

A Study of Hospital Recommendation System

Apurva Vaidya¹, Poonam Kadu², Priyanka Kondhawale³, Swanand Patwardhan⁴

Department of Computer Engineering

Pimpri Chinchwad College of Engineering Nigdi, Pune - 411044, India

Abstract

In this digital world, we come across Recommendation System in nearly all aspects. Designing a Hospital recommendation system is a need for the fast-growing world. In this paper we study different methods like Content-based filtering, Collaborative filtering and Hybrid filtering for the recommendation of the system. To provide the hospital with the best ranking for curing a particular disease to the user asking for a recommendation. The system collects the information from the user and displays the nearby hospitals related to it. Among the detected hospitals it suggests the hospitals to users based on the user ratings. The main objective of this paper is to recommend the best hospitals to the users which will be beneficial in emergency situations.

I. INTRODUCTION

Recommender systems act as an effective solution to information filtering. It helps out the users to acquire personalized and useful information regarding their search. Unlike many other types of recommendation systems, hospital recommendation mainly depends on ratings, reviews and costs of the treatments in different hospitals. Hospital Recommendation system is a similar system that recommends the hospital for a particular treatment. This system goes through the history of the patients and the hospitals they have visited earlier. From the complete investigation the system will reach the recommendation of the hospital she/he deserves.

Hospital recommender aims at providing accurate analysis of hospitals by estimating the reviews of thousands of current and past patients, which were put down by the patients themselves in various online forums. Hospital-Recommender system acts as a bridge connecting the users and the healthcare providers. This can be utilized by both the patients and also by the healthcare providers. The patients can use it to discover hospitals which can help them during their period of illness whereas the healthcare providers can utilize this system as the ultimate platform that helps them build their presence, flourish establishments and engage patients more deeply than before. The proposed system further helps the users to understand the quality of a assured hospital by providing star ratings for the hospital when the user needs.

II. MOTIVATION AND CHALLENGES

The information on the internet has become a challenging problem for users. The user is required to be clear about their needs to get accurate information. In the current situation what happens is if we want to have some treatment done then our first approach will be to ask a friend or the relatives for a good doctor

or a good hospital so that you will do your treatment from that doctor only. But sometimes it does happen that your disease may also be similar with your friends and hence it happens that none of your relatives will know a good hospital for your treatment then what will you do? Hence, there is a need for a software which will directly recommend you a good hospital as per your requirement. Also, here the scope and the number of persons increases and hence the reviews also increase which will give me more accurate results. We propose a Hospital recommendation system which will give relevant information to the user's needs and constraints. This system is to analyze a user's preference and will make it easy for user to decide where to go for treatments.

III. LITERATURE SURVEY

R.Devika et al.[1]2018, proposed Collaborative filtering (CF) method which collects different kinds of information from many users and preferences about the interests of a user to make predictions automatically. The problem with CF is, as it makes predictions by considering previous rating information given by like-minded Users. This paper overcomes these issues by using Hybrid Filtering. Among the detected hospitals it suggests the hospitals to users based on the user ratings. Based on the Hybrid filtering approach recommend the hospitals to the account holders. Depends on the specialty of the Hospital and user preference, the Similarity is calculated using the cosine similarity concept.

S. Swarnalatha et al.[2]2019, proposed a Med-recommender system aims to provide accurate analysis of hospitals by taking into account the reviews by thousands of patients, which were written by the patients themselves in various online forums. Our recommendation system performs sentiment analysis on the reviews of various patients using Natural Language Processing techniques to classify them as positive and negative reviews. The system is evaluated using 300 online reviews about hospitals and specialties and found to yield 90% of accuracy. The proposed system also helps the users to understand the quality of a certain hospital by providing star ratings for the hospital when the user needs.

Hanqing Chao et al.[3]2018, This paper presents a new model for estimating the spatiotemporal population density in each hospital based on location-based service (LBS) big data, which would be beneficial to guiding and dispersing outpatients. To improve the estimation accuracy, several approaches are proposed to denoise the LBS data and classify people by detecting their various behaviors. In addition, a long short-term memory (LSTM) based deep learning is presented to predict the trend of population density. By using Baidu large-scale LBS logs database, we apply the proposed model to 113 hospitals in Beijing, P. R. China, and constructed an online hospital recommendation system which can provide users with a hospital rank list basing the real-time population density information and the hospitals' basic information such as hospitals' levels and their distances.

Ayrine John et al.[4]2016, this approach presents an idea for a medication recommendation system for medical inquiry. This approach is based on four main steps: (i) analysis of clinical document (ii) retrieval of relevant medical terms and (iii) Clustering the medication and symptoms. iv) Recommend the proper medication. The proposed system can also work as a tool for supporting the doctors in their disease diagnosis. As future work efficiency of recommendation system can be increased by including age of the person, demographic informations during the training phase. Also the brand and the chemical contents available in the medicine can improve the recommended medicine.

Miss Shreya B.Ahire.[5]2015, In this paper, they proposed a framework which recommends food and exercise based on the user's requirement and constraints. This framework will use semantic web technology to analyze user's preferences. This system will be helpful to build a healthy and well nourished society. The proposed system will use the profile to categorize the associated knowledge so that users can make delicious food and exercise inquiries. As the framework is fully automated which gives relevant information to users' profiles with less intervention from domain experts. This framework will use semantic web technology to analyze user's preferences and will build a nourished and health associated user's profile and will use the profile to categorize the associated knowledge so that users can make delicious food and exercise inquiries. They will also use the Decision Tree algorithm for retrieving related information from the database.

IV. SYSTEM ARCHITECTURE

In Fig 1. Different modules have been shown like User Module, Hospital Module, Admin Module which is used in system.

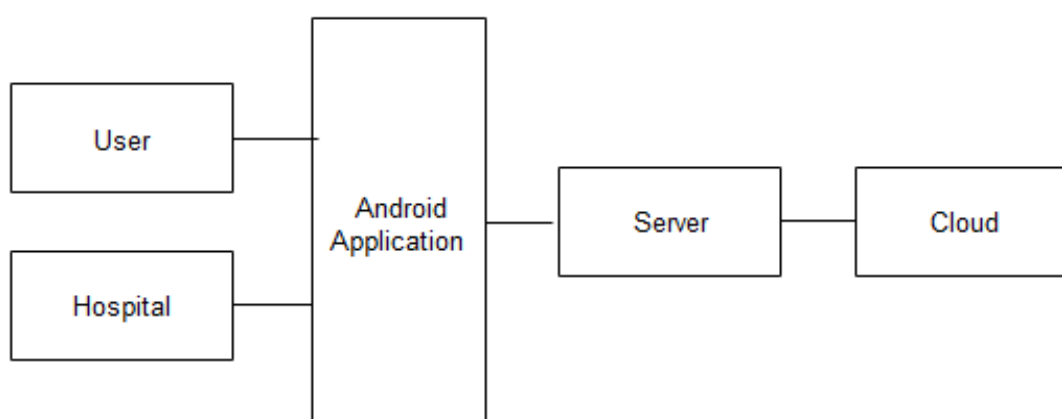
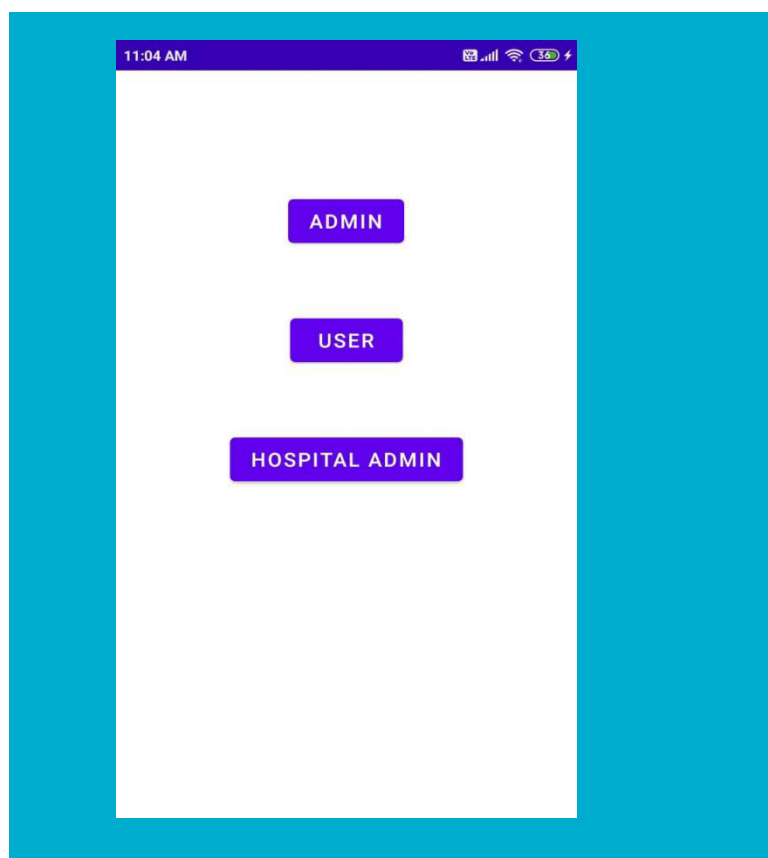
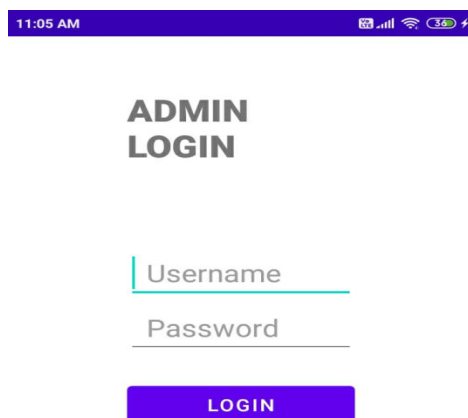


Figure 1.



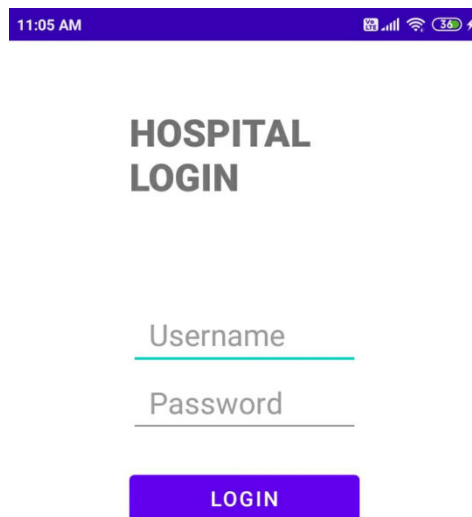
Admin Module

- Can add or delete hospital

A screenshot of the Admin Login screen. The screen is white with a blue border. At the top, there is a status bar with the time 11:05 AM and various icons. Below the status bar, the text "ADMIN LOGIN" is displayed in bold. Below this, there are two input fields: "Username" and "Password". Below the input fields, there is a blue button with white text labeled "LOGIN".

Hospital module

- Can add details of particular treatment and its cost
- Update details of particular treatment
- Delete details of particular treatment
- Not able to see the other hospital treatment and its cost



The screenshot shows a mobile app interface for a hospital login. At the top, there is a status bar with the time 11:05 AM and various icons. Below the status bar, the text "HOSPITAL LOGIN" is displayed in a bold, sans-serif font. Underneath, there are two input fields: "Username" and "Password", each with a light blue underline. Below the password field, there is a blue button with the text "LOGIN" in white, uppercase letters.

User Module

- User can search the particular treatment
- Can able to see treatment and costs for that treatment for different hospitals, rating of the hospitals, reviews of the hospital.

USER LOGIN

LOGIN

Not a member yet?

REGISTER HERE

There are several ways to build a Recommendation System and these approaches are divided according to the needs of the application. Though there are several types of Recommendation Systems, they are mainly categorized into three types: Collaborative Filtering, Content-Based Filtering, and Hybrid Recommendation Systems. In this section, let us have a look at each of these types.

A. Collaborative Filtering Recommendation System

From the technology aspect, the recommenders are moving from Machine learning approaches to more advanced Neural Network and Deep Learning approaches. The idea of a Collaborative Filtering is very simple; given the ratings of a user, find all the users similar to the active user who had similar preferences in the past and then makes predictions regarding all unknown products that the active user has not rated but are being rated in their neighborhood while considering the preferences or tastes of neighbors. We first calculate how similar the other users are to the active user and then unrated items from the user communities are recommended to the user following predictions. Here the active user is the person to whom the system is serving recommendations. In these types of systems, the main actors are the users and the product information such as ratings, rankings and liking towards the product. Figure 2 represents Collaborative Filtering Based Recommendation System.

Figure 2. Collaborative Filtering Based Recommendation System

B. Content-Based Filtering Recommendation System

Figure 3 depicts building a Content-Based Filtering Recommendation Systems which involve three main steps: Generating content information for products, generating user profiles and preferences relative to the features of the product, and generating recommendations and predicting a list of items that the user might like. In the Item-Profile generation, the features of the product are extracted that represent the product. These features can be structured or unstructured data. For example, in the case of movies, an item profiles for each movie can consist of different types of genres. This is carried out by creating a matrix with items as rows and genre as columns. Binary representation is used to show if the movie belongs to a certain genre (denoted by 1) or if it does not (denoted by 0). In the User Profile Generation step, a preference matrix is built matching the product content and the user profile and item profile are compared and calculate the similarity between them. The cold start problem is easily

C. Hybrid Recommendation System

Hybrid recommendation systems came into existence due to the limitations of each of the previous kinds. Hence there have been several strategies to combine Collaborative Filtering and Content-Based Filtering and is called Hybrid Recommender Engine as shown in Figure 6. Amongst the various approaches used, the weighted method is the most common. In the beginning, the combination of the recommendation results is obtained from each and equal weights are distributed to each of these results and gradually the weights are adjusted after evaluating the responses from the users to the recommendations. Feature Combination method is another popular approach where the User profile from Content-Based Filtering is combined with user-item ratings information and a new strategy is considered to build a Hybrid Recommendation System.

V. CONCLUSION

In this study, we have studied three approaches: Collaborative Filtering, Content-Based Filtering and Hybrid recommendation system. We found content-based filtering best for our hospital recommender system. Using a content-based approach Hospital Recommender System will help patients to get accurate recommendation for particular disease or recommendation of hospital in budget. Using a content-based approach we are able to make a Hospital Recommendation System which is very efficient and easy to use.

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