ANALYSIS OF EMOTIONS ON VOICE USING AWS COMPREHEND

Prof. (Mrs.) Vidya G. Shitole[1], Ajinkya Kamble[2], Pratik Naik[3], Pratik Parbhane[4]

[1]Assistant Professor, Dept. of Computer Engineering, SRTTC FOE, MH, India
[2]Student, Dept. of Computer Engineering, SRTTC FOE, MH, India
[3]Student, Dept. of Computer Engineering, SRTTC FOE, MH, India
[4]Student, Dept. of Computer Engineering, SRTTC FOE, MH, India
(Savitribai Phule Pune University)

--***---

Abstract: *The area of research that analyses people's thoughts, opinions, evaluation, behaviors, and emotions from written language is sentiment analysis or opinion mining. In natural language processing, it is one of the most active research fields and is also widely studied in data mining, web mining and text mining. In fact, due to its relevance to business and society as a whole, this research has spread to management sciences and social sciences outside of computer science. The growth of social media, such as reviews, forum discussions, blogs, micro-blogs, Twitter, and social networks, coincides with the importance of sentiment analysis. In almost every business and social domain, sentiment analysis systems are implemented because opinions are fundamental to almost all human activities and are essential influencers of our behaviors. We will use AWS cloud services in our work to perform sentiment analysis. Cloud computing in the future and one of the most striking technical advances in the world of technology. AWS is made up of so many different products and services for cloud computing. It is the fastest growing cloud service for the public. This operation is also faster and more accurate with the use of AWS services.*

I. INTRODUCTION

When it comes to making choices that improve customer satisfaction and loyalty, having access to the right data at the right time can be a game changer. Tracking consumer sentiment in real time on social media, for instance, will help you identify a crucial problem impacting your customers immediately, so you can take decisive action. Sentiment analysis models are able to identify patterns in text using Natural Language Processing (NLP) and a set of algorithms and automatically classify opinions as positive, negative or neutral. Opinion mining is the method of detection whether the opinion of a consumer is positive or negative or neutral, whereas the process of collecting and evaluating the data is sentiment analysis to assess the level of positivity and negativity present in the expressed opinion. In fact, opinion mining is used in the process of sentiment analysis, so these two terms are closely interrelated. The degree of positivity or negativity in as sentence needs to be decided because when a consumer expresses his/her views through a review, he/she will specify both the positive and negative things he/she learned from that product. Therefore, a review that appears to be positive as a whole can also include some negativity with respect to those characteristics; in a negative review, on the other hand, there will also be a chance of finding some positivity. This is where the sentiment analysis comes into focus. There is a lot of research going on in this area, but most of the research is focused on the study of text- bases emotion, paying attention to the analysis of voice. Sentiment analysis research is carried out on structured data, but now a days as data is generated in social media at a tremendous pace, so this research goes towards conducting sentiment analysis on unstructured data that is manually difficult. There are some methods for analyzing emotions, such as using super vector machines, using Naïve Bays or machine learning and deep learning techniques, but all these processes take time, and it is now necessary to make this process faster than before. So, we chose to do the research using cloud. Using cloud, it is possible to reduce the time factor and there are several benefits over conventional methods. So, we use AWS services to conduct sentiment analysis. AWS Comprehend is used to generate the sentiment file, AWS Transcribe is used to convert the audio into text, AWS Athena is used to convert data to structured data, AWS Glue is used to generate the metadata, AWS Lambda is used to trigger the audio file from the data store, AWS Quick Sight is used to generate the metadata, AWS Lambda is used to trigger the audio file from the data store. This will help to recognize the audio sentiment and provide the result in the form of dashboards such as bar charts, making it easier for individuals to enhance the business.

II. LITERATURE SURVEY

A]   A Feature Based Approach for Sentiment Analysis by Using Support Vector Machine:

In this paper, the author built a sentiment analysis method using a classifier in a novel approach called Support Vector Machine. It is difficult to perform as one

must go through five different stages, which would take a lot of time to complete the assignment.

B] A Comparative Study of Machine Learning and Deep Learning Techniques for Sentiment Analysis:

A comparison of different machine learning and deep learning as well as their hybrid techniques is presented in the paper. In this paper, it is concluded that deep learning techniques provide better results in most instances. However, indifference to the precision of the two methods is not very high, and the deep learning approach only increases the difficulty of solving in such situations.

C] Sentiment Analysis on Speaker Specific Speech Data:

The author presented the generalized model in this paper that takes an audio containing a conversation between two individuals to perform speaker recognition. This system only works well with the artificially generated dataset. In conversational dialogue, it does not provide an accurate result in interpreting the sentiment of the speakers.

**D] Research on text sentiment analysis based on CNNs and SVM:**

In this paper, the author proposed a model for sentiment analysis that combines SVM and a Convolutional Neural Network (CNN). As a result of this experiment, they found that their approach offers better accuracy for text sentiment analysis than CNN or SVM alone. The data set was processed in this process in such a way that it was first filtered and then filtered set is trained by Word2vec. Whereas the SVM does the classification, the CNN learns the characteristics.

III. PROBLEM STATEMENT

In today's environment where we're suffering from data overload (although this does not mean better or deeper insights), companies might have mountains of customer feedback collected. Yet, it's still difficult for mere humans to interpret it manually without some form of mistake or prejudice. Companies with the best intentions frequently find themselves in a void of perspective. To inform your decision making, you know you need insights, and you know you miss them, but how best to get them, you don't know. The study of sentiment offers answers to what the most critical problems are. Since sentiment analysis can be automated, decisions can be taken on the basis of a significant amount of knowledge rather than plain intuition, which is not always accurate. Sentiment analysis can be conducted better using AWS services than with conventional approaches such as SVM,

machine learning processes or any other. Automation can be achieved in this area with the use of AWS services. Better integration and scalability are ensured by the use of cloud services.

IV. ARCHITECTURE DIAGRAM
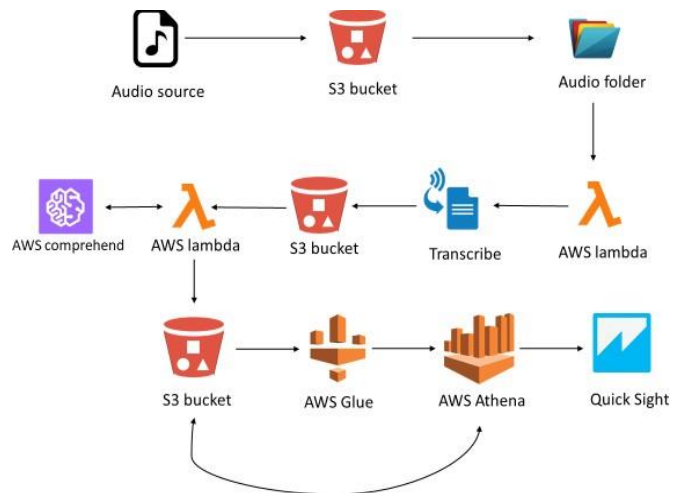
First, we will get the audio file from source and upload that file into the S3 bucket then using AWS lambda we will transfer that file to transcribe for generating the text of audio file. We will save that file again into S3 bucket. Then by triggering the AWS lambda that text file will be converted to sentiment file by use of AWS Comprehend.

Using AWS Glue metadata is created from comprehend file, this database will be replicated to AWS Athena to make query, at the end using quick sight data is displayed using bar charts.

V. PROPOSED SYSTEM

In this paper, the author proposed a model using AWS Comprehend to implement sentimental analysis. This method includes 3 steps that extract the emotion from the audio. a) Transform the audio to text using the AWS Transcribe service. B) Use the AWS Comprehend to translate the text to sentiment. C) By using the AWS Glue and AWS Athena and the final process of building the dashboard in the form of bar charts and suggested framework with several advantages, producing the metadata of the sentiment data and making the demand, it is scalable and able to increase the resources by using the AWS cloud if appropriate. There is no need to pay extra money under this proposed system. We can just pay for the services we have used, and no need to purchase additional licenses. Tools can write the code once and can use it several times, so the time complexity of the

developer can be minimized. In the proposed framework, there 9will be no security issue because AWS Cloud provides the security service such as Identity Access Management (IAM), provides the data in an encrypted format and no need to buy data.

VI. SAMPLE DIAGRAM

VII. FLOW DIAGRAM

First, we will save the audio file into the S3 bucket. We will write the code using server less service lambda and trigger the audio file from S3, then by using transcribe we will change the audio into the text. When text file is ready using lambda, file is stored into the Comprehend S3 Bucket. When file is stored into the Comprehend Storage output can be seen. Then, using AWS Glue we can create the metadata then using Athena data is formulated. After the procedure is done the data is presented in the form of bar charts using Quick Sight.

VIII. CHALLENGES

Challenge No.1: Word Ambiguity

There are some terms whose polarity cannot be described in advance, and their polarity depends heavily on the meaning of the sentence. While working on sentiment analysis, you'll face this problem.

There are some common techniques, such as sentiment analysis approaches based on Lexicon. This lexicon contains opinion words with their polarity value. Since word polarity varies in various domains, a universal opinion lexicon that has a polarity for every word cannot be created.

Challenge No.2: Sarcasm Detection

Sarcasm is Expression of negative sentiments using positive words. Using Sarcasm, you can easily fool to the sentiment analysis models unless they are designed in that way to analyse sarcasm.

Not only for a computer, but even for a person, it can be difficult to understand. The endless variance in the terms used in sarcastic sentences makes it difficult to train models of sentiment analysis successfully. To make sarcasm accessible, common subjects, preferences, and historical information must be exchanged between two individuals.

Sarcasm is mostly seen in social media comments and posts.

Challenge No.3: Multipolarity

Sometimes, a given sentence or document may exhibit multipolarity, or whatever unit of text we want to examine. In these ways, it can be deceptive to provide just the overall outcome of the study, much like how an average will often mask useful details on all the numbers that went into it.
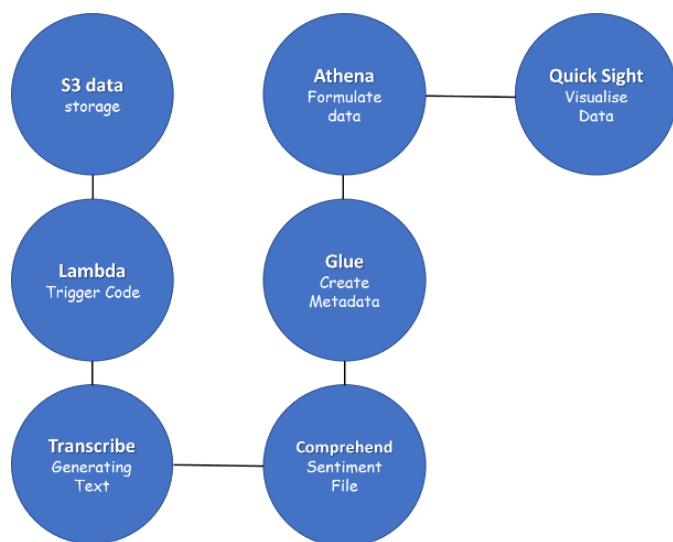
Picture when writers in an article or review speak about various persons, goods, or businesses (or aspects of them). It is normal that certain subjects would be criticized and some praised inside a piece of text.

Challenge No.4: Negation Detection

Negation is a way to reverse the polarity of words, phrases, and even sentences in linguistics. In order to determine whether negation occurs, researchers use various linguistic rules, but it is also necessary to determine the range of words that are affected by negative words.

If a positive or negative word falls within the scope of

negation, the original meaning of the words shifts. In that case, the opposite polarity will be restored. The easiest approach to dealing with negation in a sentence, which is used in moststate- of-the-art sentiment analysis techniques, labels all the words from a negation cue to the next punctuation token as negated. Because of the particular construction of language in various contexts, the usefulness of the negation model can be modified.

IX. FURURE SCOPE

Sentiment Analysis is becoming better because social media is increasingly more emotive and expressive. Facebook introduced "Reactions" a short while ago, which enables its users not only to "like" content, but to attach an emoticon, whether it be a heart, a shocked face, angry face, etc. This is a fun, seemingly silly feature for the average social media user that gives him or her a little more freedom with their answers. But this provides an entirely new layer of data that was not available before, for anyone looking to leverage social media data for sentiment analysis. The information behind those interactions gets wider and deeper every time the major social media platforms update themselves and add more features.

The future of sentiment analysis will continue to dig deeper, far beyond the surface of the number of likes, comments and shares, and aim to reach the significance of social media interactions and what they tell us about the consumers behind the screens, and truly understand them. This forecast also predicts broader sentiment analysis applications- brands will continue to leverage this tool, but so will people in the public eye, governments, non- profits, educational centers, and many other organizations.

X. CONCLUSION

In areas such as business development, social media observations, sensing emotions of specific audiences, conducting sentiment analysis can be useful. We have used AWS services for improved speed and accuracy in performing sentiment analysis. This experiment uses AWS resources such as Identity Access management for security, S3 for data storage, and Transcribe to convert audio to text.

XII. REFRENCES

[1] G. Satyanarayana, Dr Bhuvana J, Balamurugan M, "Sentimental Analysis on voice using AWS Comprehend", 2020 International Conference on Computer Communication and Informatics (ICCCI -2020), Jan. 22 – 24, 2020

[2] Chiyyedu Manasa, Dheeraj D, Deepthi V S, "Statistical Analysis of Voice Based Emotion Recognition using Semilarity Measures", 2019 1st International Conference on Advanced Technologies in Intelligent Control, Environment, Computing & Communication Engineering (ICATIECE)

[3] Kruttika Jain, Shivani Kaushal, "A Comparative Study of Machine Learning and Deep Learning Techniques for Sentiment Analysis", 2018 7th International Conference on Reliability, Infocom Technologies and Optimization (ICRITO) (Trends and Future Directions), August 29-31, 2018, AIIT, Amity University Uttar Pradesh,
Noida, India.

[4] Maghilnan S, Rajesh Kumar M, "Sentiment Analysis on Speaker Specific Speech Data", 2017 International Conference on Intelligent Computing and Control (I2C2), June 2017, India.

[5] D V Nagarjuna Devi, Chinta Kishore Kumar, Siriki Prasad, "A Feature Based Approach for Sentiment Analysis by Using Support Vector Machine", 2016 IEEE 6th International Conference on Advanced Computing, 27-28 Feb. 2016.

[6] Indhra om Prabha M, G. Umarani Srikanth, "Survey of Sentiment Analysis Using Deep Learning Techniques", 2019 1st International.

[7] Bing Liu, "Sentiment Analysis: A Multi- Faceted Problem", IEEE Intelligent Systems,
November 2014.

[8] Walaa Medhat, Ahmed Hassan, Hoda Korashy, "Sentiment Analysis Algorithms and Applications: A Survey", 2090-4479 2014 Production and hosting by Elsevier B.V. on behalf of Ain Shams University, May 2014.

[9] Igor Mozetic, Miha Grcar, Jasmina Smailovic, "Multilingual Twitter Sentiment Classification: The Role of Human Annotators, PLoS ONE 11(5): e0155036. May 2016.

[10] ka V. Mantyla, Daniel Graziotin, Miikka Kuutila, "The Evolution of Sentiment Analysis - A Review of Research Topics, Venues, and Top Cited Papers", Computer Science Review, 27, 16-32.

November 2017.

[11] Badjatiya P., Gupta S., Gupta M., Varma V., "Deep Learning for Hate Speech Detection in Tweets", Proceedings of the 26th International Conference on World Wide web Companion –
WWW' 17 Companion., s2017.

[12] Byeongki Jeong, Janghyeok Yoon, Jae-Min Lee, "Social media mining for product planning: A product opportunity mining approach based on topic modelling and sentiment analysis", International Journal of Information Management, Volume 48, October 2019

[13] https://youtu.be/ChRM3uyfwbU

[14] https://youtu.be/kON3Yhputw8