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HUMAN EMOTION CLASSIFICATION USING DEEP LEARNING

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Abstract **-** Research on facial detection and identification has received a lot of attention lately. Here, identifying and authenticating face traits is the primary goal of facial recognition. We have opted to investigate textual, audio, and visual inputs and create an ensemble model that compiles the data from all of these sources and presents it in a comprehensible and understandable manner. This approach can distinguish between seven different emotions: happiness, sadness, anger, surprise, fear, disgust, and neutrality. The three primary steps of the algorithm are feature extraction, emotion recognition, and image/audio/text processing. In this study, we used the algorithms CNN for recognizing emotions in video, SVM, HMM, and CNN for recognizing emotions in audio, and RNN, LSTM for recognizing emotions in text.

Keywords – Facial detection, feature extraction, emotion recognition, and image/audio/text processing

I.INTRODUCTION

The study's overarching goal is to suggest a dependable, practical, and precise detection method. The study's particular goals are as follows: a person's emotions can be predicted based on their monitoring-calculated symptoms.

The purpose of emotion detection through text is to identify a collection of emotions that are defined by a greater level of granularity, which is more difficult than merely recognizing neutral, positive, or negative sensations from text. For instance, the categorization might contain emotions like rage or pleasure. Machine learning algorithms are expected to have inconsistent results since identifying these emotions may be difficult, even for the human eye. It is significant to highlight that, in modern times, visual expression tends to perform better than verbal representation for emotion recognition.

Natural language processing issues can be solved in a variety of ways, the two most common being rule-based and learning-based methods. Learning-based techniques emphasize probabilistic modeling and probability maximization, whereas rule-based approaches often focus on pattern-matching and are

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heavily focused on language and regular expressions. Here, we'll discuss some of the key techniques and mostly concentrate on learning-based approaches, ranging from "traditional" classifiers to more sophisticated neural network structures.

In the context of our study, we choose to employ text mining to identify personality traits based on the "Big Five" model of psychology rather than to identify common emotions like disgust or surprise. Although categorizing personality characteristics and emotion identification are two distinct fields of study with different theoretical foundations, they share certain learning-based techniques and have intriguing literature. This decision was made primarily to provide the user with a more comprehensive assessment. Since emotions can only be understood in the context of one's own personality traits, we reasoned that examining personality traits would enhance the accuracy of our analysis. We welcome any pertinent and supplementary information that deepens our understanding of the user's quirks.

The goal of speech emotion recognition is to automatically detect a person's emotional or physical condition from his voice. An essential component of human connection and communication is the emotional state of the person speaking, which offers feedback without changing the language contents.

Signal processing, feature extraction, and classification make up the typical speech emotion identification procedure. Acoustic filters are used to the raw audio signals during signal processing to separate them into meaningful components. The sensitive part of speech emotion detection is feature extraction since features need to effectively define the emotional content of human speech while also being independent of the speaker or even the lexical content. Finally, emotion classification will associate emotion labels with feature matrices.

Automatic image capture ensures that photos are taken whenever a regular activity takes place. It will trick the detecting mechanism. Large useless collections are produced when photographs are continuously captured. The auto collected picture datasets will make detection slower or less accurate.

On the subject of voice emotion recognition, many sorts of study are being done. It includes a theoretical definition, categorization of affective state, and a list of ways to convey emotions. An SER system built on several classifiers and feature extraction techniques is created to carry out this investigation.

The project work concentrated on the emotional states of individuals in various age groups. The study's findings describe the range of responses that people can display in various circumstances.

II.LITERATURE REVIEW

Multilingual Vocal Emotion Recognition and Classification Using Back Propagation Neural Network

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AUTHORS: Ying-Jie Liu, Ming Zeng, Qing-Hao Meng, Snekhalatha Umapathy, Rachel, Rajalakshmi

Over the last years, an excessive investigation has been completed to recognize emotions by using speech statistics. Cao et al proposed a ranking SVM method for synthesize information about emotion recognition to solve the problem of binary classification. This ranking method, instruct SVM algorithms for particular emotions, treating data from every utter as a distinct query then mixed all predictions from rankers to apply multi-class prediction. Ranking SVM achieves two advantages, first, for training and testing steps in speaker-independent it obtains speaker specific data. Second, it considers the intuition that each speaker may express mixed of emotion to recognize the dominant emotion. Ranking approaches achieves substantial gain in terms of accuracy compare to conventional SVM in two public datasets of acted emotional speech, Berlin and LDC.

1. Multi-Label Emotion Detection From Text

AUTHORS: Kalyani Vishwakarma, Prof. Pushpak Bhattacharya With increasing accessibility and availability to online data, it is very motivating and interesting to study huge data for sentiment and emotion analysis. Emotion Analysis is an extension of sentiment analysis. It is the process of analyzing text and classifying text into different emotion classes. In current scenario, emotion detection has become a trend because of its use in various domains like marketing, pervasive computing, recommendation systems, political science, etc. A lot of research work done so far deals with issues like context-dependency, word sense disambiguation and co-reference resolution and to resolve these issues and improve the design and implementation of systems is strictly needed. Treating emotion detection task as single-label classification problem is not a good idea since affective words can be mapped to multiple classes. In this paper, we review the approaches, methods and models that have been introduced and implemented. We also discuss the reasons why these models are insufficient.

III.METHODOLOGY

Our goal is to create a model that can offer a visual user interface and a live sentiment analysis. As a result, we have chosen to divide the inputs into three categories:

- Video input from a live camera or stored from an MP4 or WAV file, from which we divide the audio and the pictures.
- Audio input from the microphone which is saved in form of MP3 file.
- Textual input, such as responses to questions that would be posed to a user from the platform.

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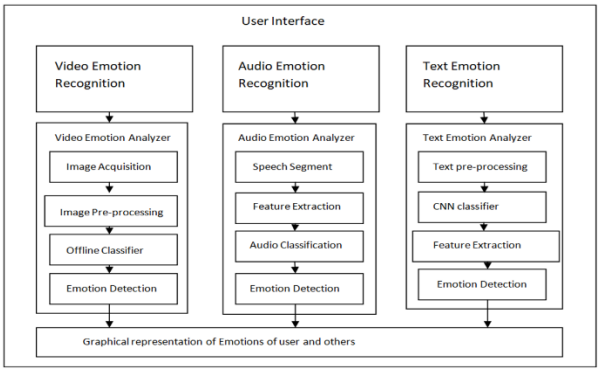

Text Analysis:

The pipeline for text-based personality identification is organized as follows:

- Retrieving text data.
- Individualized natural language processing:
    - Tokenizing the content and utilizing regular expressions to clean and standardize formulations
    - Removal of all punctuation
    - lowering the tokens' casings
    - Applying part-of-speech tags to the remaining tokens after removing any predetermined stopwords
    - Token lemmatization for greater accuracy utilizing part-of-speech markers.
    - Padding the token sequences from each page to limit the input vectors' shape.
- Prediction utilizing our trained model and 300-dimension Word2Vec embedding

Audio Analysis:

The following steps were taken to build the speech emotion recognition pipeline:

- Voice recording
- Audio signal discretization
- Log-mel-spectrogram extraction
- Spectrogram split with a moving window
- Make a prediction using our pre-trained model

Video Emotion Analysis:

The following design was used to create the video processing pipeline:

- Launch the camera
- Use the histogram of oriented gradients to recognize the face.
- Close up of the face
- Set the face's dimensions to 48 by 48 pixels.
- Utilize our trained model to forecast the face.
- Note the quantity of blinks on each image's facial landmarks

IV.RESULTS

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FIG 1 Home Screen

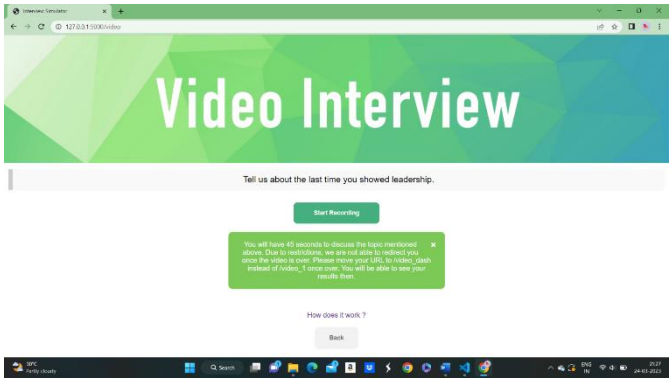

FIG 2 Video Emotion Interface

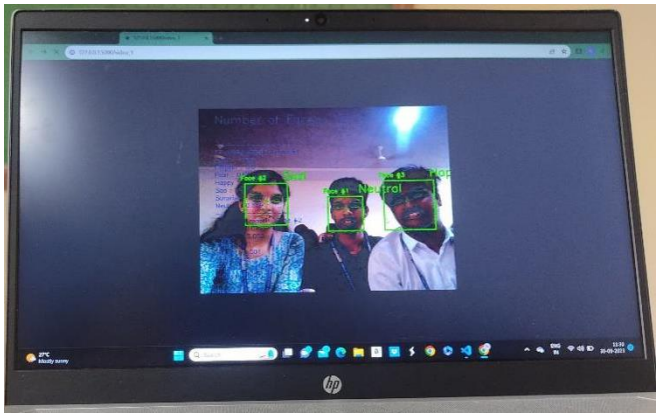

FIG 3 Video Capturing

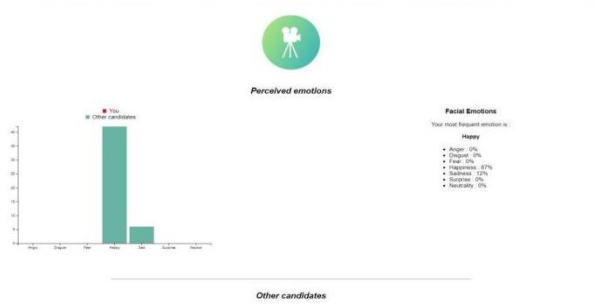

FIG 4 Video Emotion Result

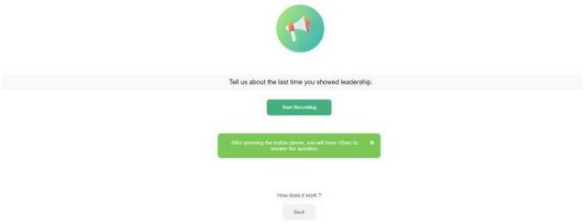

FIG 5 Audio Emotion Interface

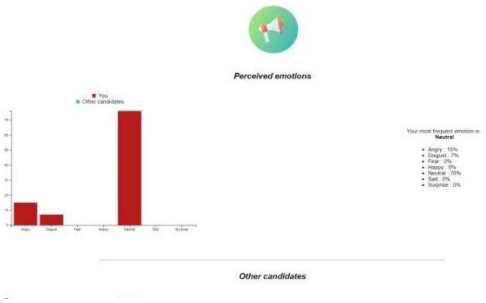

FIG 6 Audio Emotion Result

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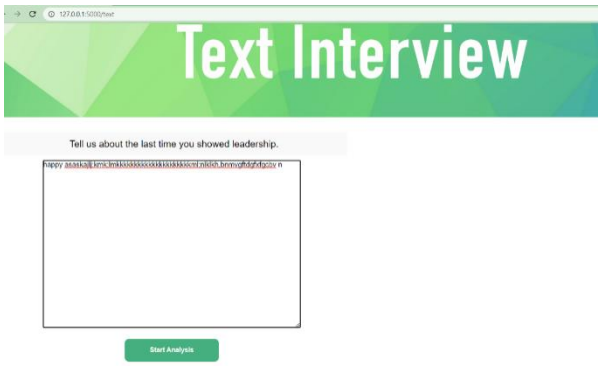

FIG 7 Text Emotion Interface

FIG 8 Text Emotion Result

V.CONCLUSION

The Project Is Over The goal of the Human Emotion Detection System is to anticipate human emotions. Conclusion: For distinct input types taken independently, it is possible to build quite good classifiers for both personality characteristics and emotions identification. Each modality requires a different collection of features and hyper-parameters.

In order to provide a more comprehensive assessment of a user's mental state, the next steps for our project will be to design an ensemble model capable of fusing the insights gained from both personality traits detection and emotions recognition. The coherence measure in our final model would reflect how closely a given user's emotional profile resembles the typical traits of those who fall into the same Big Five psychological category. This would typically imply unsupervised clustering methods.

VII.FUTURE ENHANCEMENTS

Biomedical wearable sensors embedded with IOT technology is a proven combination in the health care sector. The benefits of using such devices have positively impacted the patients and doctors alike. Early diagnosis of medical conditions, faster medical assistance by means of Remote Monitoring and Telecommunication, emergency alert mechanism to notify the caretaker and personal doctor, etc are a few of its advantages.

The proposed work on developing a multimodal IOT system assures to be a better health assistant for a person by constantly monitoring and providing regular feedback on the response levels. For future work, it would be interesting to enhance this work into the development of a human emotion detection model by the addition of other physiological parameters, including an activity recognition system and application of machine learning techniques.

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