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Implementation of hotel booking cancellation using machine learning algorithms

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Abstract— Eventzone is a system based on accessing the internet to book a venue for an event .The study aims to develop and an online hotel booking system for various events, in place of the traditional manual ones. The use of online view of booking rates and uploading of available slots and facilities were used so that the organizations can view and make their choice before the event, and also on the same day. But when it comes to cancel the booked slot you can even cancel it. The cancellation fee for bookings in the online booking industry is pretty high. After the reservation is cancelled, hardly anything can be done. This creates discomfort for many organizations as well as the venue owner and creates a desire to take precautions. Therefore, by predicting the booking to be cancelled and preventing them will create a good value for both the sides. Machine Learning will predict the future cancellations precisely.

Keywords—Booking cancellation; hospitality; machine learning; predictive modeling; prototyping; revenue management.

1.INTRODUCTION

This project aims to reduce cancellation results, hotels using strict cancellation policies and over-reservation strategies, which tends to have a negative impact on revenue and hotel reputation. To overcome this, a machine learning based system model is developed. Recently Machine Learning has gained importance in the world of automation. Machine Learning not only reduces the manual work, but also generates appropriate results. Instead of hard coding Machine Learning helps the machine itself to learn and make decisions and provide precise results. Real – time scenarios are used to process the data for better results. Once the model is ready, it should be trained using a dataset. It is used to check the algorithm's accuracy and the ability to predict the outcome. Once we get the desired results, it's easy to take the required steps to avoid the further cancellation and offer the best experience for the customers.

2.LITERATURE SURVEY

A. Predicting Hotel Bookings Cancellation With a Machine Learning Classification

Booking cancellation is a very common thing in today's world, which can cause severe losses to the business owners. This paper describes how AI is used to identify which booking can be cancelled and prevent some losses. The machine learning model should be evaluated in the real time environment for accuracy. Prediction model of hotel booking cancellation no doubt the issue that can be resolved in the context of Design Science Research (DSR), as it need to develop an artifact, here in this particular case, a form of Revenue Management System (RMS), fulfilling the two requirements of DSR[1].

B. Application Of machine Learning In Hotel Industry A Critical Review :

The growth in IT industry also affects the Hotel Industry. However, this change is quite slow. Many researchers are focused on testing and applying new artificial intelligence technology and learning equipment in the hotel industry. The study offers a brief knowledge about the use of Machine Learning and its combined technology in the hotel and tourism industry. Machine learning is quite trending these days[2].

C. Aspect based Sentiment Oriented Summarization of Hotel Reviews :

The reviews and the feedbacks of the customer play an important role in the image as well as the revenue system of the hotel. But most of the travelers don't read all reviews. The system analyzes the reviews and feedback by the customers. The feedbacks of the customer are gathered from the hotel's website and the stored as classes. As per the study, the model analyzes the overlooked information by the customers and takes some essential steps. Finally, after processing all the data collected an emotional analysis is done. The hotels thereby can take the required steps to improve their service [6].

***D.* Machine Learning for Web Page Adaptation :**

The World Wide Web is a collection of varied documents constituting a huge repository of information available; the massive nature of the data imposes difficulty in extracting knowledge. The amount of data in bulk quantity is not always easy to process. The purpose of Web Mining is to find the relevant information and process it accordingly. Web mining uses several data mining techniques, the unstructured nature of web data makes it difficult to use the data mining techniques in data. Web mining can be categorized in three parts which is dependent on the type of data to be mined [8].

2.1 Summary of Related Work

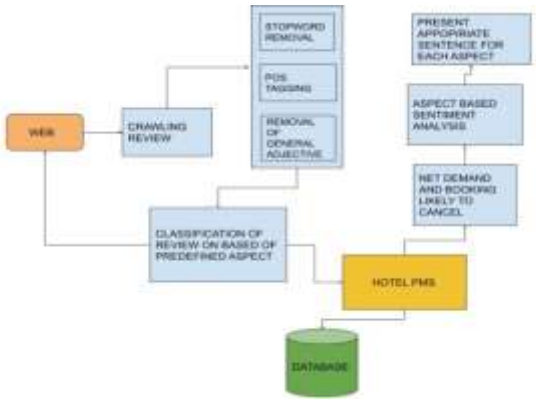
Sr. No	Paper details	Advantages and Disadvantages
1	**Title**: Predicting Hotel Bookings Cancellation with machine learning classification model. **Author** : Nuno Antonio, Ann de Almeida, Luis Nunes	**Advantages** If we have required data accurate prediction is possible. **Disadvantages**: Incapabile of producing highly accurate results.
2	**Title**: Application of Machine Learning in the Hotel Industry **Author**: Dr..Eid	**Advantages:** Machine Learning Algorithms provides simplicity. **Disadvantages:**Social influence makes it difficult to control the predictions.
3	**Title:** Aspect based Sentiment Oriented Summarization of Hotel Reviews. **Author:** Akhtae, Nashez Zubair, Abhishek Kumae, Tameem Ahmad	**Advantages:** Analyze information that ratings would overlook. **Disadvantages:** Requires high amount of data analyse and process.
4	**Title:** Machine learning algorithms are implemented in the embedded systems with the help of APIs. **Author:** Kamil Židek, Ján Piteľ, Alexander Hošovský	**Advantages:** The Artificial Neural Network (ANN) method used gives better results than others. **Disadvantages:** The algorithm used does not indicate the sufficient accuracy.

3. PROPOSED WORK

Hotel Industry's primary goal is to provide a quality service to its customers. The experience the customers will have decides the image of the hotel in their mind. Customer satisfaction can be defined as the link between his expectations and a test purchase in the background.

3.1 System Architecture

The system architecture is given in Figure 1.



1. Begin the Procedure.
2. Hardcode list of aspects and the keywords. And create empty files with the aspect names.
3. Repeat until all cached files are read
   a. Repeat for every sentence in the feedback.
      i. Repeat for every word in the sentence.
         1. Compare each word with the keyword in the list of features.
         2. Find out similarity scores with the system of these words.
         3. Find out the approximate average for all the keywords.
      ii Find elements which are most similar to the sentence.
      iii Assign this sentence to the file of this aspect.
4. End the procedure.

Random Forest is used for classification in the model. The data required is collected from the dataset. Then the decision trees are constructed for the individuals. The decision trees generates the output. The classification of the final output is done respectively.

4. REQUIREMENT ANALYSIS

The implementation detail is given in this section.

4.1 Software

OPERATING SYSTEM	**WINDOWS 10**
PROGRAMMING LANGUAGE	**PYTHON**
DATABASE	**MYSQL**

4.2 Hardware

PROCESSOR	**3.4GZ INTEL**
HDD	**1TB**
RAM	**8GB**

4.3 Dataset and Parameters

HOTEL	GROUP	CANCELED	NOT CANCELED	TOTAL	%CANCELED	ACTION	%ACTION
H1	ACTUAL	486	1489	1975	24.6%	N/A	N/A
	PREDICTED	483	1526	2009	24.0%	109	5.4%
H2	ACTUAL	1043	3060	4103	25.4%	N/A	N/A
	PREDICTED	1025	3086	4111	24.9%	196	N/A

5. OUTPUT DETAILS AND SCREENSHOTS:

We have collected the data from the customers such as their personal details, their travel history, nationality, gender, age, previous cancellations(if any), duration of the stay, time of arrival, etc. Once all the gathered data is processed, we can get the outputs as given in the figure below. Depending oninputs, the system predicts whether the customer is likely to cancel the booking or will not cancel. The user can alter the input details as per his/her needs.

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