

# Sentiment Classification and Opinion Mining on Airline Reviews

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## 1. Introduction

### a. Overview

- i. In the present scenario, technology has been acting as the segway between the end users and the goods/service owners. One main example would be Twitter. Twitter is one of the popular social media platform where flight travelers share their feedbacks in the form of tweets. With the help of this valuable information, airline owners can get first hand information on how well they are providing service for their flight-takers and also allows them to work on their weak points. Our project, AirlineTweetAnalysis gathers up all the tweets with regards to 3 specific airlines(Virgin Airlines, United Airways and Southwest) and can predict as to which tweets are positive and which are not. We have used Natural Language Processing along with Artificial neural networks as our primary tools to create this application.

### b. Purpose

- i. The application's main purpose is to help the both sides of business in the air industry. On one side, it can help the airline owners to know where to improve and at the same time it can also help customers choose which airline has better services, this mainly allows the customers to be given more choices.

## 2. Literature Survey

### a. Existing problem :

The main problems that exist in the current techniques are: inability to perform well in different domains, inadequate accuracy and performance in sentiment analysis based on insufficient labeled data, incapability to deal with complex sentences that require more than sentiment words and simple analyzing. It is still difficult for a vast majority of tools to precisely evaluate what truly is a negative, neutral, and a positive statement. In some of the moments it's not advanced enough to successfully deal with sarcasm or context of some of the discussions.

### b. Proposed solution :

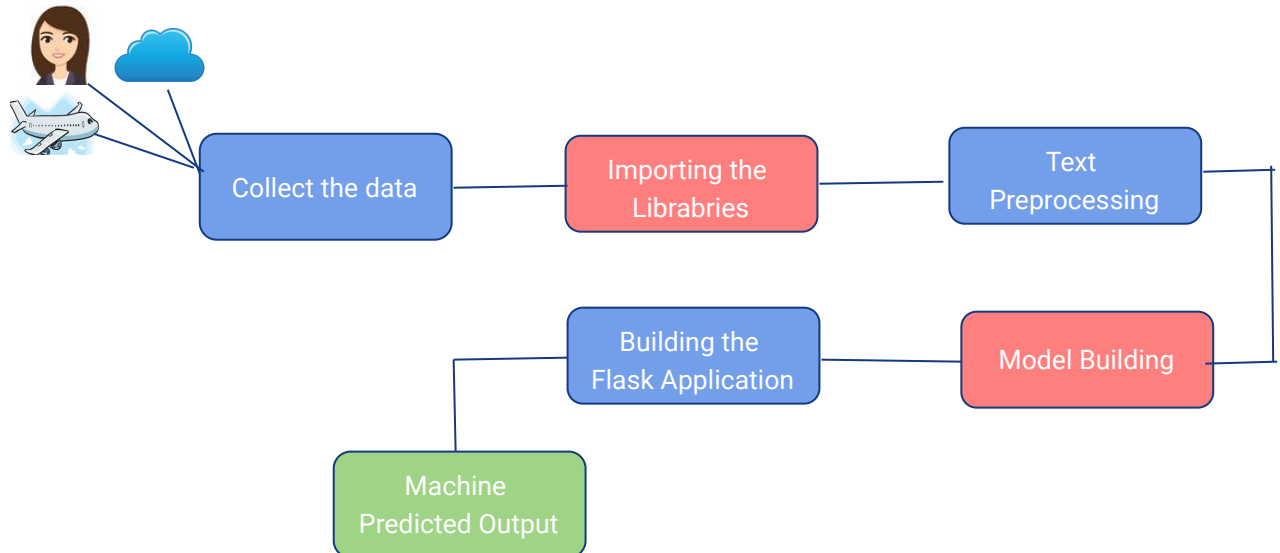
One of the best proposed solutions is : in order to provide a more accurate picture of the user's opinions, it is simply not enough to classify them by polarity. More in-depth knowledge of their expression is needed, thus in the projects, you need to aim to extract human emotions conveyed in the tweet with the help of existing emotion models from the domain of psychology.

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## 3. Theoretical Analysis

### a. Block Diagram



### b. Hardware/software designing:

Software designing should be done for the GUI for the sentiment analysis and Opinion Mining. We designed Flask GUI Application based on Python.

It takes the input from the Natural Language Processed Neural Network (.h5 file) and generates the processed GUI output.

Software Requirements:

- Jupyter/ Spyder
- With installed libraries like Tensorflow, Keras, OpenCV

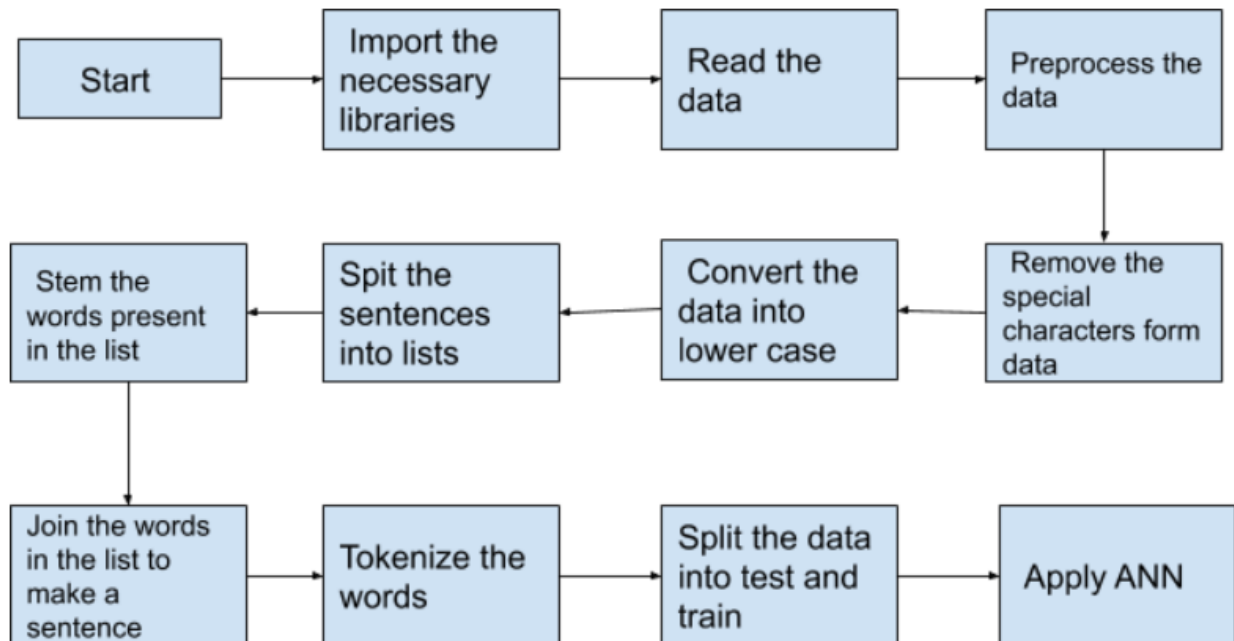
## 4. Experimental Investigation:

- Given a message, our system classifies whether the message is positive, negative, or neutral sentiment. The training data was provided by the task organizers (No other tweet data are used). We have created our model using Artificial Neural Networks and Natural Language Processing. From the given data we “text” as the input variable and “airline\_sentiment” as the output variable. Depending on the text we give our model predicts the sentiment. The accuracy of our model while predicting is around 85%.

## 5. Flowchart

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## 6. Result

As the NLP Model is trained with the dataset, Our Model will generate the Sentimental Analysis either Positive, Neutral, Negative for the inputted data.

## 7. Advantages and Disadvantages

### a. Advantages:

- i. Sentiment analysis is a useful tool for any organization or group for which public sentiment or attitude towards them is important for their success. Our app allows you to keep track of what's being said about your service during travelling and can help you detect angry customers or negative mentions before they turn into a major crisis. This app will predict the type of tweet more accurately.

### b. Disadvantage:

- i. The human language can be complex for machine-based learning systems to interpret. For example, opinions can be expressed with sarcasm or irony, and the order of words can add even more confusion.
- ii. For example: 'Disappointed' may be classified as a negative word for the purposes of sentiment analysis, but within the phrase "I wasn't disappointed", it should be classified as positive. "It is not so bad". This statement is actually a positive tweet but the words in it will be

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negatively understand by our code.

## 8. Applications :

- a. Customer review analysis and service evaluation (e-commerce, booking, services)
- b. Advanced A/B testing
- c. Marketing plan improvement based on large-scale feedback analysis
- d. Inform and make operational improvements or capital expenditures
- e. Recommender system performance enhancement
- f. Part of conversational system
- g. Social media monitoring and abusive content filtering

## 9. Conclusion

- a. Nowadays, sentiment analysis or opinion mining is a hot topic in machine learning. We are still far to detect the texts very accurately because of the complexity in the English language. In this project we tried to show the basic way of classifying tweets into positive or negative category using ANN as baseline and how language models are related to the ANN and can produce better results. Our algorithm achieves an accuracy of 82.34% percent which is not excellent, however, the accuracy achieved by the system is still good. To further improve the accuracy, we can try a different number of layers, drop out, epochs and activation.

## 10. Future Scope

- a. Air industry always has the highest priority when it comes to travelling and sure enough people would always prefer a genuine rating. In the future, we would definitely want a more enhanced and a simpler way of knowing more about the airlines available. Through this application, we can know the precise information about different airlines with first-hand information from the travellers itself. This application can be further be used in many other applications. For instance, a well know travel app is Trivago, with the help of this application, Trivago might be able predict which type of travellers would prefer which airlines. Furthermore, it can also be converted into an API for easy access to the main information and to be used in many more apps.