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Geolocation Clustering for Student Housing

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ABSTRACT :

Over the past few years, immigration has grown, especially among workers and students looking for employment or education chances. However, there are a number of difficulties associated with relocating, and housing is one of the main ones. Finding acceptable housing that fits their tastes and budget is a challenge for young people and students [1]. To solve this, we suggest recommending lodgings for migrants based on criteria including amenities, cost, and closeness to their destination using KMeans Clustering, a data mining technique. We can categorise various lodging options, including PGs, apartments, hostels, and adjacent facilities like food vendors and everyday essentials, by examining geolocational data[1].

The main goal is to develop a system that suggests the best places to stay near ISBMCollege, tailored to each person's requirements. This method can be used for a variety of purposes, such as helping businesses locate themselves strategically near educational institutions to increase accessibility for prospective customers.

When it comes to moving to other states or cities to pursue further education at institutions or for employment, students and young adults frequently encounter challenges. This study uses K-Means Clustering to categorize migrant accommodations according to their budget, location, and facility preferences in order to determine which accommodations are ideal for them.

The goal of this project is to develop a system that would categorize users according to their interests, such as PG, apartments, hostels, food stalls, daily requirements, etc., in order to discover the best accommodations for them close to ISBM College. This technique can be further developed and utilized for a number of purposes, including locating a business in a suitable area (for example, stationery stores, shopping centers, entertainment venues, etc. are ideally suited near an educational institution).

1. Introduction :

In the current digital era, the internet provides a wealth of information that influences our choices in many facets of life. The internet has a significant impact on everything from where we stay to what we eat, mostly through recommendation engines that customise content according to our online activity and interests. [3]

Due to considerations like job and educational possibilities, migration is increasing, especially in India. However, moving to a new location has difficulties, particularly for students, like acquiring acceptable housing without local contacts or knowledge [1].

A initiative designed especially for ISBM College students is in progress to solve this problem, with the goal of making it easier for them to locate housing close to campus. Based on the location and preferences of the student, this project uses techniques such as K-Means clustering and content-based filtering to suggest hostels, paying guest rooms, and other amenities [1].

The study's main goal is to effectively address students' housing needs by using technology to expedite the search process and improve the entire experience of adjusting to a new learning environment.

This initiative's main objective is to facilitate students' full adjustment into a new setting, not merely to find lodging. Housing is frequently one of the most difficult parts of moving to a new place, which can be daunting. The project enables students to concentrate more on their studies and less on practical issues like finding housing by offering a straightforward, technologically advanced alternative. Students who have comparable interests and experiences can also feel more connected to one another thanks to this method.

With the goal of assisting students in relocating to new cities, this program may eventually serve as a template for other educational establishments in India and around the world. More individualised, data-driven housing solutions will be required as the number of students rises and more people relocate to cities. Additionally, this technology might greatly enhance the entire student experience and help create smarter, more connected learning environments when combined with other smart campus solutions (including cafeteria, transportation, and academic resources).

Literature Survey :

In the digital age, recommendation systems have become indispensable, assisting users in locating what they need among the enormous amount of data on the internet. These systems provide tailored recommendations for films, books, music, and other media by examining user data [3]. For example, if you liked a particular film, the algorithm may recommend others you would appreciate. These suggestions lessen information overload and simplify decision-making [3].

Incorporating location information into recommendation systems has been popular recently. This implies that suggestions can be even more pertinent if they take your current location into consideration.

The sectors of social networks and academia are paying attention to this development because they see how it could enhance user experiences.

Recommendation systems play a vital role in helping users make informed decisions by suggesting relevant content based on previous interactions. *Collaborative filtering* and *content-based filtering* are the most common methods used in housing recommendations. Collaborative filtering works by identifying users with similar preferences, while content-based filtering suggests items based on attributes like price and location. Hybrid systems that combine both methods have been shown to improve recommendation accuracy, especially for housing platforms [1][2].

Clustering techniques, such as *K-Means clustering*, have been applied to group similar housing options or user preferences. This approach helps in segmenting housing data based on location, price, and amenities. Clustering allows for more targeted and personalized recommendations for users, such as students looking for accommodation close to educational institutions [3][4].

Migration for education has led to an increasing demand for student housing. However, students often struggle to find suitable housing due to lack of local knowledge and limited access to reliable information. Studies highlight the difficulty students face in finding affordable, safe, and well-located housing. Technology-driven platforms have been identified as effective tools in addressing these challenges by streamlining the housing search process [5][6].

Recent research emphasizes the role of *machine learning* and *big data analytics* in improving housing search platforms. Platforms using real-time data on availability, prices, and nearby amenities can enhance the student housing experience. Furthermore, *smart city technologies* have the potential to integrate housing data with urban infrastructure, offering real-time solutions for students and residents [7].

In India, migration for education is increasingly common, particularly in urban centers. Studies show that students moving to cities often face difficulties in securing accommodation, leading to a greater reliance on word-of-mouth or informal networks. Educational institutions and governments have begun developing digital platforms to address these housing challenges.

Problem Statement :

Consider a company employee or student who recently relocated for job or school. It can be difficult to find acceptable lodging, especially if there are particular requirements regarding location, price, and amenities [1]. These people frequently find it difficult to find the finest solutions that suit their needs since they lack local knowledge. Additionally, their relocation procedure may become much more challenging as they navigate transit networks to get to their destinations.

Students, in particular, encounter specific housing difficulties when they relocate to new places. They frequently turn to unofficial means of finding housing, which may not always be accurate or dependable, because of things like a lack of local contacts, unfamiliarity with the location, and the ongoing need to juggle housing with their academic obligations [1].

By offering tailored housing recommendations, our initiative, the Geolocation Analysis System, seeks to alleviate these problems and make it easier to locate acceptable accommodations. The system considers user choices, including location closeness to significant locations like workplaces or institutions, budget, and chosen amenities. The system provides the user with the most pertinent selections by employing data-driven techniques such as content-based filtering and K-Means clustering [1].

Furthermore, by incorporating local transit choices, the Geolocation Analysis System goes beyond housing recommendations. Users can explore the city with ease thanks to the system's assistance in determining the optimal ways to go to their destinations. The system is a complete resource for immigrants acclimating to their new surroundings since it offers both housing suggestions and transit options.

By providing these capabilities, our project hopes to ease users' transitions into their new living and working situations by lowering the stress and time associated with home searches and city navigation.

4. Objectives :

The following are our goals for the geolocation analysis system project:

1. Get the Accommodations That Are Available:

Our objective is to gather information on all of the hostels and paying guest (PG) rooms that are offered in the user's city. This means compiling comprehensive data on various hotel options.

Filtering according to User Needs:

Once the options have been compiled, we want to filter various dorm and PG rooms according on the user's chosen choices. This could include things like your budget, chosen amenities, ideal location, etc.

3. Offer Options for Transportation:

Our objective is to tell customers about the nearest transit choices from the selected guest room or hostel. This can mean connecting with transportation APIs to offer alternatives like ridesharing services, bus schedules, and metro stations.

Implement Recommendation System for Affordability:

Using a recommendation engine, our system will suggest to customers affordable PG and hostel rooms. This might rely on factors including the user's spending limit, historical pricing data, and availability.

5. Estimate pricing Based on User Preferences:

Finally, we attempt to provide customers with an approximate pricing range for PG and hostel rooms based on their preferences. This may mean examining pricing data collected from many sources and accounting for location, facilities, and demand.

The overall objective of our system is to facilitate immigrants' search for suitable accommodation by providing them with comprehensive information, letting them choose options according to their tastes, and providing tailored recommendations.

5. Methodology :

We are working on a project to compile and organize information about different cities. We'll begin by cleaning the data of any errors or strange principles. After that, we'll group comparable areas together using a method called K-means. Using the Foursquare API, we will compile data on the paid guest rooms and hostels in each region. We'll utilize a technique called content-based filtering to match these options with user preferences. Finally, we will plot all of this data on a map using Folium or other mapping software.
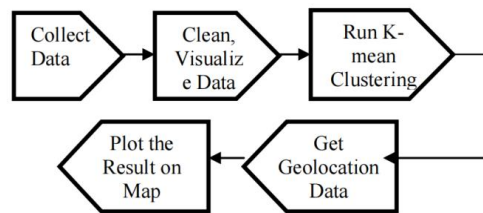
The steps for our project are [2]:

Fig. Block Diagram

Gather Data:

Obtain the dataset from the appropriate source. setting up the surroundings for data analysis.

choosing the pertinent and necessary characteristics (money, commuting to work or college, etc.) from a wide range of options.

2. Clean, Visualize Data:

Preparing the dataset for analysis by cleaning it. The survey data is raw and unfit for analysis due to a number of anomalies that could produce surprising and inaccurate conclusions.

3.Execute K-Mean Clustering:

The cluster nearest to the cluster center receives the data point. The new cluster is calculated once more.

Graphs are used to assess and show the findings once the data has been collected. The general analysis of trends is a helpful tool for comparing distributions across multiple groups and datasets.

Get Geolocation Data:

K-means clustering is used to group the data. The population dataset is subjected to K-Means clustering, which divides the data into distinct groups according to shared characteristics. When working with unlabeled data, it is among the most straightforward unsupervised learning techniques for training the machine learning model. In order to ensure that the sum of squared distances between data points and the cluster center is as small as possible, it assigns data points to clusters. The similarity between data points reduces as variation does.

5. Plot the Outcome on a Map:

K-means clustering is used to group the locations. K-means clustering of the final location data is used to determine the ideal place to stay; the findings are then displayed on a map using Map.

6. Result :

The location is clustered using K-means clustering. The best site to stay is identified by applying K-means clustering to the final location data; the results are then displayed on a map using Map.

Fig. Result
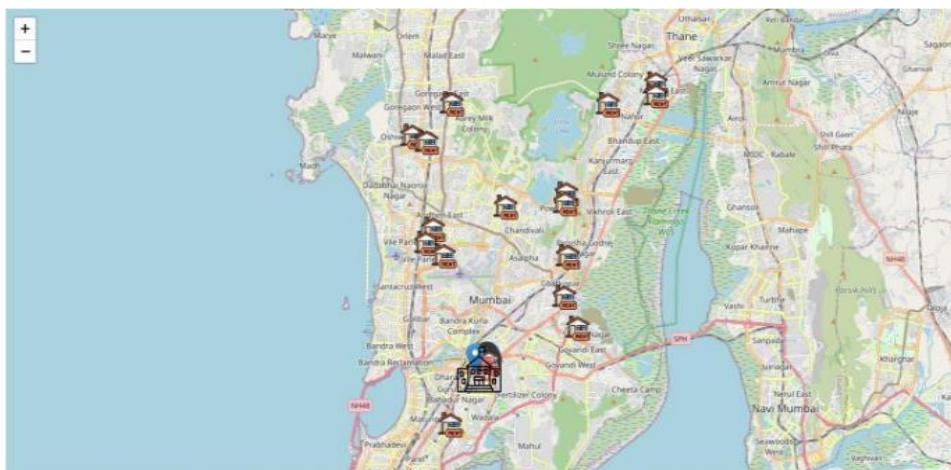
The model suggests hostels in the same cluster as the user's input based on user preferences and geographic location. Ratings and the user's location are taken into account when making content recommendations.

A list of suggested hostels along with their names, addresses, costs, ratings, and separations from the user's current location is provided by the model output.

Customers may confidently select a hostel based on their tastes and location according to the information provided [1].

7. Conclusion :

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In this study, we investigated the obstacles that staff and students encounter while moving to a new place, namely the challenges of identifying appropriate housing that satisfies certain requirements for location, cost, and amenities. We emphasized how crucial it is to incorporate technology in order to streamline the housing search, lower stress levels, and enhance the moving experience in general.

These issues are addressed by the suggested Geolocation Analysis System, which makes recommendations for the best housing options based on user preferences using personalized recommendation techniques including content-based filtering and K-Means clustering. Additionally, the technology guarantees a smooth transition for customers by offering details on nearby transit choices, allowing them to easily navigate their new surroundings.

Our method has major advantages in terms of user pleasure, efficiency, and ease. The method improves the relocation experience for immigrants while also saving time by fusing transit information with housing recommendations. Furthermore, this study paves the way for future advancements, such as the incorporation of increasingly complex machine learning algorithms and the extension of the platform to incorporate additional services like neighborhood facilities, community resources, and security measures.

In conclusion, by offering a complete solution that takes into account both housing and transportation needs, the Geolocation Analysis System has the potential to completely transform how people locate housing and navigate new cities. This study shows how effectively technology may be used to address practical issues, which eventually helps individuals adjust more easily and live better in their new settings.

8. REFERENCES :

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