HOTEL REVIEW ANALYSIS FOR THE PREDICTION OF BUSINESS USING DEEP LEARNING

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ABSTRACT

Sentiment analysis is a widely used topic in Natural Language Processing that allows Identifying the opinions or sentiments from a given text. Social media is the scope for the customers to share their opinion over the products or services as part of customer reviews. Dissect this review has become an important factor for business analysis since online business is exponentially growing in today's techno-friendly competitive market. A large number of algorithms have been found in recent articles.

Among those deep learning is an important approach. In the proposed methodology, long short-term memory (LSTM) and gated recurrent units (GRUs) have been used to train the hotel review data where the accuracy rate of identifying customer opinion is 86%, and 84% respectively. The dataset is also tested by using Naïve Bayes, Decision Tree, Random Forest, and SVM. For Naïve Bayes obtains an accuracy of 75%, for Decision Tree obtains an accuracy of 71%, for Random Forest the accuracy is 82% and for SVM our accuracy result is 71%. Deep learning is used to obtain better business performance and also get the review from customers and also to predict the sentiment about customer review. Our algorithm works properly and gives better accuracy.

I. INTRODUCTION

In the age of modern science, everything is based on online and on the internet. Internet-based shopping has become easier and more popular because of better quality, and fast logistic systems. Internet-based shopping and booking is very comfortable. People can easily make a booking without going outside. The most effective s ide part of online-based work is that people can give a review. Recognizing reviews allows others to easily understand the emotions of others and obtain the rationality result of different products.

In the hotel review, the prediction of business using Deep Learning was analysed [24]. Many start-up businesses became failure due to lack of analysis and the sentiment of the customer. Sentiment Analysis is the most significant to improve a business site. Here, different type of data from social media as well as from the Hotel Management Website was collected using Unami tools. And also, some supervised an unsupervised data is used to predict the best result. This article will help to improve the business.

1.1 Scope

At present, online-based opinions can easily analysis with the help of Sentiment Analysis (SA). It is the management of sentiments, different opinions subjective text, and different emoji used for giving reviews. People can easily get the comprehension information related to people review.

Mainly Sentiment analysis is one kind of tool that helps to get the public sentiment. By capturing reviews of product or location or person might be found from a different internet-based site like Face book, Amazon. Sentiment Analysis is used to increase the requirement of analysing and structuring hidden information which comes from social media in the form of data.

The growing popularity of online booking platforms, hotel reviews have become a valuable source of information for travellers when making their accommodation choices. However, analysing the vast amount of text data contained in these reviews manually is a time-consuming and labour-intensive task. Hence, there is a need to develop automated methods for sentiment analysis of hotel reviews. Sentiment analysis, also known as opinion mining, is the process of automatically identifying and classifying subjective information from text data. It involves analysing the language and tone used in text to

determine whether it expresses positive, negative, or neutral sentiment.

1.2 Purpose

Sentiment analysis has a wide range of applications in industries such as marketing, customer service, and product development, where understanding customer opinions and feedback is crucial. In this project, we aim to develop a machine learning model that can perform sentiment analysis on hotel reviews to determine the overall sentiment expressed in the review. The model will be trained using a dataset of hotel reviews that have been labelled with their corresponding sentiment. The dataset will be pre-processed to remove irrelevant information, such as stop words and punctuation, and transformed into numerical features that can be used as input to the machine learning model.

We will explore a variety of machine learning algorithms, including Naive Bayes, Logistic Regression, Support Vector Machines (SVM), and Random Forests, to identify the most effective algorithm for sentiment analysis of hotel reviews.

1.3 Objective

We will explore a variety of machine learning algorithms, including Naive Bayes, Logistic Regression, Support Vector Machines (SVM), and Random Forests, to identify the most effective algorithm for sentiment analysis of hotel reviews. We will evaluate the performance of each algorithm using standard evaluation metrics such as accuracy, precision, recall, and F1-score. The proposed project has practical applications in the hospitality industry, where it can be used to automatically analyse customer feedback and identify areas for improvement in hotel services.

LITERATURE SURVEY

[1] Due to the advancement of the technology, people tend to focus on the online content related to products and services available through websites and the opinions of others which are provided in the form of reviews and comments. [2] The development of Internet technology has changed the way of travel for tourists. More and more people get information from the Internet, which has brought great changes to the tourism industry. The same is true of hotels as a key industry in the tourism industry. [3] A comfortable operation of tourism activities depends on the presence of amenities like hotels and tourist attractions. To ensure that tourism operates smoothly, it is also crucial to understand the meaning behind customer feedback to maintain good facilities and services and improve inadequate or poor facilities.

[4] This study optimises sentimental analysis using four cutting-edge machine learning classifiers: Naive Bayes, J48, Tree, and One. This four classification methods' effectiveness are investigated and contrasted. While one appears more promise in producing the accuracy of correctly classified instances, Naive Bayes was proven to be quick at learning. [5] The discussion and critique of products and services occur across various mediums, including the realm of social media. Reviews from previous customers offer a wealth of information about products, allowing shoppers to make prepurchase product evaluations. [6] Sentiment analysis is a widely used topic in Natural Language Processing that allows identifying the opinions or sentiments from a given text. Social media is the scope for the customers to share their opinion over the products or services as part of customer reviews. [7] In today's scenario online reviews on various digital platforms plays a vital role for customers to buy products.

Based on the reviews and ratings by the consumer on E-commerce platform like flip kart, amazon etc. products are widely accepted or rejected. [8] Hotel reviews are obtained from consumers' experiences after using hotel accommodation services as textual information. This information can help potential customers to choose services that suit their needs. Prospective customers are pretty difficult to judge the hotel from the overall reviews. [9] With the development of e-commerce, a large number of hotel reviews have been produced. According to the short text features of hotel reviews, sentiment classification method based on emotion dictionary needs a lot of emotional database resources, while machine learning method needs complex artificial design features and feature extraction process. [10] It is crucial to optimize the Naive Bayes technique because its level of

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accuracy still has flaws. In order to achieve a higher level of accuracy, optimization employs the right and best techniques for text grouping, particularly for hotel review classification.

2.1 Existing system

In our modern science, many authors work on sentiment analysis. R. K. Bakshi addresses his article about sentiment analysis and how to do it on the opinion of humans [1] [22]. Later on, L. Yang analysis on e-commerce review using the deep learning method. The author shows the CNN and GRU technology [2] in that case accuracy was excellent but another e-commerce review is not at good analysis in CNN algorithm. Hemalatha S., the author describes the notion investigation are the audits on eateries about food, administration, cost, and feeling.

Machine Learning calculations in the notch library of python can end up being exceptionally valuable in any such exploration of Natural Language Processing and the library has been utilized broadly in this work [3]. Zeenia Singla also analysis on e-commerce review [8] and she demonstrates her methodology portrayed characterization of surveys as useful to assess the item comprehensively, empowering better-dynamic for customers [4]. These days, social sites like Facebook, Twitter are generally utilized for posting the client's audits about various things, for example, films, news, food, style, governmental issues, and considerably more.

Charu Nanda writes in her research sentiment Analysis on film audits in the Hindi language is examined [5]. Online audits received familiarity as individuals are making choices with the assistance of them. In the future most of the choices are based on Artificial Intelligence (AI). Similarly, many creator examinations on client audit in the various cycles. In this manner, the business future can be anticipated [6] [7] [9]. Hui Yuan, the author designed a novel social media analytics framework on top of Apache Spark for predicting and visualizing consumers' opinion orientations based on their relationships with other consumers whose opinion orientations are known.

For analysis of customer opinion, they use state of-the-art collective classification (CC) algorithms. This algorithm considers not only user's local features but also them relational features [10]. Some authors contribute to this analysis system about many other language comments and reviews [14] [15]. They are delectable about e-commerce sentiment analysis [16] [18].

2.2 Proposed system

In this article, different types of an algorithm are used for the analysis of sentiment of customer. In research work, the analytical part depends on evaluation or developing an algorithm. Though the work, a dataset of the business sector and the dataset from the different website along with some procedure can be developed. In the modern era, natural Language Processing is mostly effective in the machine learning part. In that case sentiment analysis [22] [23] is most important in any business future. In this method, initially collect the data then process the data for our algorithm purpose. These data are trained by deep learning algorithms [19] such as LSTM and GRU where the prediction accuracy in up to 86% in different epoch.

Finally, classify the reviews in machine learning algorithms like Naive Bayes, Decision Trees, Random Forest, and SVM and compare their accuracy level. Sentiment Analysis refers to the use of natural language processing, text, and emoji analysis to identify, extract, qualify, and study affective states. It is mainly applied to the voice of the customer like the customer opinion, survey response which will give in a different type of social media or sites. Initially, collect some data from the dataset which is unsupervised through Unami tools from social media. Later on, some unsupervised algorithms were used on those datasets for classification, and some supervised algorithms are utilized. Deep learning approach is used to calculate the sentiment and machine learning algorithm is used to calculate better performance analysis.

MODULES

Service Provider

In this module, the Service Provider has to login by using valid user name and password. After login successful he can do some operations, such as Browse Hotel Reviews Datasets and Train & Test, View Trained and Tested Accuracy in Bar Chart, View Trained and Tested Accuracy

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Results, View Predicted Hotel Review Type Details, Find Hotel Review Ratio, Download Predicted Data Sets, View Hotel Review Ratio Results, View All Remote Users.

View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorize the users.

Remote User

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like PREDICT HOTEL REVIEW ANALYSIS TYPE, VIEW YOUR PROFILE.
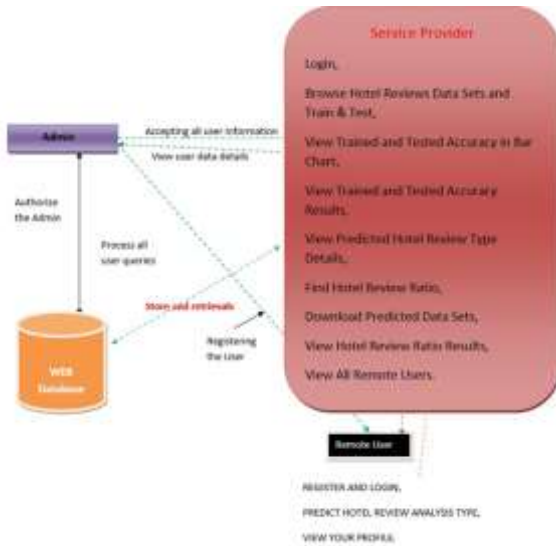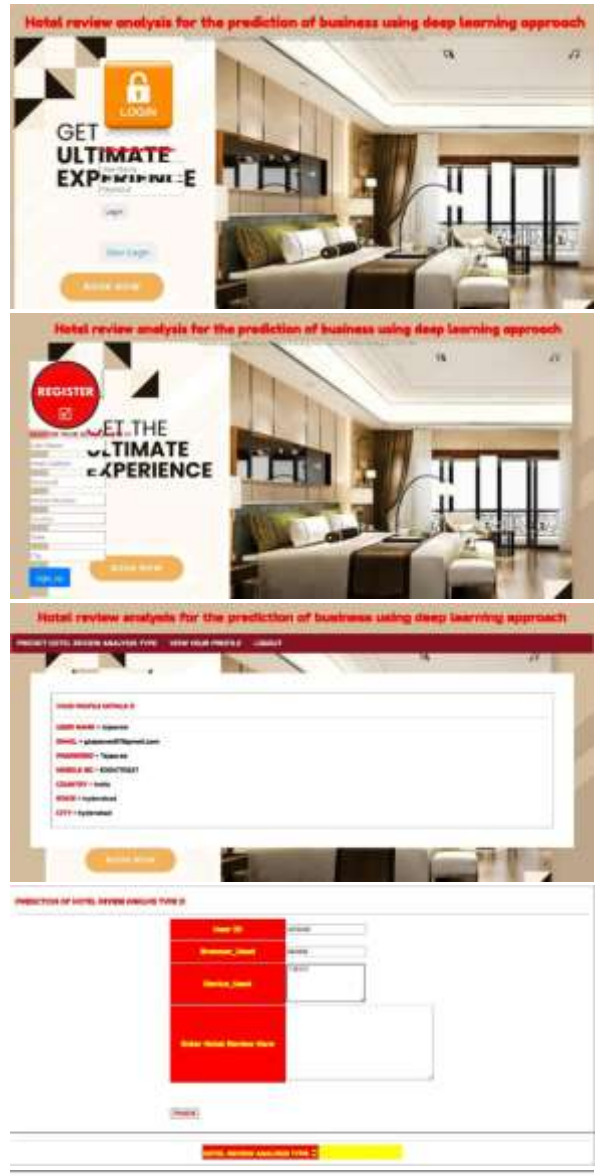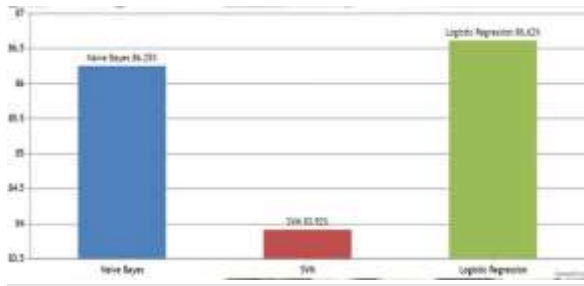
4.SYSTEM ARCHITECTURE

Fig:4.5 This is the architecture of hotel review

SCREEN SHOTS

Tweets DataSets Trained and Tested Results

Model Type	Accuracy
Naive Bayes	85.86666666666667
Naive Bayes	86.0848484848485
SVM	83.51515151515152
SVM	83.4909090909091
Logistic Regression	85.55151515151516
Logistic Regression	85.45454545454545
Decision Tree Classifier	73.30909090909091
Decision Tree Classifier	74.81212121212121
SGD Classifier	84.89696969696969
SGD Classifier	85.0909090909091
Random Forest Classifier	81.98787878787878
Random Forest Classifier	81.5030303030303
Random Forest Classifier	82.66666666666667

CONCLUSION

The present age is the modern age. Everything in the age is now technology dependent and every person in the country is able to familiarize themselves with this technology. With the help of that technology, online marketing has become popular in today's world, which has easily become popular among people. People are now getting a lot of things through their hands very easily. One part of online marketing is the online hotel booking system.

With this people can easily prebook the hotel of their choice and they can easily go to their hotel without having to bother to search for the place. It has become the most popular among people and this led to an increase in the number of people traveling around. And at the same time, they can able to view different beautiful places of the world by taking advantage of this hotel booking. In the future, many more features can be added to the project and ensure more popular things.

Future Enhancement

Everyone in today's world knows how far the world has come. Our country is moving forward by maintaining that continuity. New innovations in technology have made human work easier and more dynamic. So, today they can do any work in a short time through technology very easily. The most popular site in this modern age is online marketing.

Further, this will be accepted by the people. In the online hotel booking system, people can easily book the hotel of their choice. Based on some algorithms, it is planned to add more features in the future.

This will make our website more secure, acceptable, and popular to everyone.

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