Sentiment Analysis of Telephonic Communication of Companies

Manasi Sheode[1], Mrunmayee Thakurdesai[2], Switi Shinde[3], Manasi Sonawane[4]

[1, 3]Computer Department, MMCOE

Abstract: Call centers are service centers that act as a bridge between enterprise and customers. Importance is being given to customer satisfaction and also to performance of call center agents. However, few researches are being done by taking both the customers and the call center agents as the end users. A system performing aspect-based sentiment analysis is being designed and implemented. The proposed system incorporates audio to text conversion, sentiment analysis and a separate customer-login module. It is able to represent sentiments of customers regarding any particular aspect using joint bar graphs. This can increase or can result in the growth of any company or an organization. This system is product based as it can be used anywhere that can increase the profit of company or any related organization. Other related system had some disadvantages which lead to focus on this system that will be helpful to result in focusing on the feedbacks given by the customers which will be analysed and will result in adding good profit. Sentiment analysis involves extracting subjective information normally from a group of documents and also determining polarity about specific objects. We will be implementing Naive Bayes classification algorithm, which is a supervised learning algorithm. One of the best and easiest ways of selecting the most probable hypothesis given the training data that we can use as our prior knowledge about the problem.

Keywords: Audio To Text Conversion, Sentiment Analysis, Naive Bayes Algorithm, Call centers, Joint bar graphs

I. INTRODUCTION

Today's customer service centers have a system in which audio calls are recorded but only few recordings are checked randomly by the team lead. During this process a lot of valuable information can be missed. Since opinions of people about the whole company or any particular aspect are provided with these calls they are rather important and should be analyzed thoroughly. This project presents a system that is created to solve the problem of losing valuable information from all the calls at the call center using aspect-based sentiment analysis on call center data. This project makes it easier to understand every customers call more effectively and analyze it further. Classification lies at the heart of both human intelligence and machine intelligence. We are making use of Naive Bayes classifier, which is a popular method for text categorization. The Bayesian Classification represents a supervised learning method for classification. It assumes an underlying probabilistic model and allows capturing uncertainty about the model in a principled way by determining probabilities of the outcomes. The results of aspect-based sentiment analysis performed would be displayed using joint bar graphs. In this project, we are creating a system, targeting call center agents as well as the customers as our end user. By creating a system that can perform aspect wise semantic analysis. That is why we are implementing a system in which all the call recordings will be converted to text on which sentiment analysis will be performed. This system can be best implemented in any call center or customer service center. Goals and objectives of our system is to convert recorded audio calls to text to perform pre-processing on the text to perform aspect-based sentiment analysis on the pre-processed text to display the results in the form of joint bar graphs. Sentiment analysis aims to determine the attitude of a speaker with respect to some topic or the overall contextual polarity of a document. Nave Bayesian Classifier used to set label to text data. Aspect category extraction includes mapping entity with its attribute whereas Sentiment Polarity is where Extracted aspects are classified as either positive neutral or negative using Nave Bayesian algorithm which is a classification algorithm.

II. EXISTING SOLUTION

It has been observed that in last years company or any organization can be expanded with the help of customers. As customers are useful as they give feedback of their experience of the product and hence necessary changes regarding it can be changed which will increase the sales of the company. It has been observed that these feedbacks can be used in expanding of organization of company it is important to focus on the feedbacks but it is not possible to focus all of these hence different systems are applied that will easily analyse these feedbacks and will give valuable results. Existing solutions incluse some basic feedback taking strategies such through papers that is not feasible solution as these feedbacks will never give any end result. Other system include and takes only text as a input which becomes sometimes difficult or time consuming for the customer to write a feedback. Hence a system is proposed that takes a audio file which is taken as input and also can be prosposed easily.

III. PROPOSED SOLUTION

The Objective of our system is to convert recorded audio calls to text to perform pre-processing on the text to perform aspect-based sentiment analysis on the pre-processed text to display the results in the form of joint bar graphs. Input is taken in MP3 format. Aspect- Based sentiment analysis module Sentiment analysis aims to determine the attitude of a speaker with respect to some topic or the overall contextual polarity of a document. Aspect category extraction includes mapping entity with its attribute whereas Sentiment Polarity is where Extracted aspects are classified as either positive, negative or neutral. Output will be displayed int the form of bar graphs.Bar Graph Generated: Positive and negative bars will be two types which will be shown.

IV. ALGORITHM USED

Naive Bayes Algorithm is used for processing. What we expect from any algorithm is high performance. So basically we want to choose the simplest method which will give good enough results for your problem and which will have a good enough performance or we can say high performance. In machine learning, Naive Bayes classifiers are a group of simple probabilistic classifiers which are based on applying Bayes Theorem with strong (naive) independence assumptions between the features. Naive Bayes classification algorithm is simple to implement. If the NB conditional independence assumption holds true a Naive Bayes classifier will converge quicker than discriminative models like logistic regression, so you will need less training data. And even though the NB assumption doesn't hold, an NB classifier still performs very well in practice. We are also displaying the results of sentiment analysis in the form of a joint bar graph. Spam detection is solvable by using Naive Bayes. It is primarily used for text classification which involves high dimensional training data sets. A few examples are spam filtration, sentimental analysis, and classifying news articles.It is not only known for its simplicity, but also for its effectiveness. It is fast to build models and make predictions with Naive Bayes algorithm. Naive Bayes is the first algorithm that should be considered for solving text classification problem.

V. LITERATUURE SURVEY

In [1] In this paper, a comprehensive opinion mining system is being implemented for the call center called as customer voice center. The proposed system incorporates sentiment classification, domain knowledge base techniques and information extraction. SVM classifier is built depending on a variety of features to find out the sentiments and detect the attitude of caller. It helps the enterprise make a closer understanding of customers voice and do market positioning as well as business adjustment.

In [2] Aspect based sentiment analysis relies heavily on the syntactic features. However, the reviews that this task focuses on are natural and spontaneous, which poses a challenge to syntactic parsers. In this paper, the authors have addressed this problem by proposing a framework of adding a sentiment sentence compression step before performing the aspect-based sentiment analysis. Different from the previous sentence compression model for common news sentences, sentence compression seeks to remove the unnecessary information for sentiment analysis, thereby compressing a complicated sentiment sentence into one which is shorter and easier to parse.

In [3] In this paper, a software toolkit is being designed with the help of which aspect-based sentiment analysis is carried out to analyze the tweet corpora. The toolkit facilitates sentiment analysis for extracting the positive, negative and neutral aspects of the tweets on Twitter. It leverages part-of-speech tagger and dependency parsing technique to identify aspects as well as the sentiment expressions, for which the polarities are being determined subsequently. The developed solution is demonstrated by taking the example of Airbnb. In [4] Web consists of huge amount of user generated info, accurate methods are needed to analyze and specify users opinions and attitudes towards events, products and entities. In this paper, the authors have proposed a method for aspect based sentiment analysis which relies on classifier ensembles. Latent Dirichlet Allocation is used to model topic and natural language processing technique is used to specify dependencies on sentence level and determine interactions between words and aspects. To recognize the existence of polarized stance and then specifying the exact polarity of the users comments towards each aspect an ensemble classifier based on support vector machine base classifiers is formulated.

In [5]This paper represents a call monitoring system using big data analytics for assessing all recorded calls on certain criteria. Analysis of large amount of call records is done using Hadoop Map Reduce framework and algorithms like Cosine and n-grams are used for utilization of text similarity. Drawback of this system was lack of call record corpus it is used for small call record corpus.

In [6]Education is required to demonstrate the short-term benefits such as reduced costs and improved efficiency. This kind of educational need is usually addressed by companies through their call center operations, for which the evaluation of customer satisfaction can be a challenge. This study focuses on the extraction of words via text mining of call center inquiries and responses as a tool for improving customer satisfaction. It will be necessary to investigate the performance of the dictionary of feelings in order to increase the quantity of data available in the future.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue III Mar 2020- Available at www.ijraset.com

In [7] In this paper, the authors have proposed a method by which Call Center conversations would be ranked automatically on the basis of the extent of anger each conversation contains in order to classify ifthe speech contains anger or not. Limitation: The authors of this paper have experimented with only small dataset, and noise cancellation has not been added to reduce background noise.

In [8] In this paper, the authors have proposed a system to extract aspect-sentiment pair and for generating the ratings based on Indonesian reviews on a restaurant. The authors have used three algorithms Naive Bayes Classifier, Support Vector Machine and Conditional Random Field, and WordNet is used for grouping aspects and giving ratings for categories. Limitation: The authors of this paper have used limited raining data.

In [9] In this paper, the authors have proposed several text mining techniques on recorded audio calls. Speech recognition technology is used in the proposed approach for generating texts and analyzing them using different text mining technologies. Limitation: The authors of this paper have used limited data set.

In [10] In this paper, the authors have proposed a system for call-center monitoring and analysis of call-center conversations, using text analytics for assisting both call center agents and administrators. Limitation:The authors of this paper have not performed rigorous evaluation of their proposed system.
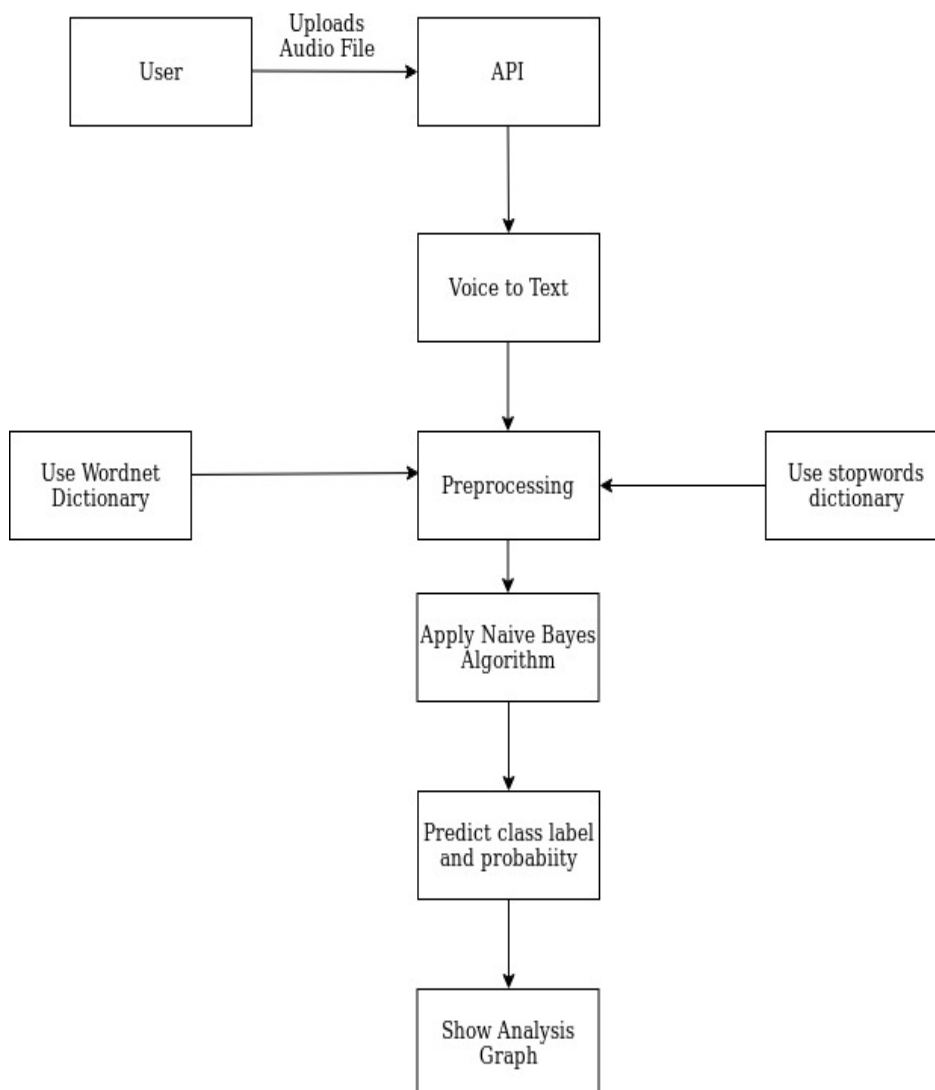
A.   System Architecture

Fig. 1 System Architecture
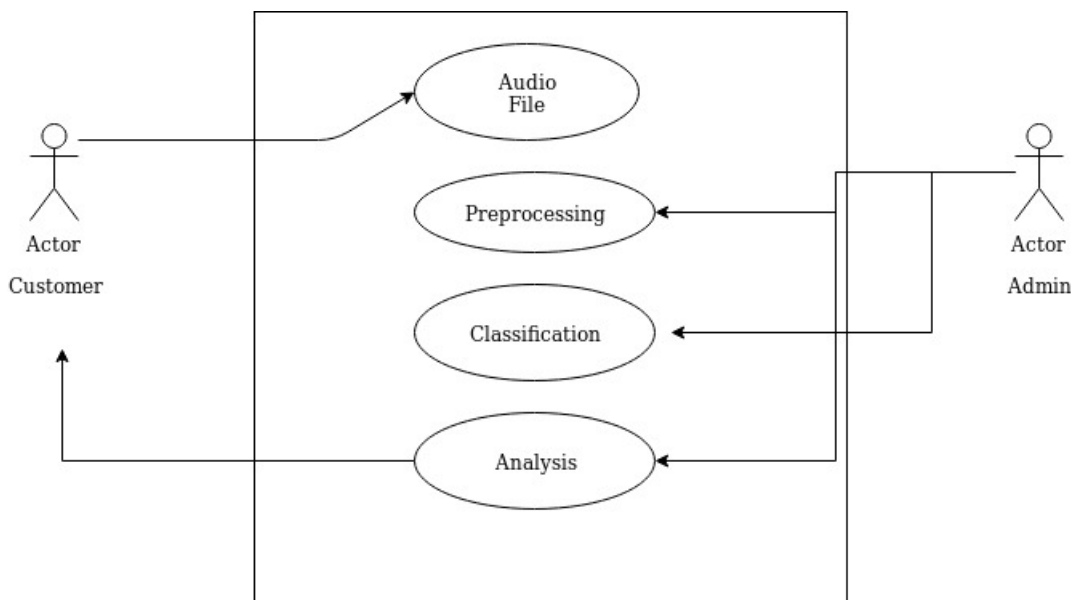
B.   UseCase diagram

Fig. 2 UseCase Diagram

VI. CONCLUSIONS

There can be different advantages in the following form such that call analysis will be done precisely: All the call recordings are analyzed properly. Issues of customers seen at a glance: The output is visualized in a graphical form, therefore issues are addressed at a glance. Saves call center agents time: All call recordings can be converted into its equivalent text form very quickly and classified automatically which saves a lot of time. Valuable data for companies not missed: Since all call recordings are converted and analyzed, no information is missed. Future Scope can be that in the future, proposed system would take into consideration different languages and not just English.

The corresponding result will be a bar graph generation.It is able to represent sentiments of customers regarding any particular aspect using joint bar graphs.

REFERENCES

[1]   1] Peijia Li, Yonghong Van, Chaomin Wang, Zhijie Ren, Pengyu Cong, Huixin Wang, Junlan Feng, Customer Voice Sensor: A Comprehensive Opinion Mining System for Call Center Conversation, 2016 IEEE International Conference on Cloud Computing and Big Data Analysis.

[2]   Wanxiang Che, Yanyan Zhao, Honglei Guo, Zhong Su, Ting Liu,Sentence Compression for Aspect-Based Sentiment Analysis, IEEE/ACM TRANSACTIONS ON AUDIO, SPEECH, AND LANGUAGE PROCESSING, VOL. 23, NO. 12, DECEMBER 2015.

[3]   Marvin Hagge, Moritz von Hoffen, Jan H. Betzing, Jorg Becker, Design and Implementation of a Toolkit for the Aspect-based SentimentAnalysis of Tweets, 2017 IEEE 19th Conference on Business Informatics (CBI).

[4]   Isidoros Perikos, Ioannis Hatzilygeroudis, Aspect based Sentiment Analysis in Social Media with Classifier Ensembles, 2017 IEEE/ACIS 16th International Conference on Computer and Information Science (ICIS).

[5]   Betl KARAKUS, Galip AYDIN, Call Center Performance Evaluation Using Big Data Analytics, 2016 International Symposium on Networks, Computers and Communications (ISNCC).

[6]   Yoko Kobayashi, Kazuhiko Tsuda, Extraction of the Customer Satisfaction in the Call Center Using Feelings Dictionary, 2016 5th IIAI International Congress on Advanced Applied Informatics.

[7]   Dimitris Pappas, Ion Androutsopoulos, Haris Papageorgiou, Anger Detection in Call Center Dialogues, 2015 6th IEEE International Conference on Cognitive Infocommunications (CogInfoCom).

[8]   Susanti Gojali, Masayu Leylia Khodra , Aspect Based Sentiment Analysis for Review Rating Prediction, 2016 International Conference On Advanced Informatics: Concepts, Theory And Application (ICAICTA).

[9]   Souraya Ezzat, Neamat El Gayar, Moustafa M. Ghanem, Sentiment Analysis of Call Centre Conversations using Text Classification, International Journal of Computer Information Systems and Industrial Management Applications, ISSN 2150-7988 Volume 4 (2012) pp. 619 -627.

[10] Gilad Mishne, David Carmel, Ron Hoory, Alexey Roytman, Aya Soffer, Automatic Analysis of Call-center Conversations, CIKM 05 Proceedings of the 14th ACM international conference on Information and knowledge management, October 31November 5, 2005, Bremen, Germany.

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)