

Sentimental Analysis of Customer Reviews using RPA and Categorization of Reviews using ChatGPT

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ABSTRACT

Reviews and feedback are very important for traveling websites and service providers. Reviews have been shown to be important in the decision-making process. Organizations and businesses are able to improve their goods and services thanks to comments and reviews. It is impossible to read every single review due to the vast number of client input on e-commerce sites including forums, review sites, and blogs. The current approaches for sentiment analysis paint a broad picture of how customers feel. But in order to examine each customer's emotions separately and resolve them, we need to automate this operation. Realistically speaking, reading every review and performing an analysis would be impossible or highly time- and resource-intensive. The model for sentiment analysis of customer reviews using robotic process automation and categorization of the reviews using openAI is proposed in this study. After analysing each customer's sentiment towards a certain airline, ChatGPT was used to categorise the reviews. As a result, we now receive feedback in categories and are aware of each client's emotion, making it simple to enhance the customer experience.

Keywords : Robotics Process Automation, Sentiment Analysis, Uipath, ChatGPT

I. INTRODUCTION

As a result of social media, a lot of sentiment-rich data is produced, including tweets, status updates, comments, and reviews. The emergence of the Internet has altered how people communicate their ideas and beliefs. Today, it is done mostly through blog postings,

internet forums, websites that offer product reviews, social media, and other channels. It is exceedingly challenging to handle and track these references manually for large airlines with thousands of daily references on social media, news websites, and blogs. Using sentiment analysis, it may be determined whether the language under consideration—in this

case, consumer feedback—is positive or negative. We can carry out this analysis utilising machine learning and natural language processing. The existing methods for performing sentiment analysis are lexicon-based and machine learning-based methods. Lexicon-based approach determines the sentiment based on the semantic alignment of the words used in the text. Each word in a collection of words is given a positive and negative value. And the second is Machine learning strategy where a machine learning model that employs textual elements to predict feelings is trained and tested. Three types of machine learning approaches exist: 1) Monitored 2) Unsupervised and 3) Reward-based learning.

Social media users or even the users registered publish an enormous amount of stuff, far too much for the average person to look through. As a result, this procedure must be automated, and numerous sentiment analysis techniques are routinely employed. During my review process I did not find any paper on use of RPA in sentiment Analysis. In order to automate the process, we must apply Robotics Process Automation. The main benefit of using RPA in sentiment Analysis is that with just one click our bot runs and we get the final product. Along with that we have the leverage to know the sentiment of each and every customer or client reviews rather than getting a holistic overall view. Not only we get the individual sentiment, we can further automate the process to carry some excel activities or some other activities with that particular data.

Robotic process automation (RPA) as a new technology that focuses on automating repetitive, routine, rule-based human processes with the goal of providing advantages to the businesses who choose to adopt such software. RPA is used in a variety of corporate sectors, with services and telecommunications ranking at the top. Other applications are found in sales, banking and insurance, healthcare management, and the oil and gas industry. In this venture we will be using it for the Airline

industry by taking in the raw data from the website and predicting its sentiment and then categorizing it using ChatGPT.

II. LITERATURE REVIEW

[1] In 2023, Cole E. et al worked to evaluate the viability of generative language models for content creation, such as ChatGPT. Additionally, they talked about the effects of Prompt Engineering, which involves fine-tuning inputs supplied into language models to get exact output for entrepreneurship research and practise.

[2] In 2022, Shalin et al. worked on sentiment analysis of hashtags of trending topics in twitter where they used the R libraries to analyse the statement based on the words used in each tweet. They were effective in presenting them in three comprehensible formats, including a bar graph that indicates the emotions and two word clouds, one of which displays the most frequently occurring terms linked with the hashtag and the other of which categorises the phrases as positive or negative.

[3] In 2022, Rohan et al. did a review on sentiment analysis of Customer Reviews. They put forth a system that analyses client feedback and reviews using Natural Language Processing and several machine learning categorization methods. The approach has grown in acceptance recently. The most accurate algorithm out of the three that were used—Bernoulli's Naive Bayes, Linear Support Vector Classifier, and Logistic Regression Classifier was Logistic Regression which gave the highest accuracy.

[4] In 2022, Arti Pandey did a survey on Sentiment Analysis where she compares the various algorithms and methodologies utilised in the sentiment analysis sector. She talked about various machine learning and deep learning techniques in Sentiment Analysis which are Support Vector Machine, Naïve Bayes, Bayesian

Network, Deep Neural Network, Convolutional Neural Network and Recurrent Neutral Network.

[5] In 2021, Huay Wen Kang et al. explored six different sentiment analysis models which are Random Forest, Multinomial Naive Bayes, Linear Support Vector Classifier, Ensemble Method, Bidirectional Long Term Short Memory (Bi-LSTM) and BERT model, in order to determine and develop the best model to be used. In Conclusion they found out that BERT model was found to perform the best out of the six models tested, scoring an accuracy of 86%.

[6] In 2021 Dr. P. Suresh talks about the mining of Customer Review Feedback Using Sentiment Analysis for Smart Phone Product. Sentiment Analysis has a partnership with NLP, which helps to tokenize in order to calculate word counts. In order to evaluate which smart phone is superior, the word count is compared to the sentiments expressed in the reviews, together with consumer feedback based on the product ID. By identifying the indirect product and offering strategy for the numerous implicit products, this research methodology must be increasing sales.

[7] In 2021, Dr.Sushree Sangita Ray et al. gives a study on Customer satisfaction with airline services, particularly with relation to the city of Bhubaneswar. Her research aimed to improve the client's comprehension, satisfaction, and proposal by examining surveys of airline passengers both subjectively and numerically. The customer loyalty of the carrier is significantly impacted by seat comfort, thus aircrafts should be vigorous for the evaluation and provide superior seat ease. The airline's staff has a significant impact on customer loyalty, thus they should try to provide better service as customers expect it. F&B has a significant impact on airline customer loyalty, so it is important to deliver high-quality food that has less additives and artificial additives.

[8] In 2020, David Andrade gave a study where he looked at the current software testing issues, RPA

usage, and how RPA is being used to address important issues that manual software testing cannot. He also addressed the problems with Robotic Process Automation (RPA) for Automated Software Testing and gave a Comparison of Uipath and Automation Anywhere.

[9] In 2020, Kavita et al. gave a study on Sentiment Analysis for Automated Email Response. They discussed the many methods that are employed to identify sentiments. One of the most recent systems that delivered amazing results just based on sentiments is the RNN, or recursive neural network. RNN process input sequence using internal states. Another approach that has proven useful is the SVM classifier, which first pre-processes the text before vectorising it to produce a bag of words. Recurrent neural networks (RNNs) are so named because they consistently complete the same task for every element in a sequence, with the results depending on earlier calculations. Currently, LSTMs are the most popular sort of RNNs employed since they are considerably better than vanilla RNNs at capturing long-term dependencies.

[10] In 2019 Lucija et al. gave a systematic literature review on Robotics Process Automation. The purpose of their study was to examine how RPA is defined in the academic community and how much RPA has been studied in the literature in terms of its current state, emerging trends, and practical applications. Additionally, the distinction between RPA and business process management is discussed.

[11] In 2018, Dini et al. gave a systematic Literature Review on the sentiment analysis of Malay Language. As the Sentiment Analysis on the Malay language is very scarce so he chooses this language and described the various methods of Sentiment Analysis like the Lexicon Approach.

[12] In 2017, Zeenia et al. talked about Sentiment Analysis of the Customer Product Reviews using the

Machine Learning approach. The proposed framework consists of three models with over 4,00,000 reviews in the dataset. The package which was used for Sentiment Analysis was 'Syuzhet'. Naive Bayes, SVM, and Decision Tree were the three classifiers employed; nevertheless, predictive accuracy of SVM was found to be the best with a value of 81.75%.

[13] In 2013, Ajay et al. did a survey on Feature based Sentiment Analysis on Customer Feedback where they described the approaches and challenges in feature-based sentiment analysis

III. PROBLEM STATEMENT

The existing methods for Sentiment Analysis give an overall picture or sentiment for the particular give dataset. But there is no mention of automation in this field. What if, we want the individual sentiment of a customer so that we can contact to that customer directly. The reviews come in a very unstructured format, so how do we categorize them.

IV. PROPOSED SOLUTION

The paper easily enables us to Apply Robotics Process Automation in the field of Sentiment Analysis. So, with the just the click of the bot the work starts. Our bot automatically goes to the traveller website, searches for the required airline, chooses from the variety of categories. It scrapes the required number of reviews from the website. There after the reviews are sent the the OOTB (Out of the Box) ML model in the Uipath AI Fabric where each review is analysed and the sentiment predicted in either positive, negative or neutral. The output for individual data is displayed in an excel sheet with sentiment. Also we have the confidence score being shown next to sentiment. There after OpenAI ChatGPT is integrated with Uipath wherein we use prompt engineering to create

categories for classification. Each review is taken from the excel sheet and then categorized which makes it more structured and easy to understand.

V. METHODOLOGY

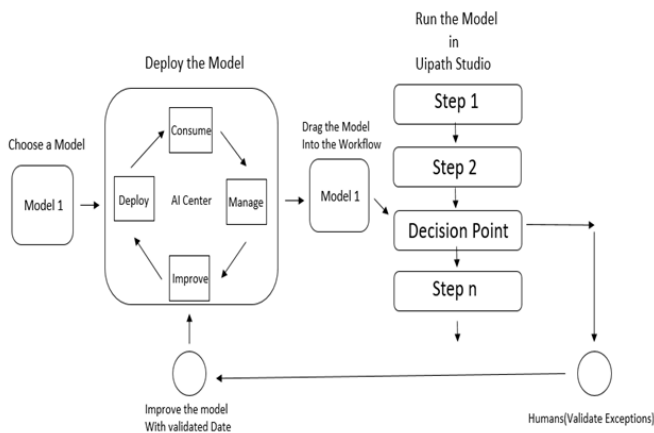
A feature of the Uipath platform that enables the deployment, management, and scaling of machine learning models is called Uipath AI Fabric. It is intended to increase Uipath automation capabilities by seamlessly incorporating AI technology. The software used to design automation processes, Uipath Studio, effortlessly connects with AI Fabric. By integrating machine learning models into their automation projects, developers give their bots the ability to reason and carry out difficult tasks that require data analysis or prediction.

A selection of pre-trained machine learning models that target typical automation use cases are available through Uipath AI Fabric. These models include functionality for picture recognition, sentiment analysis, and document comprehension. Additionally, businesses can use well-known machine learning frameworks like TensorFlow or PyTorch to train and deploy their unique models.

Organisations can use the catalogue of pre-built, out-of-the-box (OOTB) machine learning models offered by Uipath AI Fabric for a variety of automation use cases. These out-of-the-box models are made to handle typical situations and quicken the integration of AI tools into Uipath workflows. The study of text data to ascertain the sentiment or emotional tone expressed is made possible by OOTB sentiment analysis models in Uipath AI Center. These models may categorise text as positive, negative, or neutral, enabling businesses to automate sentiment analysis tasks for examining user reviews, monitoring social media, and customer feedback.

The results are categorized using Prompt engineering which is a method for modifying the answers of language models like ChatGPT by giving clear

instructions or directives in the form of prompts. Prompt engineering is to modify the behaviour of the model and urge it to produce desirable results.



Working of UiPath AI Center

VI. RESULT ANALYSIS

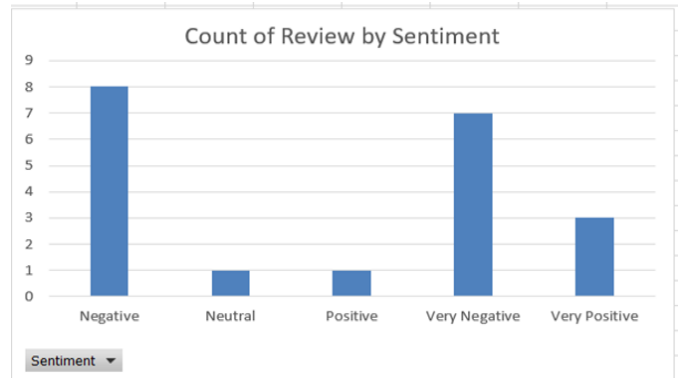
The following conclusion is reached after analysing customer reviews of Srilankan Airlines on the TripAdvisor website. We can infer from the excel sheet a specific customer's attitude as well as their level of confidence in the review. Additionally, the category column provides us with the classification outcomes from ChatGPT, which makes it really simple to wrap up the analysis. The feeling Alongside the reviews, positive, negative, and neutral feedback may be viewed. The range for the confidence is set at 0 to 1.

Img1: Sample Excel sheet which shows Sentiment, Confidence and Category alongside the reviews

Img 2: Sample graph of the reviews

Name	Review	Sentiment	Confidence	Category
James	horrific flight entertainment. I dont care about leg space, comfort etc its the films, music and tv to keep me going, the music did not work the tv had the bare bones of choice and films were mostly old and tired at most two choices per genre. the games section did not work and...	Negative	0.58	Limited entertainment package:
Emmanuel Niranjn	I upgraded to XL seat but was surprised to know the seats (J) are much smaller than other seats very conjusted. 1. SEATS are very bad shape (Broken) 2. No TV and REMOTE Working (14 hours) was just sitting idle. Requested the Air Hostess to change the place if any...	Negative	0.44	Limited entertainment package:

Img 1.



Img 2

VII. CONCLUSION AND FUTURE WORKS

The Sentiment Analysis of Customer Reviews Using Robotic Process Automation and Categorization Using ChatGPT is the foundation of the paper. Under the section titled "Result analysis," the results are displayed in images.

The application of robotic process automation to natural language processing is still in its infancy. To make the process quick and easy, new machine learning models are being created. We put out a few concepts that we believe need additional investigation and could lead to even better performance in the future. Currently, we have developed a really straightforward procedure, but we can enhance this workflow RPA process by adding certain filters that ask users which airline they would select and which airline class they would take into consideration so that the evaluations may be improved. Additionally, after examining the tone of each review. We can contact the consumer using their username and ask them for suggestions on how to make the airline's services better. One of the main future opportunities is that it can be used on many airline and travel websites to enhance the entire consumer experience.

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