SENTIMENT ANALYSIS USING NATURAL LANGUAGE PROCESSING AND MACHINE LEARNING

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Abstract- In today's digital world we all know how sentiment analysis is important and their work of website building and creating any company profile in any social media and digital platform. It helps to tackle customer inquiries digitally and they are a way to determine whether to purchase any particular company product and maintain the review platform good to protect the face of the company. In this research paper, we discuss how Natural Language Processing (NLP) and Machine Learning (ML) work together to function the sentiment analysis. How NLP use certain tools and how they codify the human language and their way of transferring the data to meaningful conclusion and how MI uses python for sentiment analysis.

Keywords- sentiment analysis, human language, NLP, MI.

I. INTRODUCTION

 Behind a situation, to detect the view or emotion sentiment analytics inspect and discover the feeling and aim behind a bit of work or articulation or any manner of reporting. Humans speak different languages on this earth; language is an essential tool to express our views and feelings. Whatever humans say by language sentiment is associated with that. The
sentiment can be constructive or pessimistic or impartial as well [1]. Like take an example, a restaurant business company put on sale various food items like milkshakes, burgers, sandwiches, pizza, etc. They also design a website to reach customers, right now where the customer could order any type of food according to their choice, and they can give reviews and suggestions any time, to upgrade the value of food or may they like the taste food or they hate the taste [2]. By using these examples we can have 3 types of reviews given by customers. First, the constructive one signifies that the food is liked by customers. Second, the review going to be a rejection, and hence company should focus on developing a strategy to improve the food. The third one going to be like the customer neither show any reaction, we can consider it as a neutral statement. By examining all the reviews the company should focus on the increase the quality and value of the food or promoting different strategies of brand awareness to increase their annual sales. But there are thousands and millions of reviews of their food and over time it's impossible to scan each customer's review and come to any decision making [4]. To solve this problem that time sentiment analytics comes to play, which analyzes huge amounts of reviews and helps to make the decision for future progress by using real-life evidence better than based on a tiny sample of data, and that time natural processing and machine learning (ML)help to analyze it [5].
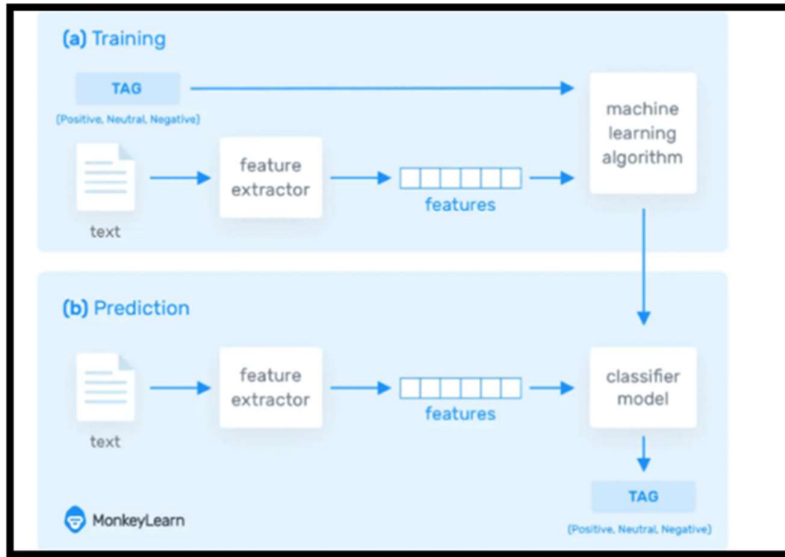
Figure 1: Working of Sentiment Analysis
(Source: 3)

II.OBJECTIVES

1. To the importance of natural language processing (NLP).
2. To analyze the data through NLP.
3. To the importance of machine learning.
4. To do sentiment analysis by using python by using machine learning.
5. To the best mode of NLP is for sentiment analytics.
6. To the best mode of ML algorithm is for sentiment analytics.

III.METHODOLOGY

This research article gets secondary data from the online scholarly articles available online and their research work. Sentiment analytics become an essential part of various industries like lustral analytics, analyzing the review and any text, and biometric procedures. It is also used for analyzing the voice of any person, reviews, and responses to surveys, online e-commerce businesses, and social media handles and services to any digital marketing for any present or upcoming company [7]. Eventually, it helps to research market size and exponential growth, do a competitive analysis of other's competitor businessmen in the market, and create solutions for good industry-related problems and future growth. It has some disadvantages like sarcasm and irony negotiation types and ambiguity of words.

IV. IMPORTANCE OF NATURAL LEARNING PROCESSES

At the current stage, humans speak rightly about 6500 languages, and they also have another sub and sign language. It is really not possible to analyze all the languages and give us normal data. Language is not just a tool of communication, many sentiments, and identities and also many cultures attach to it and become the carrier of all of this to the next generation [8]. But for machines, it is very challenging to analyze all this sentiment and give us data. For that, there is called natural processing language. The NLP sub-file is sentiment analysis, it helps identify and takes out the important point from the data.
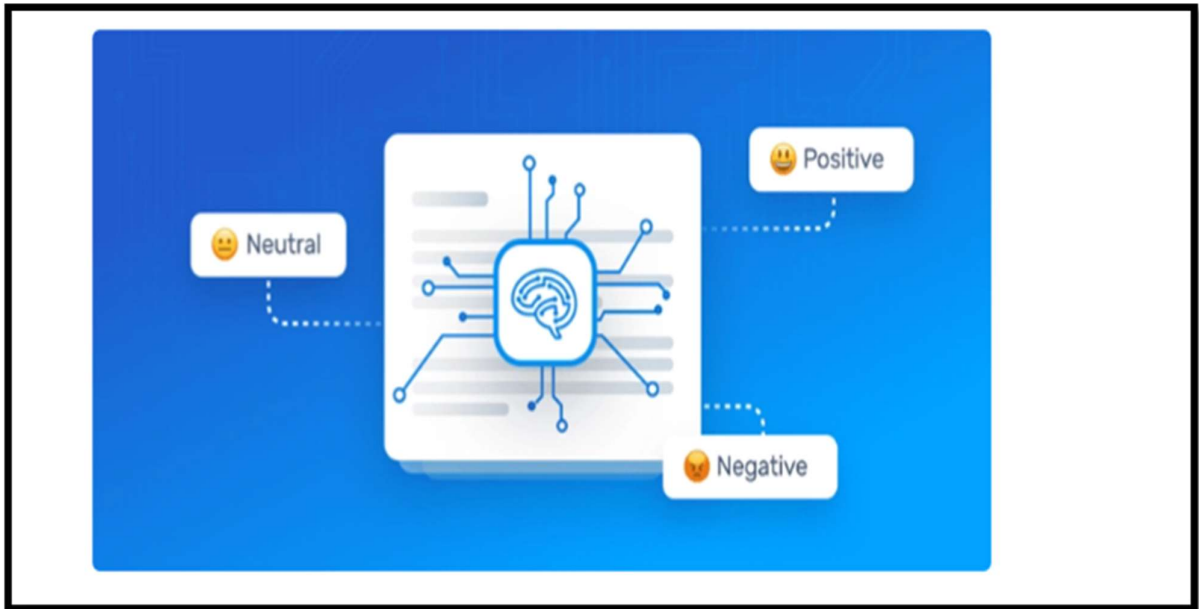
Figure .2 Analysis of Human Language
(Source: 5)

V. ANALYZE THE DATA THROUGH NLP

In this process, NLTK (Natural Language Toolkit) helps it by providing sets of archives for natural process language. Then the stop words provide a set of words that do not give any meaning to any sentences, then the WordNet Lemmatizer converts every human language word into the meaning full word according to the machine with keeping context behind it. Basically, it helps AI (artificial intelligence) to proceed and recognize human language that helps repetitive tasks to perform monotonously [9]. Many processes like checking spells, translation of machine, and classification of ticket summary. It also has five phases, such as analysis of discourse, analysis of pragmatics, analysis of syntactic, analysis of lexical, and analysis of semantics.
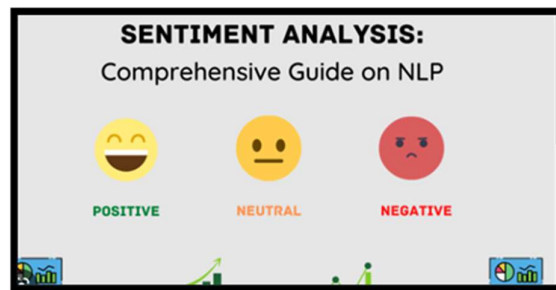

Figure 3: NLP guide
(Source: 2)

VI. IMPORTANCE OF MACHINE LEARNING

To analyze the polarity from negative to positive we need machine learning. By using it machines can determine the emotions of any sentence without the input of humans, basically, computers or AI can learn new tasks with no systematic program and perform them in a perfect

way [10]. It can also be trained and it can be understood like sarcasm, definitions, context, and words that are misplaced. So, it is a much-needed program for AI.

VIII. SENTIMENT ANALYSIS IN PYTHON BY USING MACHINE LEARNING

Using MI sentiment analysis can define different architectures by using Long-Short Term Memory Recurrent Neural Networks (LTSM RNN) for new tasks. Bi-directional RNN of the multilayer is being used and that helps to create Recurrent Neural Networks (RNN) layers. Its major advantage is having more context in a directional in a single frame, such as a model in a flowing forward, when the model estimates the net sentence, it is going to be because of due reliance based on earlier knowledge [11]. In a directional network, a machine has knowledge of the opposite directions of two networks and how to input catching flows of two opposite directions, Input parameters numbers, a layer of hidden, and the dimension of output can be defined by using the rate throughout and boolean of bidirectional. As a result, we get weights of embedding through pre-trained and duplicate the same model. In any case, the machine does not require the embedding of learning and also be the straight focal point directly to the job and can also learn those embedding related to sentiments. Some models regarding the parameter optimize the fast convergence by using the Adam optimizer along with a long model of the loss function of logistics. By loping the epochs through the numbers and each epoch iterations by the number it can measure the batch size that already is there [12]. It can pass the model of text, the prediction, the calculation of every iteration loss, and also calculate the loss of propagate backward. The evaluating function of the function of training is the only major change and by that, we can evaluate the back ward propagate loss of torch and model. It's not gradient signifying while evaluating the descent way [13]. By the helpers of epoch helper functioning machine can calculate each epoch times and takes to its run completing and it's a way of print it.

$$P(A|B) = \frac{P(B|A) \times P(A)}{P(B)}$$

Figure 4: Naive Bayes formula

(Source: 8)

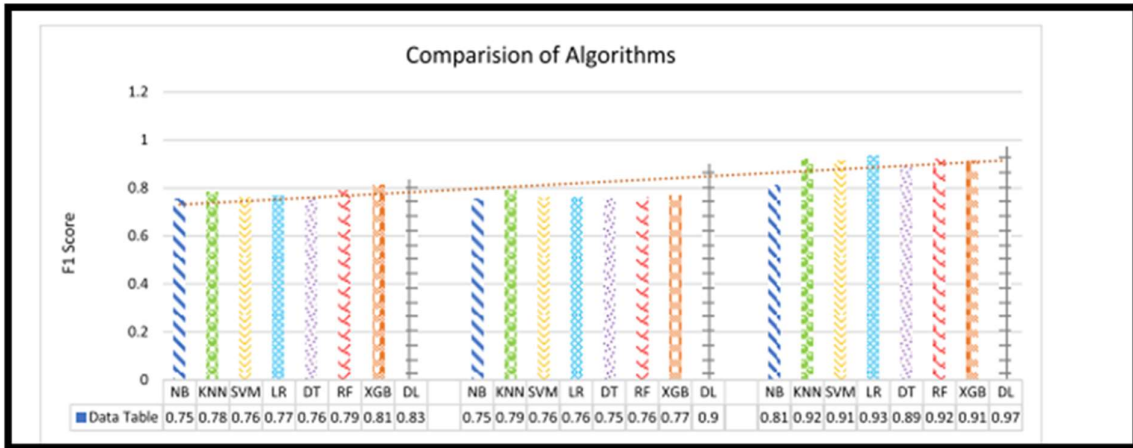| Mode	BEST
The mode for NLP	Generative Pre-Trained Transformer (GPT) is the best in case anybody uses NLP in the AI [14]. It helps the language of a pre-trained model that can help various tasks to be fine-tuned
The mode of MI algorithm	There are several, such as vector machines of support, neural networks of multilayer perception, Naive Bayes, and trees of decisions.

Figure.5 Use of Algorithm in MI
(Source: 9)

PROBLEM STATEMENT

Due to the shortage of time, we could not extract primary sources of data, so we heavily rely on secondary sources. To conduct this research, we get help from research articles conducted by notable researchers and also take help from their research data and their recent public general article [15]. Other than this, data is also extracted from various print media article or their online platform. To extract the secondary source data get help from google scholar and online available interviews with researchers and software developers in this same field. Primary sources are the spot interview, known to investigate journalism, and research work is done by method given by researchers, so, not check the parameters, the surety of that data can vary from person to person due to changes in parameters.

CONCLUSION

Here this research paper discussed how sentiment analysis is needed for today's generation to improve business and how they need NLP to understand the human language and simplified for the machine. Along with that how MI helps in sentiment analysis. Which mode of analysis is the best available NLP and MI in the market and the algorithm behind it and the way it concludes that data gives the solution to real-life problem.

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