EMOTION CLASSIFIER BY TEXT CLASSIFICATION AND REAL TIME DETECTION

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Abstract- Emotion classification through text analysis is an essential task in natural language processing and sentiment analysis. This paper presents an innovative approach to building an Emotion Classifier using text classification techniques. Emotions are complex and multifaceted human experiences, making their automatic recognition from text a challenging problem. The proposed system leverages state-of-the-art machine learning algorithms, including deep learning models, to classify text documents into a set of predefined emotional categories. The core of the approach involves preprocessing the text data, including tokenization, text normalization, and feature extraction. Exploring various text representation methods, such as Bag of Words (BOW) and word embeddings, to transform the text into numerical feature vectors. These vectors are then used as input to train and evaluate different classification algorithms, including support vector machines, decision trees and neural networks.

Due to the rapid development of the internet era, social networking systems have evolved into a significant tool for communicating sentiments to the entire globe. Numerous people express their feelings or opinions using text, images, audio, and video. However, text-based communication via internet-based social networking platforms is particularly overwhelming. Due to social media systems, a significant volume of unstructured information is produced on the internet every second. Sentiment analysis, which detects polarity in texts, may be used to analyses the data as quickly as it is created to recognize human psychology. It determines if the author has a negative, favorable, or neutral attitude towards product management.

Keywords: emotion classifier, face emotion detection, nltk, opencv, text analyzing, text preprocessing.

INTRODUCTION

Different circumstances lead to different responses in people. Sentiment analysis is the computer analysis of how people's attitudes, views and feelings are expressed through written language. Views have a wide range of applications since they are vital to almost all human activities and are important behavioral determinants. Sentiment analysis algorithms can be trained using machine learning techniques such as supervised learning, unsupervised learning, and deep learning. Each text sample in supervised learning is labeled with the sentiment that corresponds to it, and the system is trained on this labelled data. Identify, extract, quantify, and analyze emotional states and subjective data methodically. The fusion of text classification and real-time processing addresses this challenge by developing an Emotion Classifier capable of instantly analyzing and categorizing the emotional content of text data as it becomes available. This endeavor requires a multifaceted approach, involving cutting-edge natural language processing techniques, machine learning models, and efficient real-time data processing pipelines. This paper develops into the development of an Emotion Classifier that operates in real-time, examining the strategies, techniques, and technologies necessary to achieve this feat. By employing state-of-the-art text classification methods, aim to create a system capable of not only recognizing a wide range of emotions but also adapting to changing emotional nuances and trends in text data. The real-time aspect of approach is of paramount importance.
It allows applications to respond to emotional clues in the moment, enabling more responsive customer service, personalized content delivery, and immediate mental health support. Real-time emotion classification is particularly relevant in social media platforms, chatbots, virtual assistants, and any system where user interaction and engagement are pivotal. This research explores the synergy of text classification and real-time processing, aiming to bridge the gap between human emotion expression and machine understanding. The Emotion Classifier developed herein has the potential to revolutionize how to interact with and utilize textual data in various domains, ultimately leading to more empathetic, efficient, and engaging digital experiences. Sentiment analysis is applied in a variety of fields and is possible in various models. Some instances of sentimental analysis include text mining and review categorization. Unsupervised learning is classifying groups of text data based on similarity without knowing the feelings beforehand. Deep learning entails training deep neural networks to recognize patterns and characteristics in text data automatically. Sentiment analysis has several uses, including examining customer reviews and keeping tabs on a brand's online reputation. Additionally, it may be used to detect mental health issues, forecast stock values, and analyses political debate.

**OBJECTIVE OF PROJECT:**

The objective of emotion prediction is to accurately extract people's opinions from many unstructured review texts and classifying them into sentiment class. Sentimental analysis is used in many sectors, and it can be done in many models like svm. Text mining and review classification are examples of some sentimental analysis. Real-Time Emotion Recognition: The primary objective is to create a system capable of accurately and swiftly recognizing human emotions from textual data that are generated or received. This real-time aspect enables applications to respond immediately to users' emotional clues, enhancing user experience and engagement.

Enhanced User Interaction: By understanding and classifying emotions in real-time, the system aims to improve user interaction in various applications, such as chatbots, virtual assistants, and social media platforms. It can tailor responses, recommendations, and interventions to match the user's emotional state, creating more empathetic and effective digital interactions. Sentiment Analysis in Real-Time: Real-time emotion classification plays a critical role in sentiment analysis for businesses and organizations. The system can help monitor real-time customer sentiment in feedback, reviews, and social media, allowing companies to address issues promptly and adapt to changing customer emotions.

**LITERATURE SURVEY**

[1] Sentiment Analysis-A survey

Objective: - This report discusses in detail the various approaches to Sentiment Analysis, mainly Machine Learning and Cognitive approaches. It provides a detailed view of the different applications and potential challenges of Sentiment Analysis that makes it a difficult task.
[2] Deep Convolution Neural Networks for Twitter Sentiment Analysis
Objective: - deep convolution neural network utilizing pre-trained word vectors has good performance in the task of Twitter sentiment analysis.

[3] Sentiment Analysis of Comment Texts
Objective: - In this paper, a sentiment analysis method of comments based on BiLSTM is proposed and applied to the comment sentiment analysis task.

[4] A survey on sentiment analysis methods, applications, and challenges
Objective: - This article discussed sentiment analysis and associated techniques. The primary objective of this work is to investigate and complete classification methods with their advantages and disadvantages in sentiment analysis.

Objective: - This review paper identifies the basic modules for emotion recognition which are speech, facial expression, and gesture (upper body).

Benefits to community people: -
Business Insights: Companies use sentiment analysis to monitor and understand customer opinions and reactions to their products, services, and brand.
Social Media Monitoring: Sentiment analysis is valuable for tracking public opinions on social media platforms.
Customer Support: Sentiment analysis can be integrated into customer support systems to identify and prioritize negative sentiments or complaints, allowing quicker response and issue resolution.
Healthcare: In the healthcare domain, sentiment analysis can be applied to analyze patient feedback, reviews of medical services, and even to monitor the emotional well-being of patients through their communication.
Public Opinion Analysis: Sentiment analysis is used to track public opinion on various issues, helping governments and organizations understand how people feel about specific topics.

PROPOSED METHODOLOGY
Data set which consists of the paragraph or text in the table format or the conversation between the two members. It can consist of complex words, and which is more descriptive.

Fig. 3 Methodology

The proposed method will be better and efficient for the text classification and for generating. Extraction of keywords takes place under the process to conclude the words which describe the emotion or quality of the work.
Output representations like roc curve, word clouds, pie graph, bar graph will represent all possible way to give better analysis.
NLTK: - A well-known open-source Python library created to facilitate tasks involving the processing of human language data is called the Natural Language Toolkit (NLTK).

In addition to text corpora, lexical resources, grammar, and other natural language processing (NLP) methods and functions, it offers a wide range of tools and resources for working with human language data.

The Natural Language Toolkit, or more commonly NLTK, is a suite of libraries and programs for symbolic and statistical natural language processing (NLP) for English written in the Python programming language. It supports classification, tokenization, stemming, tagging, parsing, and semantic reasoning functionalities.

OpenCV: -
OpenCV is a sizable open-source library for image processing, machine learning, and computer vision. It now plays a significant part in real-time operation, which is crucial in modern systems. Using it, one may analyze pictures and movies to find faces, objects, and even human handwriting. Python can handle the OpenCV array structure for analysis when it is integrated with different libraries, such as NumPy. The platform or the package which makes the vision projects and initiates the system work upon detections or recognitions.

Implementation for text: -

STEP1: importing the necessary library from punctuations.
STEP2: reading the excel with consist of the mode of text with emotions and minimizing with the data set size.
STEP3: setup empty data frame for staging output and creating text cleaning functions and preparing for preprocessing.
STEP4: printing the sentimental score of respective text and generating mean of sentiment score by period.
STEP5: plotting bar graphs and world clouds which describe the mode of the text either positive, negative, or neutral.

Implementation for real time: -

STEP1: - create an environment to execute in visual studio code.
STEP2: - create the requirements text within having the necessary packages in it.
STEP3: - create a new terminal to run and install the package with command pip install –r requirement.txt.
STEP4: - after the terminal execution have the code with the test and train data.
STEP5: -create the trained model and insert in real time code.
STEP6: -give the images to train the model and classes of emotions.
STEP7: - run without debugging visual code and terminal starts executing it.
STEP8: - camera access will start, and the display of emotion takes place.
Outputs: -

Fig. 6 Sentimental score

Fig. 7 Sentimental score between period and mean sentiment
Fig. 8 Sentimental score by team

Word clouds and real time video recognition outputs:

Fig. 9 positive words word cloud

Fig. 10 negative words
Conclusion: 
Emotion classifier is the one which is useful in many ways like in the emotional category and the opinion of the situation and it will help to conclude the positivity rate and negativity rate. The model can be classified into different ways like text mining, text classification, using stop words and data cleaning. Thus, sentimental analysis worth to use for many activities.

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