e-ISSN:2582-7219

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 7, Issue 7, July 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.521

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.521| Monthly, Peer Reviewed & Referred Journal|

| Volume 7, Issue 7, July 2024 |

| DOI:10.15680/IJMRSET.2024.0707224|

Emojifier using Machine Learning

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ABSTRACT: Emojis are small images frequently embedded in social media messages, combining visual and textual elements to enhance communication. By conveying nonverbal cues, emojis and avatars play a crucial role in online interactions, product reviews, brand sentiments, and more. This phenomenon has caused a surge in data science investigations centered on the art of storytelling using emojis. Advances in computer vision and deep learning have enabled the recognition of human emotions from images. In this context, we will classify human facial expressions to associate them with appropriate emojis or avatars. Emojifier, a machine learning application, is designed to categorize facial expressions, text, and speech into corresponding emojis or avatars.

KEYWORDS: Detection, facial expressions, emojis or avatars.

I.INTRODUCTION

Emojis have transformed from emoticons in the contemporary age. The necessity
for emojis emerged from the difficulty of conveying emotions and sentiments through text. Emojis have developed from emoticons in contemporary times as a result of the difficulty in effectively expressing emotions and feelings through text. Emojis have quickly become a crucial element of Western popular culture, spreading worldwide. These are now widely utilized in a range of networks and messaging applications. Emojis play a crucial role in online communication by conveying emotions effectively. Based on the most recent data provided by Statista, it is anticipated that the number of emojis will approach 3800 by next year. To address this issue, most emoji keyboards on devices have categorized them accordingly as shown in Fig. 1.

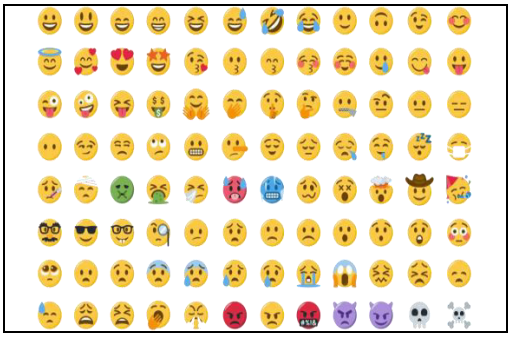

Fig. 1: Emoji Categories

The introduction of emojis in 1997 initiated a notable increase in their utilization on social media during the last ten years. In 2015, the 'Face with Tears of Joy' emoji was chosen as the Oxford Dictionary's Word of the Year, reflecting the remarkable 800% increase in emoji usage during that year. Emojis are commonly used in social media platforms, with over 10% of Twitter posts and more than half of Instagram content including at least one emoji. This widespread acceptance has prompted extensive research in areas like language, social communication, and natural language processing (NLP).

II. LITERATURE SURVEY

[1]. Umadevi V and Murugeshwari V, " Facial Emotion Recognition and Synthesis with Convolutional Neural Networks," March 2024International Journal of Computer Applications 186(11):975-986.
In this paper, the study investigates the application of deep convolutional neural networks (CNNs) in the synthesis and identification of facial expressions. The CNN architecture used for generation produces lifelike facial expressions by

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capturing delicate muscle movements and spatial connections. Furthermore, a model based on CNN is capable of accurately classifying these expressions, achieving leading-edge precision. This method makes a significant contribution to the automatic synthesis and recognition of facial expressions, with potential uses in human-computer interaction, affective computing, and virtual environments.

[2]. Galiveeti Poornima, Sudha Y, Dr.Pallavi R, Dr. Deepak S Sakkari, "Localization of objects in Emoji-Based Social Networks through the utilization of Deep Learning Methods".
In this paper,

- **Localization of Objects through CNN.:**
  - Train classifiers and regressor for objects at various scales.
  - Utilize deconv and directed back propagation to understand CNN workings.
  - Develop methods for object localization without bounding box data.
  - Use synthetic data and multi-output neural networks for localization.
- **Emotion Analysis with Emoji:**
  - Improve sentiment analysis accuracy with emoji embedding.
  - Use emojis for emotion prediction and sentiment analysis.
  - Create custom metrics and callbacks for emoji-based emotion recognition.
  - Implement a 2D Convolution model for emotion localization.

[3]. R. Sun, H. Haraldsson, Y. Zhao and S.
Belongie, "Anon-Emoji: The development of an Augmented Reality System for Children with Autism Spectrum Disorders aims to enhance their comprehension of facial expressions and emotions through an Optical See Through interface.

", 2019 IEEE International Symposium on Mixed and
Augmented Reality Adjunct (ISMAR-Adjunct), 2019, pp. 448-450

- In this paper, the research showcases a specialized Optical See-Through Augmented Reality System tailored for children diagnosed with Autism Spectrum Disorders. This system integrates 3D emoji models to conceal facial expressions, aiding in the recognition of emotions. Through this system, researchers aim to improve the emotional perception skills of children with ASD.

III. METHODOLOGY

3.1 System Architecture

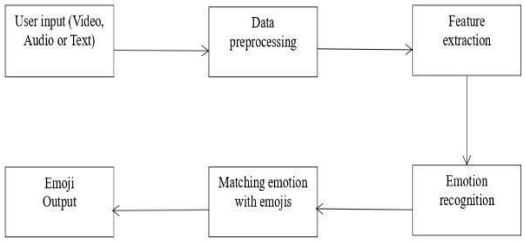

Fig. 2 - System architecture

The above fig. 2 shows that, the system includes image capture, preprocessing, training a Convolutional Neural Network (CNN) model, and mapping emotions to emojis. Real-time images are captured by the camera, then undergo pre-processing to enhance the extracted data and identify features for analysis. The trained model classifies the features and identifies the emotion.

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3.2 Data Flow Diagram

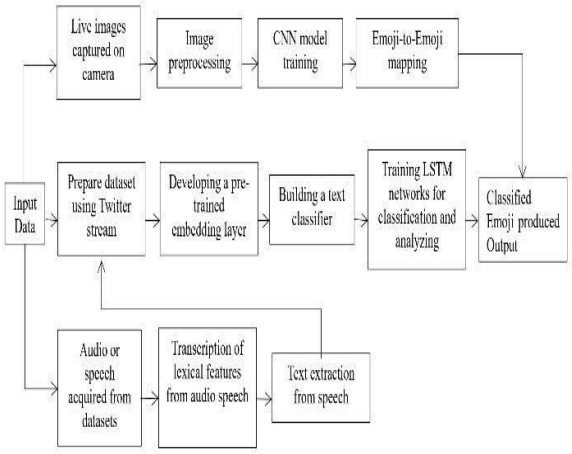

Fig. 3 – Data Flow diagram

The above Fig. 3 shows, the interaction of the 3 modules demonstrates the process of converting raw input data, extracting its features, and classifying it to generate a single emoji output.

3.3 ALGORITHMS

Natural Language Toolkit

NLTK is a widely used open-source platform for developing Python applications that deal with human language data. It may be a comprehensive library of instruments and assets for Natural language processing (NLP) task such as tokenization, stemming, lemmatization.

CNN Algorithm

In the realm of image and video processing, the Convolutional Neural Network (CNN) is often utilized for its deep neural network structure. The system autonomously acquires spatial hierarchies of features from unprocessed image data, taking cues from the organization of the visual cortex in the human brain. CNNs have proven to be highly efficient in tasks such as classifying images, detecting objects, and segmenting images.

Haar Cascade

The Haar cascade algorithm, developed by Viola and Jones in 2001, utilizes a machine learning approach for detecting objects in images or videos. The Haar wavelet transform is utilized to calculate a series of Haar-like characteristics from rectangular subregions of the image. These attributes are later employed to train a classifier that can differentiate positive and negative samples effectively.

3.4 MODULE DESCRIPTION

Module 1: FACIAL EXPRESSION TO EMOJI CONVERTER

- The camera records the real-time image, after which image pre-processing filters the acquired real-time input image data and identifies features for further processing.

Module 2: TEXT TO EMOJI CONVERTER

- This stage helps us classify our text and offers an emoji as a result. This involves developing a text classifier that can predict the appropriate emoji when given an English sentence.

Module 3: SPEECH TO EMOJI CONVERTER

- Speech involves lexical, visual, and auditory elements that are essential for recognizing emotions conveyed through speech. Extracting lexical features for real-time audio emotion prediction necessitates obtaining a transcript and extracting text from the speech.

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IV. RESULT

The user interface accurately displays the appropriate emoji or avatar based on the input with a 90% precision.

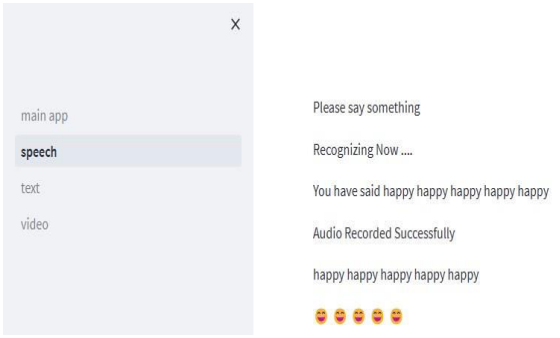

Fig. 4 Displaying emoji for speech input

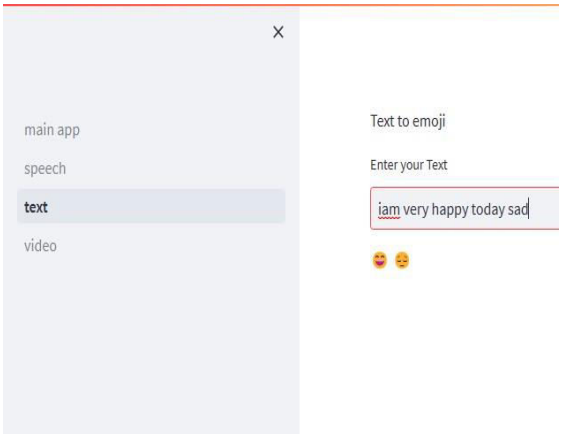

Fig. 5 Displaying emoji for text input

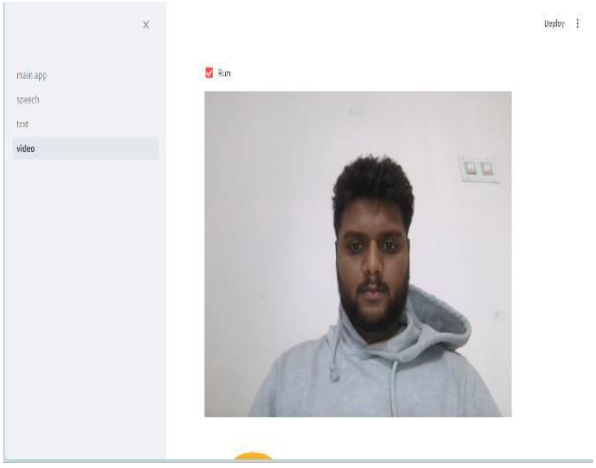

Fig. 6 Acquiring the input given through real time image

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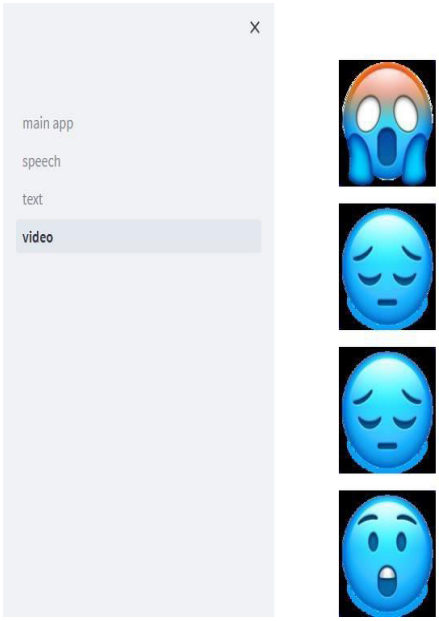

Fig. 7 Displaying emoji for image input

V. CONCLUSION AND FUTURE WORK

The Emojifier software employs sophisticated computer vision and machine learning techniques to classify human facial expressions and pair them with appropriate emojis or avatars. Its purpose is to improve communication and expression in online settings by offering users an intuitive and user-friendly platform for accurately and effectively conveying emotions and sentiments. A variety of test cases have been developed to validate the different project components and ensure the proper functioning of the Emojifier software. Overall, the Emojifier software demonstrates significant potential for diverse uses, such as chatbots, customer service, virtual reality environments, and analyzing emotions for marketing and branding purposes.

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