists of a list of types of hospitals
- The users can raise a complaint if any hospital charges more amount to the admin.

#### 2. Hospital

- The account of the hospital has to be verified by the admin.
- After verification, the hospital can add the medical facilities that are provided there along with the prices of the medical facilities.

• If the hospital confirms that the details are correct, the section of the modification of prices will get locked.

#### 3. Admin

- The homepage will consist of 3 options:
  - a) Verification of account
  - b) Enabling prices modification
  - c) Complaint management
- In the account verification admin has to verify hospital details before approving the hospital to create an account in the app.
- Next is enabling the modification of the price by hospitals.
- After that, the admin will have a complaint management section where the admin can view all the complaints logged by users.

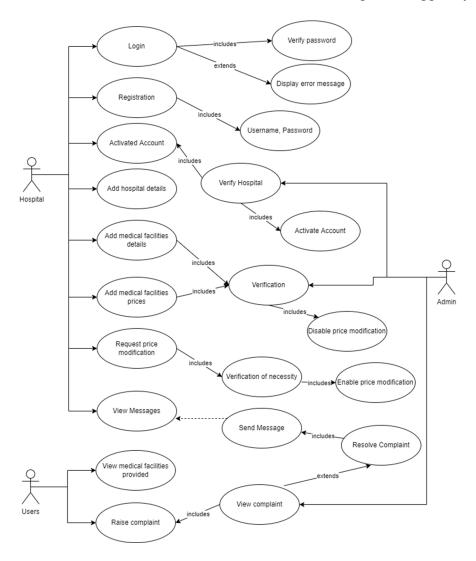


Fig 2: Use Case Diagram

#### 3.1.1. Existing System:

With the integration of technology, the healthcare sector has recently undergone a rapid evolution. One such innovation that has transformed healthcare is the use of mobile health applications. Users can access healthcare services whenever it is convenient for them thanks to these applications. In this review of the literature, we'll look at the various features of an app that lets users compare the costs of various hospital services.

The existing applications are under the United States market, with applications that help book appointments, to applications that help compare services of various hospitals. But these applications have not come under the Indian market and Medi-Price Assistant is an attempt at introducing the convenience of mobile applications in the medical and healthcare sector.

The only drawback of the existing system is that it caters only to the users in the United States of America. There does not exist any such application or website that meets the needs of the users in India.

In conclusion, a mobile app that enables users to contrast the various services offered by hospitals with their costs can be a useful resource for customers. It can boost healthcare accessibility, increase healthcare transparency, and enhance patient satisfaction. An app that compares hospital services and costs is a step in the right direction because mobile health applications have the potential to revolutionize healthcare. To encourage consumers to select low-cost, high-quality providers and to foster competition based on the value of care, some consumer advocates, employers, and health plans are pushing for increased reporting of the costs of health care services. Despite the difficulties, the rising number of health care consumers who are being asked to pay a larger portion of their medical bills may be the driving force behind price transparency.

#### 3.1.2. Product Features:

#### 1. User

- This interface would help the users to know about the prices in a go.
- The homepage will consist of a list of types of hospitals and the user can select a type of private hospital (i.e Multispeciality hospitals, Super-speciality hospitals).
- If any hospital charges more amount for any medical facility than that it provides to the patient then the users can raise a complaint about this to the admin.

• For viewing the medical facilities or prices of medical facilities the user doesn't have to login into the app.

#### 2. Hospital

- This interface would help have transparency about the prices.
- To avoid any malpractices whenever an account of any hospital is created then the admin first verifies the details of the hospital.
- After verification, the hospital can add the medical facilities that are provided there along with the prices of the medical facilities.
- As the hospital completes entering all the details they will get a pop over to confirm whether the details are correct and then the section of the modification of prices will get locked.
- If the hospital wants to do any changes to the pricing it has to send a request to the admin to allow it to make changes.
- There will be another section ie. the complaints resolving section where the hospital will be able to see the messages the admin sends to resolve any complaints about that hospital.

#### 3. Admin

- This interface would help have a genuine app and to maintain the accurateness of the app.
- The homepage will consist of 3 options :
  - a) Verification of account
  - b) Enabling prices modification
  - c) Complaint management
- In the account verification admin has to verify hospital details before approving the hospital to create an account in the app.
- Next is enabling the modification of the price by hospitals after hospital requests to enable modification.
- After that, the admin will have a complaint management section where the admin can view all the complaints logged by users.

### Key Relationships Between Variables:

#### 1. <u>User and Hospital:</u>

The relationship between the user and the hospital is that the user can search for the hospitals for their medical facilities along with the prices for respective facilities.

#### 2. User and Admin

The relationship between the user and the admin is that the user might raise a complaint to the admin in case if change in any charges is found.

#### 3. Hospital and Admin

The relationship between the Hospital and the admin is that whenever any hospital creates an account, it has to be verified by the admin. Further to ask for any changes in the prices, the hospital will have to request the admin for permissions.

### 3.2. Data Flow Diagram

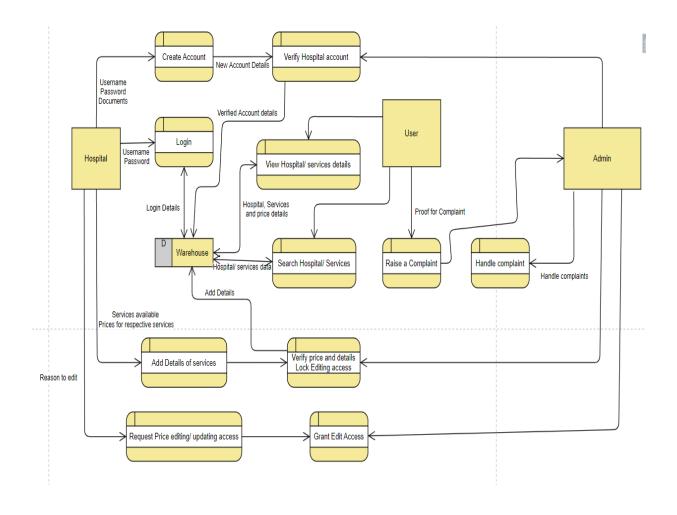


Fig 3: Data Flow Diagram

### 3.3. Technologies Used

The technologies used are listed below:

#### 1. JAVA:

Java is a popular programming language, created in 1995. It is owned by Oracle, and more than 3 billion devices run Java.

It is used for Mobile applications (specially Android apps), Desktop applications, Web applications, Web servers and application servers, Games, Database connection, and much more!

#### 2. NATIVE ANDROID:

Android Studio is an IDE for Google Android Development which contains all the Android tools to design, test, debug, and profile your application. The Android Studio uses Gradle to manage your project, a Build Automation Tool. Android Studio has many exciting features that can help you to develop your Android application like:

- -Powerful code editor with smart editing and code re-factoring.
- -Emulator to show your code output in various resolutions, including Nexus 4, Nexus 7 Nexus 10, and many other android phones.
- -Gradle based build support.
- -Maven Support.
- -Template-based wizards.
- -Dracula Theme Environment to enjoy your coding experience.

#### 3. FIREBASE:

Firebase is a product of Google which helps developers to build, manage, and grow their apps easily. It helps developers to build their apps faster and in a more secure way. No programming is required on the firebase side which makes it easy to use its features more efficiently. It provides services to android, ios, web, and unity. It provides cloud storage. It uses NoSQL for the database for the storage of data.

The advantages of using a Firebase backend:

- -Free plans for beginners.
- -Real-time database is available.
- -Growing Community.
- -Numerous services are available.

The disadvantages of using a Firebase backend:

- -It uses NoSQL so, people migrating from SQL might feel difficulty.
  - -It is still growing, so it is not tested to an extent.

### Result and Decision:

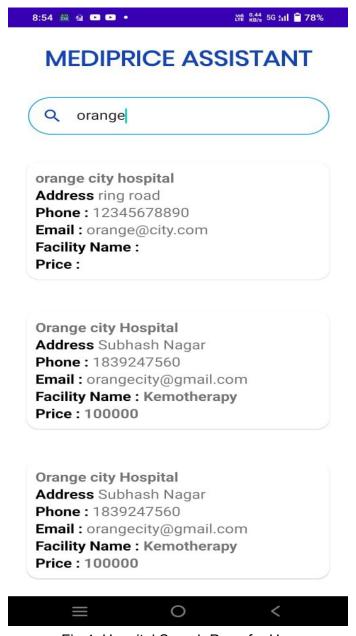


Fig 4: Hospital Search Page for Users

In the above Fig 4, we can see that the users will be able to check the various services provided by the hospitals with their respective price and other details.

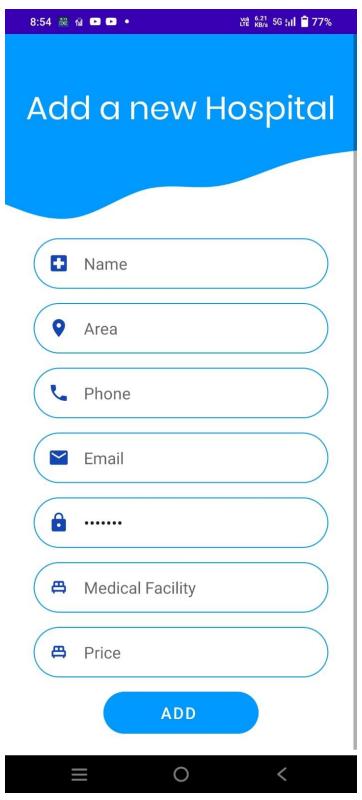


Fig 5: Hospital Create Account Page

In the above Fig 5, we can see the page for adding a new hospital to the database. The information needs to be accurately filled and on verification, the hospital will be added to the application.

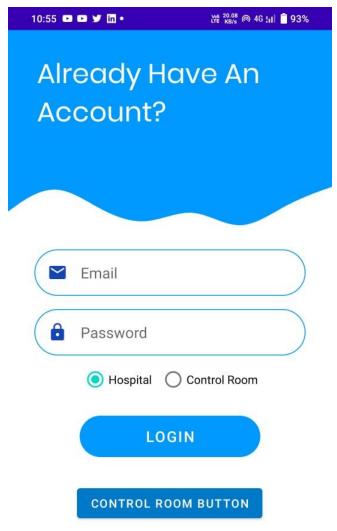




Fig 6: Login Page for Hospitals and Admin In the above Fig 6, we can see the Login page for Hospitals and Admin.

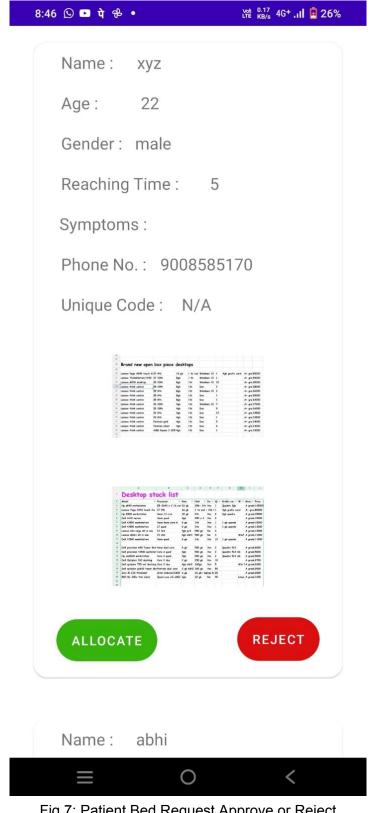


Fig 7: Patient Bed Request Approve or Reject

In the above Fig 7, we can see the request from patient for bed that the hospital receives and has to verify documents and accept or reject the request.

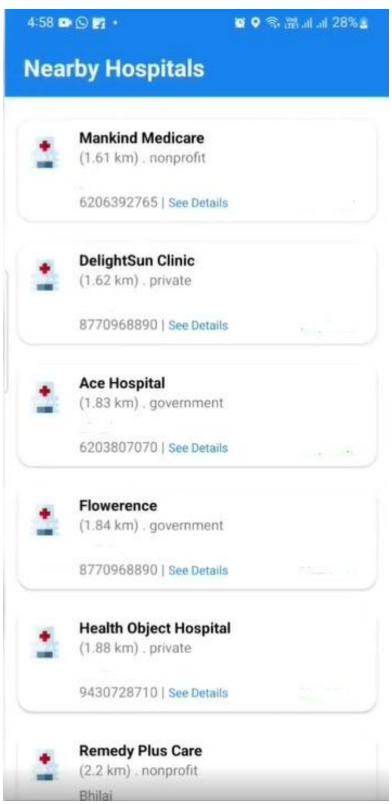


Fig 8: Nearby Hospitals List for Users In the above Fig 8, we can see the page where users can view nearby hospitals.

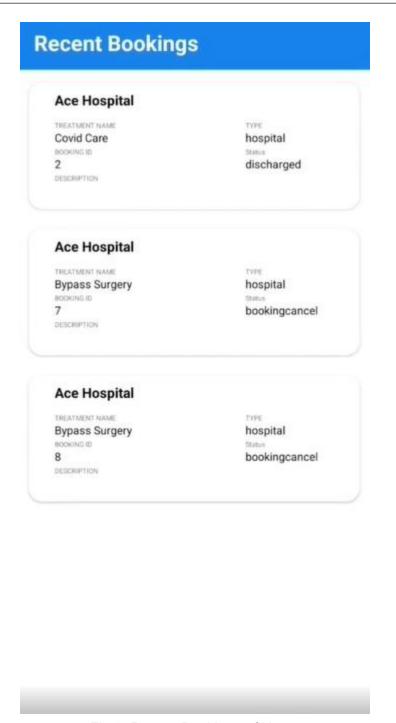


Fig 9: Recent Bookings of Users

In the above Fig 9, it represents the page for users where they can view their recent bookings.

## Conclusion and Future Scope:

In conclusion, the Medi-Price Assistant application is a valuable tool for users to compare the medication prices across various hospitals and make informed decisions about their healthcare expenses. The app's user-friendly interface and comprehensive database of healthcare service prices provided by the different hospitals have the potential to significantly reduce the financial burden of prescription medications and prices of healthcare services for individuals and families. Based on the research conducted on medical and healthcare applications that list different hospital services and their prices, it can be concluded that such applications can greatly benefit patients by providing them with transparency and information about the cost of various medical procedures. The use of these applications can empower patients to make informed decisions about their healthcare options, as well as to budget for medical expenses more effectively. Additionally, these applications can promote competition among hospitals and healthcare providers, ultimately leading to lower costs and better quality care.

However, it is important to note that there may be limitations to the accuracy of pricing information provided by these applications, as well as potential issues related to the privacy and security of patient data. Therefore, it is crucial that healthcare providers and developers work together to ensure that these applications are reliable, user-friendly, and secure.

Overall, the use of medical and healthcare applications that list hospital services and their prices can have significant benefits for patients, providers, and the healthcare industry as a whole. By leveraging technology to increase transparency and promote competition, these applications can help to create a more equitable and accessible healthcare system.

Looking towards the future, there are several potential avenues for expansion and improvement of the medi Price assistant. One possible direction is to incorporate additional features such as To enhance the apps overall value proposition. Additionally the medi price assistant could explore partnerships with healthcare providers or insurance companies to further streamline the healthcare services for users. The future scope of medical and healthcare applications that list hospital services and their prices is promising, as they have the potential to become an integral part of the healthcare system. Here are some potential areas of growth and development:

1. Increased adoption: As more patients become aware of these applications and their benefits, we can expect to see increased adoption and usage. This could lead to greater demand for more accurate and comprehensive pricing information, as well as more advanced features and functionalities.

- 2. Integration with electronic health records (EHRs): There is potential for these applications to be integrated with EHRs, allowing patients to access pricing information and make informed decisions about their care directly within their health record. This could also help to streamline the billing and payment process.
- 3. Personalization: As these applications collect more data on patient preferences and behavior, there is potential for them to become more personalized and tailored to individual needs. For example, an application could recommend hospitals or providers based on a patient's location, insurance coverage, and medical history.
- 4. Expansion to other healthcare services: While the focus of these applications has been on hospital services, there is potential for them to expand to other healthcare services such as primary care, specialty care, and diagnostic testing.
- 5. Global adoption: These applications have the potential to be adopted globally, helping to improve transparency and access to healthcare services in underserved areas.

Overall, the future scope of medical and healthcare applications that list hospital services and their prices is promising, with potential for growth, expansion, and increased integration with the healthcare system.

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### Certificate of Acceptance & Publication

This certificate is awarded to Amruta Kashikar, and certifies the acceptance for publication of research paper entitled "MEDI-PRICE ASSISTANT" in "International Journal of Research Publication and Reviews", Volume 4, Issue 4, 2023.

Signed \_\_\_\_\_ Awhich Agarwal Date 01/05/2023

Editor-in-Chief
International Journal of Research Publication and Reviews