

## PLACE RECOMMENDATION SYSTEM

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**Abstract** -This project focusses on developing an android application which can be used for recommending places to the user based on his current GPS location. For this we use user based collaborative filtering algorithm which evaluates places based on user's current location, check-in's and preferences. Collaborative filtering algorithm is used to recommend nearest and best places to the users from the device. For the purpose of recommendation, we use a self-driven database for information of places which incorporates real-world check-in spots. Our objective is to extract information about a place and recommend user their place of interest based on their ratings and system algorithm.

**Key Words** - Collaborative filtering algorithm, PHP, Android SDK, SQL, GPS.

### 1.INTRODUCTION

With the advances in technology, use of smart phone has increased multifold. Due to easy access to internet on handhelds use of location based application on mobile phone have been in trend. Location based applications make use of the current GPS location and list nearby places around a certain radius. For example, user can view shopping malls, movie theatres, restaurants, etc. when in a range of few kilometers to these places.

Despite the usage of such applications steadily increasing, the number of check-in spots have also been increasing in the recent years which creates a lot of confusion amongst the users as to which place they would like and enjoy. Therefore, this project 'Place Recommendation System' is developed to reduce the confusions of the users and helps them by recommending their place of interests. This application is used to recommend places to the users according to his\her taste and preferences, considering his previous check-ins, likes and dislikes. This application also considers the likings of other users around the targeted user's location and recommends the targeted user with the places around him\her. Hence, this application recommends places to the users using these two ways. For the recommendation part, this application uses user-based collaborative filtering algorithm which helps in sorting places and listing them to the users, as discussed earlier.

For the information of places, this project uses a self-driven database wherein, the database is created and updated by the admin. Self-driven database is used so that the information of even the smallest, not so very famous shops and places can also be listed to the user in recommendation part. Also, this database can be further modified recurrently to update information about the new places. Therefore, this application can provide great help to the local users by letting them know places which they are not aware about, also the tourists by listing and recommending them with tourist attraction places and places of basic needs such as medical stores, petrol pumps, banks, etc.

### 1.1 Need of the proposed system

On a daily basis local users find it difficult to search places of basic requirements whenever they are in new place, this application helps local users to spot places of their need, taste and preferences. Also this application helps tourists to come across language barrier and get to visit tourist spots whenever in a new city. This application performs tasks such as to find all the possible results, user can view all the local restaurant, hospitals, medical shops etc. within few kilometers range. Recommender system will evaluate attractive places based on their ratings that have been stored in the database which is created by admin.

### 1.2 Disadvantages of Existing System

Existing system takes ratings from different websites or surveys which may not be completely genuine, whereas this system evaluates ratings and recommendation directly from the users itself. In this system there are two kinds of recommendations that can be performed while existing system has only one kind of recommendation. Existing system takes more time to respond whereas, this application is more responsive & time efficient. Existing systems may not have information about all the smaller shops and places whereas, this application even lists you those places.

## 2. PROPOSED SYSTEM

Having a place recommendation application helps not only the tourists but also local users to find places according to their interests & preferences. The proposed place recommendation application is inspired by the increasing number of users around the world. We implement an application which can be used as a service to Smartphone users. For this we use Android Studio & SDK tools for the implementation & design of the project. To implement the recommendation part, we use the self-driven database to get information of places all around. This application works on the current location of the user & recommends places on the basis of the local spots & user check-in records. For this it uses user based collaborative filtering algorithm to help recommend places to the users appropriately. This algorithm works by grouping places with similar traits in a single section. For Eg. 'Monginis' & 'Merwans' are clubbed under 'Cake shop' which can further be grouped under 'Restaurants'. By using this classification, the user location, user's check-in records & processing the algorithm the user is recommended with places according to the mobile device location.

### 2.1 SOFTWARE REQUIREMENTS

- WAMP: Web Application Server, you need to have this since you have to use your system as a server and run the PHP applications.
- PHP: Server Side Scripting Language.
- MySQL: Database, to perform the tasks related to database in the web applications.
- XHTML: Extendible Hypertext Markup Language is required. Having known this scripting language, PHP coding would be easier.

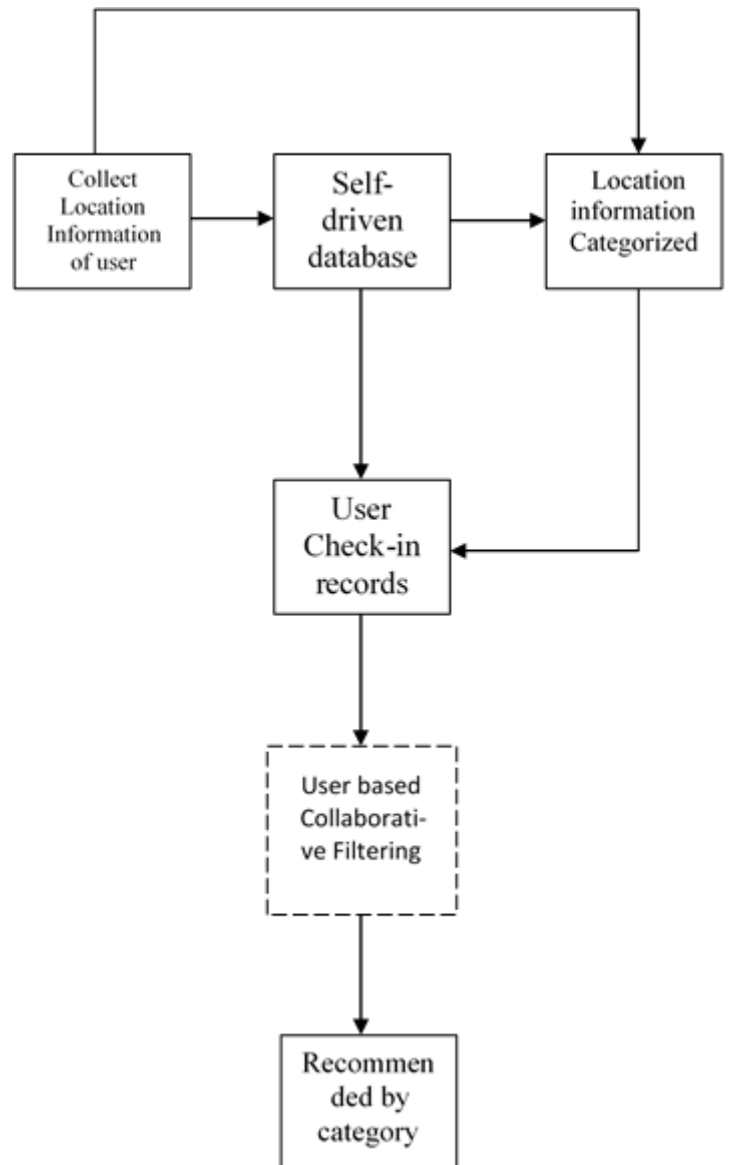
### 2.2 METHODOLOGY

Android is an open source operating system and the devices that runs the android applications works on any of the mobile devices that supports android operating system. Android is a Linux-based, open source mobile operating system used for developing apps for android devices. To start with, one has to download and install Android SDK.

#### Platforms to run Android:

1. Microsoft Windows XP or later version.
2. Mac OS X 10.5.8 or later version with Intel chip.
3. Linux including GNU C Library 2.7 or later.

### 2.3 PROPOSED DIAGRAM



**Fig -1:** Place recommender system

Above figure 1 depicts the block diagram of the Place Recommendation System. The recommendation is done by reading the geographic position of the user's mobile device. This information is sent to the database to retrieve spatial information of the local spots. Based on the categories, user's check-in records are analyzed and collaborative filtering algorithm is applied to personalize the places nearby to the end user.

### 3. ALGORITHM

#### 3.1 To estimate user ratings

For each venue  $j$  that user has checked-in record, user rating is estimated by using;

$$R_a(k) = f_a(k) * \log\left(\frac{|M|}{|M_a|}\right)$$

Where  $R_a(j)$  is the number of check-in times for venue  $j$  visited by user  $a$ .

$|M_a|$  is the total number of venues visited by user  $a$ .

$|M|$  is the total number of venues.

#### 3.2 To extract features from self-driven based on user location.

For each category  $C \in C$ , the category feature  $X_a(c)$  is computed by using,

$$X_a(c) = \frac{\sum_{k \in c} R_a(j)}{\sum_{i \in c} R_a(i)}$$

This first step is used to convert the raw frequency of visiting a place with the user to obtain a meaningful weight.

#### 3.3 User similarity matrix

$$\text{Sim}(a,b) = \frac{\sum X_a(c) * X_b(c)}{\sqrt{\sum X_a(c)^2} * \sqrt{\sum X_b(c)^2}}$$

Where  $X_a(c)$  indicates the feature value of user  $a$  for category  $c$ .

Where  $X_b(c)$  indicates the feature value of user  $b$  for category  $c$ .

This is used to find the similar users amongst the different users.

#### 3.4 Recommendation of the nearby places

$$\text{Score}_a(j) = \frac{\sum R_x(k) * \text{Sim}(a,x)}{|T|}$$

Where  $R_x(j)$  is used to estimate rating of user  $x$  in a set of most similar user  $T$  for venue  $k$ .

$\text{Sim}(a, x)$  is the similarity between user  $a$  and user  $x$ .

### 4. CONCLUSIONS

In this project, we presented the design and implementation of a mobile application called Intelligent mobile recommender system, with which mobile users can get location guidance information they need anytime and anywhere. Our proposed system recommends the nearest places for the android users by incorporating the geographic positions. Using this application, users can get an attractions' detailed information. In particular, this application can provide users with location-based information, which can be browsed or queried through a map. This application helps user recommend places of their interest, based on their location, their check-in spots and their ratings to each checked spot.

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