



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 4, April 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.165



9940 572 462



6381 907 438



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Paying Guest Recommendation System Using Machine Learning

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ABSTRACT: Now a day's people are interested for living in PGs, which having excellent features such as AC, Food, Washing Machine, Location, Sharing, better facilities etc. But due to lack of proper information about each area present in particular location they deprive from choosing desired PGs. There are many people who desire to have best PGs at their convenient working location. So, we propose the recommendation system for the users that recommendation system designed on the basis of previous users' review. So, new users get helpful to choose a desired spot using this recommendation system. We are going to add Content Based Recommendation & Encoding Algorithm, which will capture positive and negative sentiments. We are also going to combine KNN Algorithm and Quick Sort for Naive Bayes and fastest search algorithm which will used to filter out best suited PG for the end users.

KEYWORDS: Content Based Recommendation, K-Nearest Neighbors(KNN), Quick Sort etc.

I. INTRODUCTION

The Recommendation System is part of routine life where people rely on knowledge for deciding their interest. The collaborative filtering model takes data from a user's previous behaviour (i.e., previously purchased items or chose or numerical ratings provided to the item) as well as similar decision made by other users. After that, different models are used to forecast items (or ratings for items) that the user might have an interest in. although there are many approaches developed in the past. However, search still goes on due to its often used in many applications, which personalize recommendation and deal with a lack of accuracy. These demands throw some challenges. To solve this, many researchers have been used algorithm like k-Nearest neighbour algorithm and content based algorithm. A model-based system, like a neural network, generate a model that learns from the information of user-item ratings and recommends new items —Following shows the detailed description of all the above approaches. The recommendation system still require improvement to develop a better and accurate method. The recommendation system is a sharp system that provides ideas about the item to users that might interest them. In this paper, different approaches.

II. RELATED WORK

Movie recommendations using several techniques have been extensively studied in the past decades. Examples include a recommendation system using the als algorithm, a recommendation based on the weighting technique, item similarity-based collaborative filtering. These techniques require prior information about the ratings for the movies which are generated by the user. These techniques majorly use movie lens datasets for evaluation purposes. However, these system are not a bit accurate, and research is ongoing to improve real time performance of this system

III. SCOPE OF PROJECT

The Main purpose of this system is to recommend the best PG to user. With the help of this system user can find the PG in less Time. This system is easy to use and convenient for the user.

IV. TECHNOLOGY USED

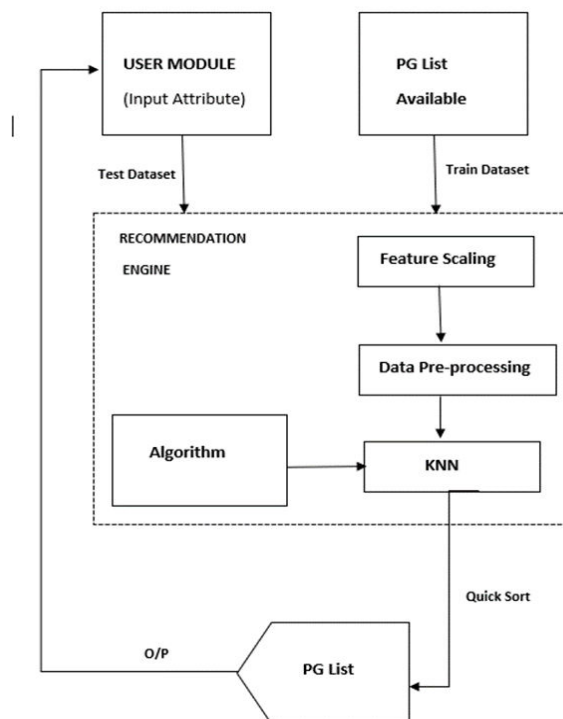
- **Visual Studio Code :-** Visual Studio Code is a code editor redefined and optimized for building and debugging modern web and cloud applications.
- **PyCharm :-** PyCharm is an IDE by JetBrains. It is used for development in Python and frameworks. You can customize it with themes and plugins. It lets you to enhance productivity while coding by providing some features like suggestions, Local VCS etc.

- **Lucid-Chart** -: Lucid-Chart is one of the ideal Drawing collaborative tool which allows you to create, share, manage of UML, wireframes etc.
- **Python** -: Python For aspiring Data Scientists, Python is probably the most important language to learn because of its rich ecosystem.
- **Django Framework** -: Django is a high-level Python Web framework that encourages rapid development and clean, pragmatic design.

V. PROJECT REQUIREMENTS

- Software Interfaces
 - Operating System - Windows8/10
 - Coding/Script language - Python, HTML, CSS etc.
 - Software - Python3.7
 - Tool - PyCharm, Visual Studio Code
 - Server - Pgadmin
 - Database - PostgreSQL
- Hardware Interfaces
 - Processor - Intel i5 core
 - Speed - 1.6 GHz
 - RAM - 4GB
 - Hard Disk - 1 TB
 - Key Board - Standard Windows Keyboard

VI. SYSTEM ARCHITECTURE



At the very first the user is provided with login credentials and then register themselves at the application and as per their needs or as per the luxury the input attributes will be provided to user module which is considered to be the test dataset; which is further used and given to the recommendation engine and the PG list available as a output is the train dataset and 20-80% type test and train data is gained and evaluated. Than in recommendation engine module some operations are performed over the data provide as an input. Firstly feature scaling is done then data Pre-processing is applied over the input and after such steps the algorithms are applied over the data to get desired PG output as much as faster it could help the end user. The algorithms used in the system are like KNN algorithm is used to find the most nearest location with the provided input facilities and then at last quick sort is used to get PG location as fast as possible with proper accuracy. So, at last the PG list is get displayed to the user and the client could finds its desired location in just a minutes of span of time and this is how the system works. And as to make us know about the needs and about the concerns or compliments of clients we have provided ratings option to the user so based on that data we may enhance our service and get to know about views using content based filtering which would help the other users regarding location, amenities and also have a chance to put their opinion.

VII. ALGORITHM

A. KNN Algorithm:

1. Load the training and test data.
2. Choose the value of K.
3. For each point in the test data-
 - Find the Euclidean distance to all training data points.
 - Store the Euclidean distance in a list and sort it.
 - Choose the first k points

$$d(\mathbf{p}, \mathbf{q}) = \sqrt{\sum_{i=1}^n (q_i - p_i)^2}$$

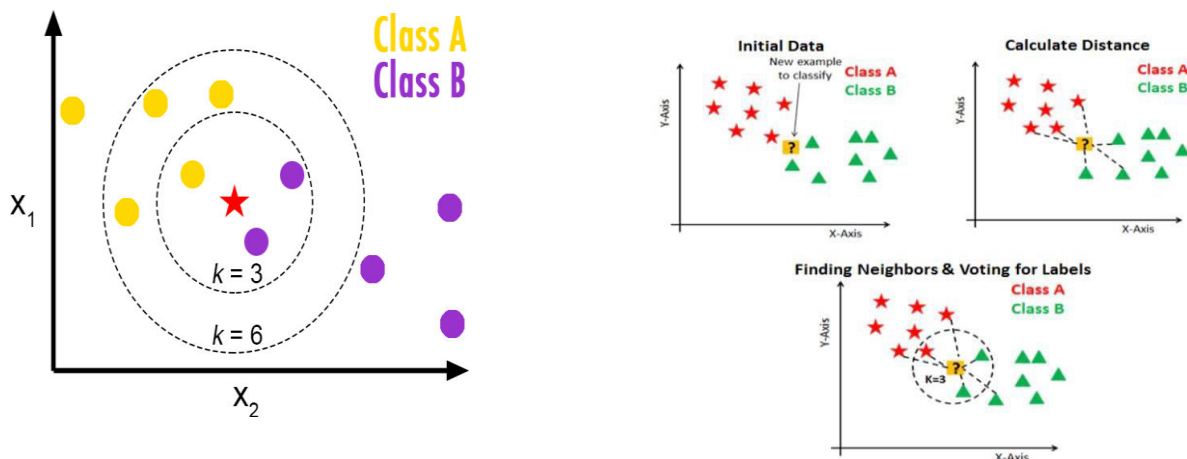
\mathbf{p}, \mathbf{q} = two points in Euclidean n-space

q_i, p_i = Euclidean vectors, starting from the origin of the space (initial point)

n = n-space

- Assign a class to the test point based on the majority of classes in choose points.
4. End.

K Nearest Neighbour(KNN) is a very simple, easy to understand, versatile and one of the topmost machine learning algorithms. KNN used in the variety of applications such as finance, healthcare, political science, handwriting detection, image recognition and video recognition. In Credit ratings, financial institutes will predict the credit rating of customers. In loan disbursement, banking institutes will predict whether the loan is safe or risky. In political science, classifying potential voters in two classes will vote or won't vote. KNN algorithm used for both classification and regression problems. KNN algorithm based on feature similarity approach.



B. QUICK SORT-

- **Input :-** Output(KNN)
- **Output :-** Sorted Paying Guest List
- **Method :**
 1. Choose any element of the array to be the pivot.
 2. Divide all other elements (except the pivot) into two partitions.
 - All elements less than the pivot must be in the first partition.
 - All elements greater than the pivot must be in the second partition.
 1. Use recursion to sort both partitions.
 2. Join the first sorted partition, the pivot, and the second sorted partition.

C. Content-based Filtering-

Content-based filtering uses item features to recommend other items similar to what the user likes, based on their previous actions or explicit feedback.

To demonstrate content-based filtering, let's hand-engineer some features for the Google Play store. The following figure shows a feature matrix where each row represents an app and each column represents a feature. Features could include categories (such as Education, Casual, Health), the publisher of the app, and many others. To simplify, assume this feature matrix is binary: a non-zero value means the app has that feature.

You also represent the user in the same feature space. Some of the user-related features could be explicitly provided by the user. For example, a user selects "Entertainment apps" in their profile. Other features can be implicit, based on the apps they have previously installed. For example, the user installed another app published by Science R Us.

The model should recommend items relevant to this user. To do so, you must first pick a similarity metric (for example, dot product). Then, you must set up the system to score each candidate item according to this similarity metric. Note that the recommendations are specific to this user, as the model did not use any information about other users.

VIII. PSEUDO CODE

- Step 1: Firstly Users Needs to Register Themselves.
- Step 2: After that Users required to Sign in / sign up.
- Step 3: After Successful Registration, Users have to fill the Attributes According to their Needs.
- Step 4 : This information will forwarded to recommendation model. Recommendation model process on data provided by user.
- Step 5: Using Knn Algorithm it will find the shortest path .
- Step 6: After processing on data system will gives us the PG list.
- Step 7: End.

IX. RESULTS

	A	B	C	D	E	F	G	H
1	Location	Food	AC	WashingM	RentMontl	Sharing	Gender	PG Code
2	Kothrud	Yes	Yes	Yes	8000	2	M	1119
3	Kothrud	Yes	No	Yes	8000	2	F	1119
4	Kothrud	Yes	No	Yes	6000	3	M	1212
5	Kothrud	No	No	Yes	6000	3	F	1212
6	Hadapsar	Yes	No	Yes	5000	3	F	1118
7	Hadapsar	Yes	No	Yes	5000	3	M	1118
8	Deccan	Yes	Yes	No	5000	3	F	6565
9	Deccan	Yes	No	No	5000	3	F	8974
10	Deccan	No	No	No	4000	3	M	8974
11	Hadapsar	No	No	No	2000	3	M	7956
12	Magarpatt	No	No	No	6500	4	F	1111
13	Magarpatt	Yes	No	Yes	6000	4	M	1112
14	Magarpatt	Yes	No	Yes	6000	4	F	1112
15	Hadapsar	Yes	No	Yes	7000	4	F	1113
16	Hadapsar	Yes	No	Yes	7000	4	M	1113
17	Hadapsar	Yes	Yes	Yes	8000	3	M	1114
18	Hadapsar	Yes	Yes	Yes	8000	3	F	1114
19	Kharadi	Yes	No	Yes	5500	3	M	1115
20	Kharadi	Yes	No	Yes	5500	3	F	1115
21	Kharadi	Yes	No	Yes	6500	2	M	1115
22	Kharadi	Yes	No	Yes	6500	2	F	1115
23	Kharadi	Yes	Yes	Yes	6300	3	M	1116
24	Kharadi	Yes	Yes	Yes	6300	3	F	1116
25	Kharadi	Yes	Yes	Yes	6800	2	F	1116
26	Kharadi	Yes	Yes	Yes	6800	2	M	1116
27	Kharadi	Yes	No	Yes	5500	3	M	1117
28	Kharadi	Yes	No	Yes	5500	3	F	1117

Fig. 1. Dataset

We Recommend the best PG/Hostel to You.....!

Our Recommended PG for you

PGName PGCode 7 Durga PG, Hadapsar 1118

[Back](#) [Home](#)

Fig. 2. Output

```
# Splitting data into Training and Testing set
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test=train_test_split(x,y, test_size= 0.26, random_state=0)

#Taking data from user for testing and prediction

test = [[1, bb, d, c, rent_value, sharing, a]]
#test=[['Location', 'Food', 'AC', 'WashingMachine', 'RentMonth', 'gender']]

# Implementing KNN Model for recommendation
from sklearn.neighbors import KNeighborsClassifier
knn = KNeighborsClassifier(n_neighbors=5)
#knn.fit(x_train, nm.ravel(y_train,order='C'))
knn.fit(x_train, nm.ravel(y,order='C'))
y_pred = knn.predict(test)
y_pred1=knn.predict(x_test)
print(y_pred)
```

Fig. KNN Model

X. CONCLUSION AND FUTURE WORK

Using this PGs recommendation system user can get easy to choose desired locality. User can choose PGs as per his/her requirements, such available facilities like AC, Washing Machine, Food and Rent on the basis of their priority, near to user working and for college going youngsters suggest preferred location.

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BIOGRAPHY

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