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# ANALYSIS OF SENTIMENTS ON VOICE USING AWS COMPREHEND

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***Abstract - Sentiment analysis or opinion mining is a field of study that analyses people's thoughts, opinions, behaviors, and emotions from written language. It is one of the most active research fields in natural language processing, and it is also frequently investigated in data mining, web mining, and text mining. In fact, because of its importance to business and society as a whole, this research has spread beyond computer science into management sciences and social sciences. The rise of social media platforms such as reviews, forum discussions, blogs, micro-blogs, Twitter, and social networks parallels the rise of sentiment analysis. Sentiment analysis systems are adopted in practically every corporate and social field because opinions are significant to practically everyone's work and influence our behavior. In our study, we will use AWS cloud services to analyse sentiments. The future and one of the most remarkable technical advancements in the technological world are cloud computing. AWS consists of so many distinct cloud computing products and services. Cloud services for the general public are the fastest expanding. The AWS services are also used more quickly and accurately.***

***Keywords: AWS, AWS Comprehend, AWS transcribe, AWS lambda, Natural Language Processing, sentiment analysis.t.***

## I.INTRODUCTION

If choices are made that promote consumer satisfaction and loyalty, the correct data can be a game changer when it comes to making them accessible. For example, the real-time monitoring of consumer feelings in social media will assist you to spot a critical problem, and quickly impact your customers, so you can move decisively. The concept for sentiment analysis can be applied with Natural Language Processing (NLP) and a series of algorithms to find text patterns, automatically classifying views as positive, negative or neutral. Opinion mining is the way to discover whether a consumer has a positive, negative or neutral opinion, although sentiment analysis is used to evaluate the positive level and the negative level contained in the views presented. Indeed, opinion mining is employed in the sentiment analysis process, therefore both phrases are closely linked. It is necessary to decide the degree of positive or negative in phrase as, by review, a consumer would specify both good and bad things that he or she learnt from the product. Therefore, an overview that seems to be overall positive may also include a certain negative effect on those features; on the other hand, a poor evaluation will also provide an opportunity to identify beneficial results. This is where the analysis of sentiments gets the spotlight. In this field, there are many research projects, however most of the research concentrates on the study of the basic textual emotion that focuses on voice analysis. Sentiment analysis study is carried out on structured data, however today in days when data are generated at enormous pace on social media, this research is designed to analyse feelings of relatively complex, unstructured data. There are some approaches for the emotional analysis, such as using super vector engines, employing NaÏve Bays, or machine learning and profound learning approaches, however these are all processes that take time. We therefore choose to use the cloud for research. With cloud, the time factor is reduced and various advantages over conventional processes can be achieved. Therefore, we use AWS services to analyse sentiments. AWS Comprehend will be used to build the sentiment file, AWS Transcribes will be employed to convert audio into text and AWS Athena is used for converting data to structured data, AWS Glue will be used to build the metadata, AWS Lambda will be used to activate the audio file in the data store. This helps us understand the audio sentiment and makes it easy for people to boost their business as dashboards, such as bar charts.

## II. LITERATURE REVIEW

[A] Sentiment of emotions on voice using AWS Comprehend:[1] In this paper author explained the method of performing voice sentiment analysis using AWS Comprehend. The method is based on AWS services like transcribe, lambda, S3 and Comprehend. This method is completely based on AWS. Author also told us about the challenges we faced while performing sentiment analysis.

[B] A Feature Based Approach for Sentiment Analysis by Using Support Vector Machine:[14] The authors in this work developed an analytical method using a new approach called the Vector Machine for Sentiment Analysis. It's hard to accomplish because it takes five separate steps, and that takes a lot of time to complete the task.

[C] A Comparative Study of Machine Learning and Deep Learning Techniques for Sentiment Analysis:[4] The report presents a comparison of various machine learning and deep learning and hybrid strategies. It is concluded in this research that in most cases, deep learning techniques deliver better results. However, indifference to the accuracy of the two methods is not very great and the approach to deep learning just makes it more difficult to solve these circumstances.

[D] Sentiment Analysis on Speaker Specific Speech Data:[5] The author described in this study a generally accepted model which uses an audio to do speech recognition that includes a dialogue between two people. Only the artificially generated data set works fine with this system. It does not accurately translate the speakers' feelings into conversational language.

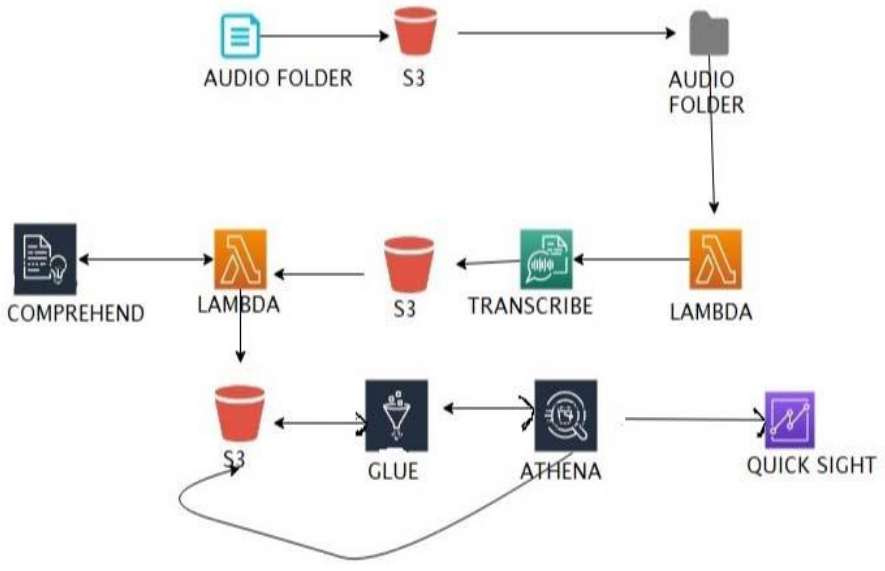
[E] Research on text sentiment analysis based on CNNs and SVM:[6] In this article the author proposes to combine SVM and a Coevolutionary Neural Network to create a sentiment analysis model (CNN). With this experiment, they observed that their technique provides greater accuracy than CNN or SVM alone for text sentiment analysis. During this process, the data set was handled so that it was initially filtered and subsequently filtered and Word2vec trained. While the SVM classifies, the CNN learns the features.

[F] Automatic speech emotion detection system using multi-domain acoustic feature selection and classification models:[13] In this paper recognition of emotions from speech is done automatically. In this research author first did the pre-processing using voice activity detection. Then author extracted the low-level descriptors from speech signals through short frames of speech. Then by using the sequential backward search algorithm discriminatory features from feature space is selected. Author obtained an accuracy of 78% and 71% respectively after experimenting using LDA and SVM.

## III. PROBLEM STATEMENT

Sentiment analysis study is carried out on structured data, however today in days when data are generated at enormous pace on social media, this research is designed to analyse feelings of relatively complex, unstructured data. There are some approaches for the emotional analysis, such as using super vector engines, employing NaÏve Bays, or machine learning and profound learning approaches, however these are all processes that take time. We therefore choose to use the cloud for research. With cloud, the time factor is reduced and various advantages over conventional processes can be achieved. Based on an important knowledge and not a plain intuition, judgments can be taken since sentiment analyses can be automated, which is not always accurate. AWS services can be used to perform sentiment analyses better than conventional methods such as SVM machine learning algorithms and other methods. The use of AWS services can lead to automation in this field. The use of cloud services ensures improved integration and scalability.

## IV. ARCHITECTURE DIAGRAM




First, we obtain the audio file from the source and load this file into the S3 bucket, and then we transfer that file to generate the text of the audio file using AWS lambda. This file will be saved to the S3 bucket again. Then by activating the AWS lambda, the text file is converted to the AWS Comprehend Sentiment File.

This database will be replicated to AWS Athena to make a query utilizing AWS Glue metadata from the Comprehend file, which is displayed using bar charts at the end using fast visual information.

## V. SYSTEM OVERVIEW

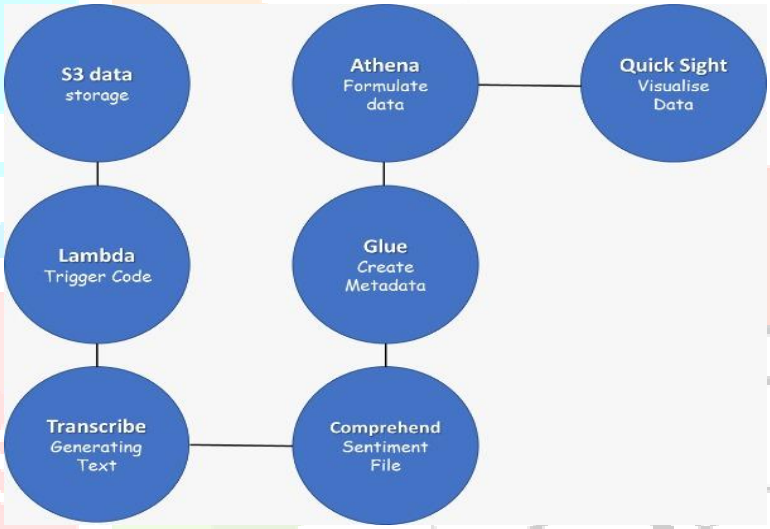
[A] PROPOSED SYSTEM

In this work, the author proposes an approach to sentimental analysis using AWS Comprehend. This approach involves three phases which extract the audio emotion. a) Transform audio from the AWS Transcribe service into text. B) To translate the text to feeling, use the AWS comprehend. c) It is scalable and able to increase resources through the AWS cloud when appropriate, by using AWS Glue and AWS, Athena as well as the final process of building the table of contents in the form of bar chart and proposed framework with several benefits, producing the sensitivity metadata and requiring them. Under this proposed arrangement, there is no need to spend extra money. We can only pay for our services and no further licenses required to buy. Tools can write code once and use it multiple times, therefore minimizing the time complexity of the developer. There is no security concern in the suggested framework as AWS Cloud provides security services like Identity Access Management (IAM), encrypted data supplies and no data purchase needs.

[B] Existing System

Existing System is based on the Support Vector Machine, and another is using CNN [6]. In the System which is based on the SVM we cannot perform the analysis easily as we have to go through the five different stages which takes lot of time. There is also a research which is done by using both the SVM and CNN together to improve performance. There are also the systems which are based on the deep learning and machine learning.

## VI. FLOW DIAGRAM




First, the audio file will be saved in the S3 bucket. We will write the code using server less service lambda and trigger the audio file from S3, then we change the audio to the text via Transcribe. The file will be saved in an Comprehend S3 bucket when the text file is complete using lambda. The Comprehension Storage output can be viewed when a file is stored. We can then generate the metadata with AWS Glue and formulate them using Athena data. The data is displayed as bar charts using Quick Sight when the operation has been completed.

## VII. MATHEMATICAL ORDER

**Relevant Mathematics Associated with the Project**

**Let S be the perspective solution for the above problems.**
**S= {s,e,i,o, DD, NDD, Success, Failure, F}**
**s= start state**
**e= end statement**
**i= set of inputs**
**o= set of output**
**Success = Desired output statement**
**Failure = Desired output not generated**
**DD = Deterministic dataset**
**NDD = non-Deterministic dataset**
**F = functions.**
**S= {s, e, I, O, success, failure} the**
**I= {set of input frame}**
**O= {}**
**DD = {}**
**NDD = {}**
**F = {F1, F2, F3, F4, F5, F6}**
**Where**
**F1 =Login ()**
**F2 = Registration ()**
**F3 = Record Database ()**
**Success = {Prediction of voice}**
**failure = {Fails to predict voice}.**

## VIII. CHALLENGES

[A] Word Ambiguity

Some terms cannot be characterized beforehand for polarity, and their polarity largely depends on the sense of the sentence. You will meet this challenge while working on sentiment analysis. Some typical techniques are available, including Lexicon-based sentiment analysis. This lexicon comprises polarity-value opinion terms. Since word polarity is different in different domains, it is not possible to establish a universal opinion lexicon which has polarity for each word.

[B] Irony & Sarcasm Detection

Expressing negative sentiments using positive words is called Sarcasm. You can easily mislead sentiment analysis algorithms with Sarcasm unless they are designed to analyse sarcasm in this way. It can be tough to understand not only for a computer, but also for a person. It is challenging to train sentiment analysis models successfully because of the limitless variances in terminology used in sarcastic statements. Common topics, preferences and historical information must be exchanged between two individuals in order to make sarcasm accessible. In social media comments and postings, sarcasm is present mostly.

[C] Multipolarity

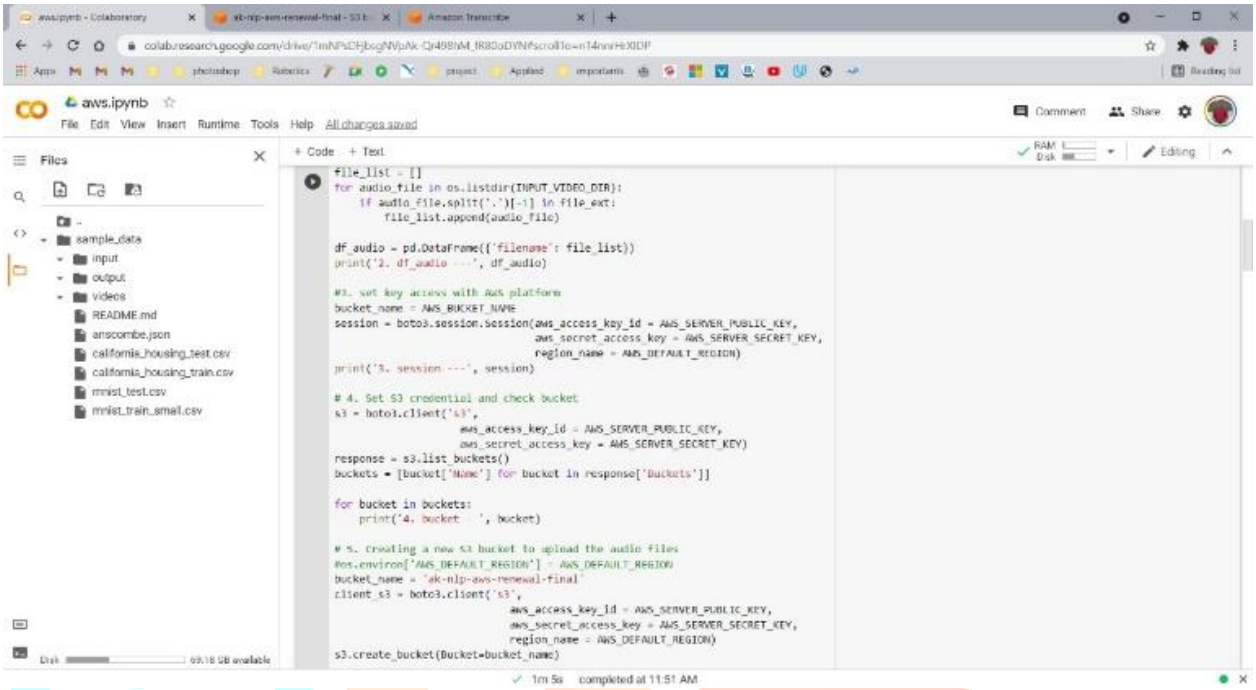
Sometimes a particular sentence or article can display multipolarity or any text unit we want to study. Thus, the overall results of the study can be tricky just like how sometimes an average masks vital information on all the figures that were entered. Picture when writers talk about other people, items, or companies in an article or review (or aspects of them). It is common for certain topics to be criticized and some to be praised in a work.

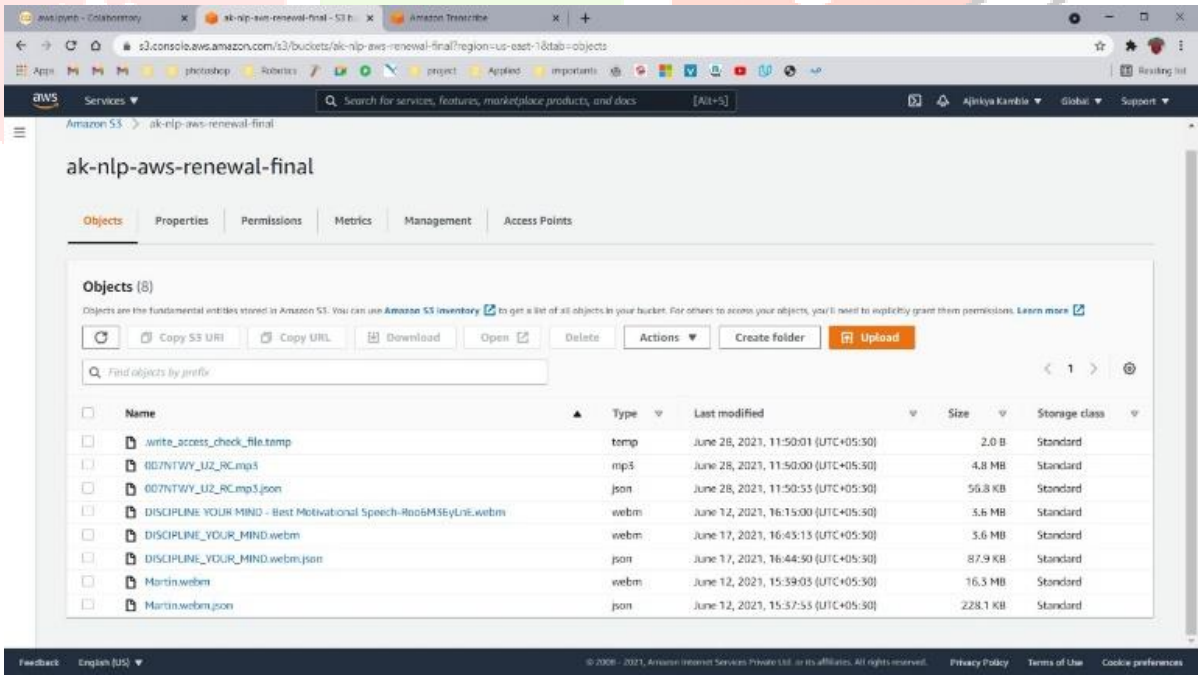
[D] Negation Detection

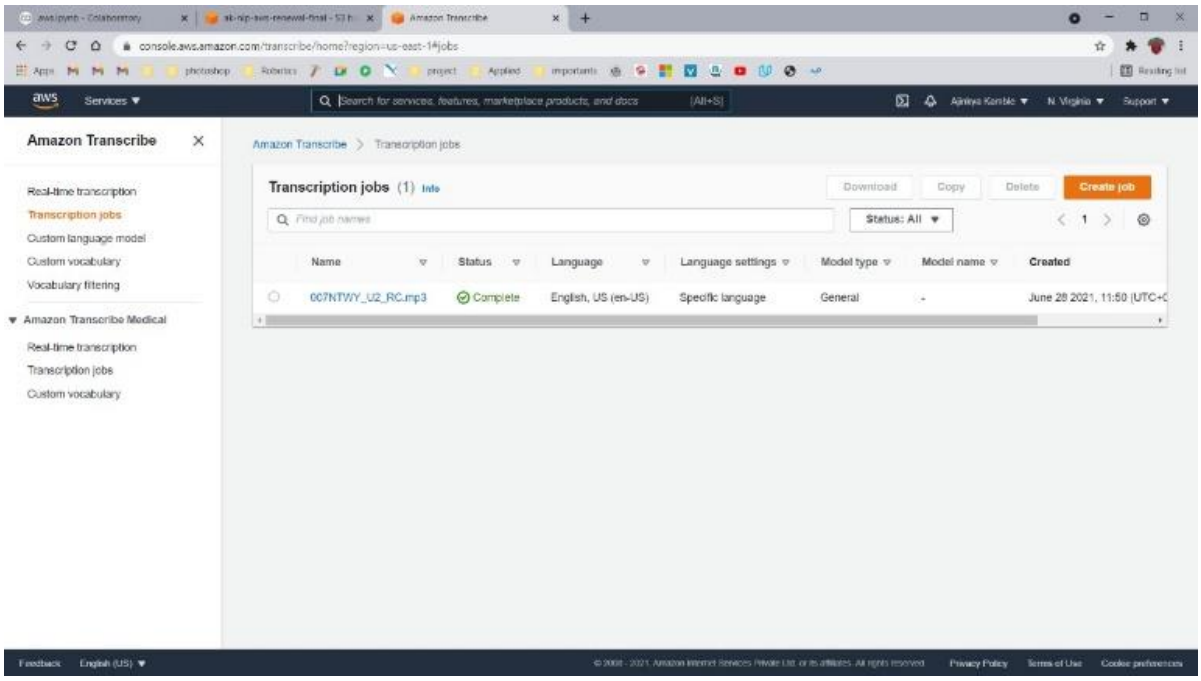
In linguistics, polarity of words, phrases and even sentences are reversed. This is called as negation. For this different linguistic rule are used to find whether negation is occurring. In this opposite polarity will be returned by changing the original meaning of the words. For dealing with this problem most easy approach is to use the most state-of-the-art sentiment analysis techniques.

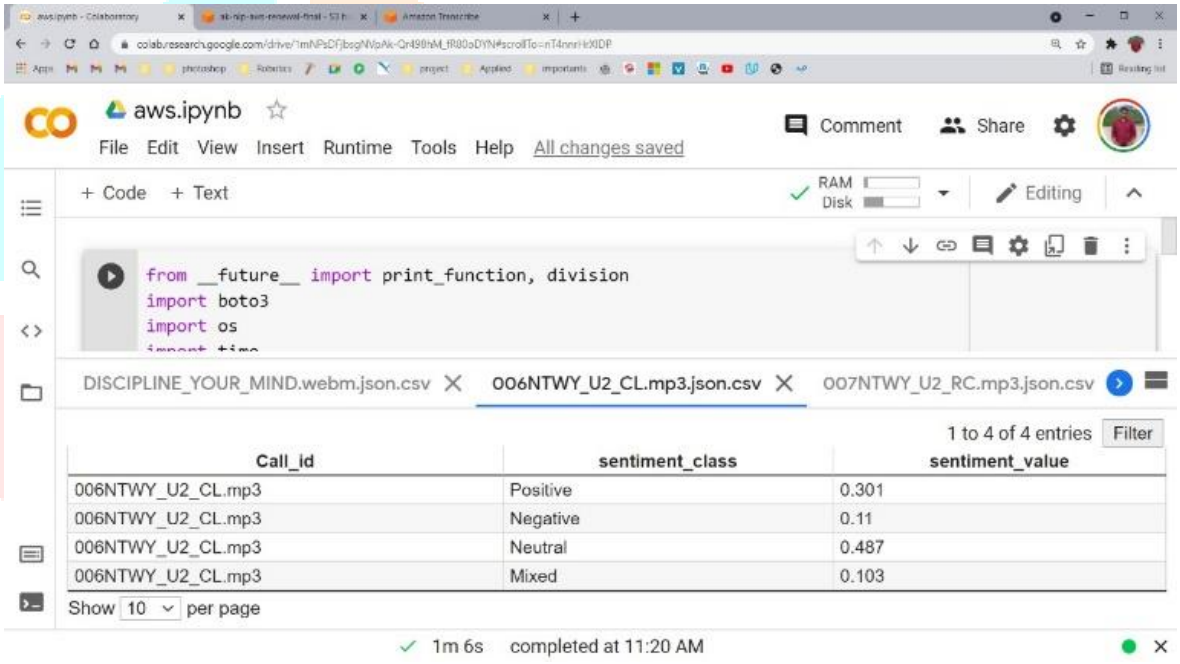
## IX.RESULT

In the proposed system we have developed the voice-based sentiment analysis using AWS services. By using the audio files in memory, we can find its sentiments. We can find if the audio is positive negative or neutral. For implementing this we have used the AWS services like AWS transcribe, AWS Comprehend, AWS Lambda, IAS and so on. The system can be used by the organizations to do the analysis on customer reviews so that performance can be increased.
In the following screenshots we have shown the result of how the output will be shown.






## X. FURURE SCOPE

A short while ago, Facebook added "Reactions" allowing its users not only to "like" content but also to attach an emoticon, whether it be a heart, an outraged face, angry face... This is a fun, seemingly stupid tool that provides the ordinary social media user a little more freedom with their answers. This, however, offers a completely new data layer that was not previously available to anyone seeking to use social media data to analyse sentiment. The information behind such interactions is increasing and becoming more deep each time major social media platforms update and add more features. In order to get insight into the importance and understanding of the social media interactions and what they tell us about consumers behind screens, the future study will continue to deepen and farther away from the surface of the number of likes, comments, and shares. This prognosis also predicts larger applications for sentiment analysis – brands will continue to use this instrument, but also public opinion, governments, profits, education institutions, and many other organizations.

## XI. CONCLUSIONS

Sensing emotions of certain audiences can be important in areas like business growth, social media observations and sentiment analysis. In performing sentimental analysis, we have used AWS services to boost speed and precision. This project leverages AWS features such as Identity Access for Security Management, S3 for Data Storage and Transcribe for audio converting to text.

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