

## HOTEL RECOMMENDER SYSTEM

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**Abstract** – While planning for a holiday the first thing that comes in our head is to book a good place to stay. But it is a challenge in finding the best hotel from thousand's of hotels to choose from. Motivated by this thought we decided to make a hotel recommender system that can recommend hotel based on hotel description and user reviews. A system which is capable of understanding human sentences and applying that understanding of it in our recommendation was a goal for us. In this paper we discuss how hotel recommendation was made possible using user reviews and hotel description.

**Key Words:** Recommendation system, hotel, reviews, Internet, hotel industry

take many various criteria for every item. They also stated that Multi Criteria Recommender Systems have a good accuracy, approaches used by them needed many previous clients to firstly rate hotels with respect to their criteria. It was ideally impossible to have client ratings for every different dimension for each hotel. They presented a paper on Multi Criteria Recommendation System for Hotel Recommendations to choose the best suited hotel in a city according to a users preference and other user's reviews. In order to know the rating of a Hotel from previous users with respect to different parameters their paper uses various Natural Language Processing approaches on a Hotel Review Corpus and it builds a user ,item, feature database. They also considered the Cold Start Problem for this domain & Text Messaging Language Problem when getting user reviews.

### 1.INTRODUCTION

In the fast development of Web2.0, the amount of online content information has significantly increased, which resulted in big piles of data getting overfilled. It's problematic to capture end- users preferences toward features of an item from varied different types of online expression like reviews, ratings, and suggestions. Recommender systems are a useful choice to search algorithms since they help users discover details they might not have found else. Recommender systems are frequently enforced using search engines. A personalized recommendation system (RS) is one effective way to help user filtering our information. The purpose of hotel recommendation system is to prognosticate which hotel a user is most willing to choose from among all hospices. So to such a system which can help the user to book the simplest hotel out of all the contrary hotels. We can achieve that using user reviews and description of the hotel.

### 2. LITERATURE REVIEW

In 2015, Yashvardhan Sharma, Jigar Bhatt and Rachit Magon has described traditional recommender systems recommend items on the basis of a single criterion where as Multi Criteria

In 2016, author Koji Takuma, Junya Yamamoto, Sayaka Kamei, Satoshi Fujita described on how they focused on the assessment values which were given by the users whose suggestions are similar to the user's suggestion. Such suggestion values may be significantly credible for the user. They also proposed a technique to extract the suggestion of review contributors from a collection of hotel reviews. Than the extracted preferences are used for the hotel recommendation in such a way that the evaluation value given by a contributor to have preference similar to the user is given larger weight. The result of their questionnaire-based evaluations indicates that their proposed method can recommend hotels that matches the user preference.

In 2019, Bushra Ramzan, Imran Sarwar Bajwa, Noreen Jamil, Farhaan Mirza presented a paper suggesting an intelligent approach to handle heterogeneous and large-sized data using machine learning to generate true recommendations for the future clients. The Collaborative Filtering (CF) approach that they have used is one of the most popular techniques of the RS to generate recommendations. They have put forward a book CF recommendation approach in which opinion based sentiment analysis is used to achieve hotel feature matrix by polarity identification. Their approach combines lexical analysis, syntax analysis and semantic analysis to understand sentiment towards hotel features and the profiling of guest type. The presented system recommends hotels based on the hotel features and user type as additional information for

personalized recommendation. The developed system not only has the ability to handle mixed data using big data Hadoop platform but it also recommend hotel based on user type using fuzzy logics. Different experiments were performed over the real world data set obtained from two hotel websites. Moreover, the values precision and recall and F-measure have been calculated and results are discussed in terms of improved accuracy and response time, significantly better than the traditional approaches.

In 2019, Aditi A Mavalankar, Ajitesh Gupta, Chetan Gandotra, Rishabh Misra proposed on how they used certain hotel recommendation dataset, which had a variety of features that helped them achieve a deep understanding of the process that makes a user select specific hotels over others. The aim of this hotel recommendation task is to predict and recommend five hotel clusters to a user that he/she is more likely to book given hundreds distinct clusters

In 2010, Yu-ning Xiong, Li-xiao Geng proposed a paper that summarizes representative online hotel reservation websites' personalized recommendation system situation, such as Qunar, Kuxun, Ctrip and Elong etc. personalized recommendations have poor performance. Their research firstly extracts hotel characteristic factor, attempts to analyse customers' browsing and purchasing behaviours, and secondly constructs a personalized online hotel marketing recommendation system polymerization model for Multi-level customers, at last presents an achieved MATLAB procedure performing the core arithmetic of the individualized recommendation.

### 3. METHODOLOGY

Hotel Recommender System is a technique based on Natural Language Processing methods. Recommendation systems often use this technique to manage the semantics of reviews and descriptions of the hotels in the data set. We used a data set that consists of various hotel features. Natural Language Processing (NLP) allows machines to itemize and illustrate human language. It's at the core of tools we use every day from translation software, chatbots, irrelevant content filters, and search engines, to grammar correction software, voice assistants, and social media observing tools. NLP consists of various libraries which allowed us to construct a model that helped in fetching the data reliably. Processes like tokenization, lemmatization were used. Extracting keywords and removing stop words were crucial parts to build our model.

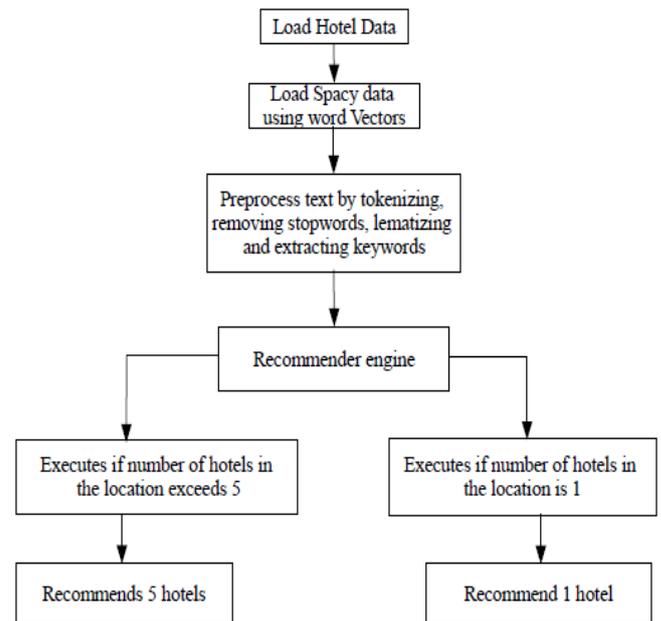


Fig -1: Block diagram of proposed system

The above block diagram proposed refers to the design of our recommender system. Initially, we had to give the necessary hotel data to the recommender engine. While doing so the data is been processed many times to generate the desired output. The recommender engine is capable of recommending the top 5 hotels based on user descriptions. The RS recommends hotels on the basis of hotel descriptions and user reviews. Our system is capable of understanding user input by breaking it down into parts of machine-level code. The output of the recommender system is given some constraints of execution under conditions

### 4. RESULT ANALYSIS

After performing all the above methods and evaluating all test cases, we got the output of our proposed system which recommends hotel by selecting a state from the given options and then writing a description of our desired hotel. Output will be a list of hotel up to a count of 5 that are recommended to the user as of his/her choice written in the description. To make the interface interactive and simple we used Streamlit library. We also implemented this recommender system in a dummy hotel management system for representation purpose to show it's use.

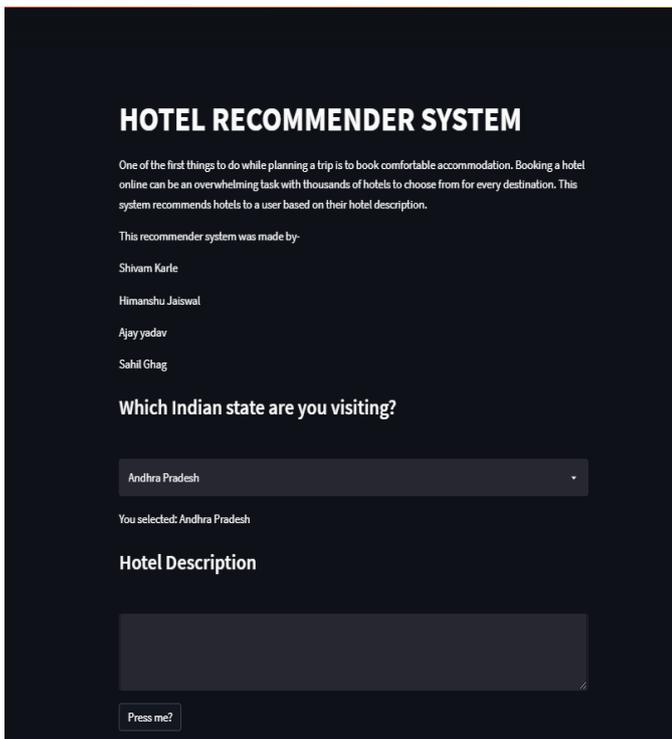


Fig -2: Front end of our system

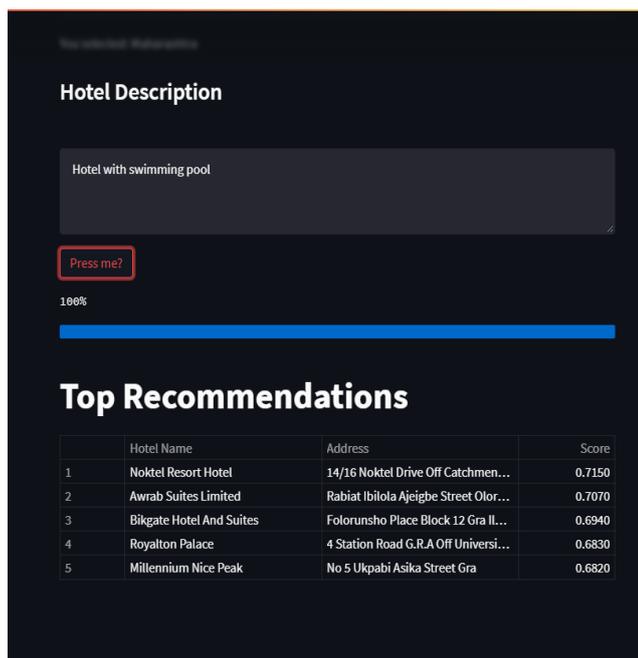


Fig -3: Recommended hotels

Fig-3 shows the output for state “Maharashtra” according to the given description according to the user. The output contains three columns namely: “Hotel name, “Address” and “Score” out of which hotel name and address are both from the given data set but the “Score” column is not included in the data set. The Score column is the ratio of the description that the user had given to the similarities that are present in the data set or the particular column.

## 5. CONCLUSION

We have successfully implemented a hotel recommendation system even though part of the data was randomized which restricted the amount of feature engineering we could do. We ranked this problem at hand as a major problem. The most important and challenging part of implementing the solutions was to create and extract meaningful features out of the thousands of data points provided to us. The exploration of data took a long time given the size of data and it helped us evoke features that implied to have a high impact on predicting the hotel. After applying multiple methods we finally were able to make a successful hotel recommender system which was capable of recommending hotel names to the user. We then successfully deployed our application using Streamlit on the internet. Our project was a success as per our research.

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