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Real Time Facial Emotion Recognition Using Deep Learning

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ABSTRACT: Human emotions are the basic things that are recognized by facial expressions. Facial expressions are states of mental health that resolve spontaneously rather than through conscious exertion and are accompanied by physiological changes in the facial muscles that signify expressions. Nonverbal communication methods such as expressions, eye movements, and gestures are used in many applications of human-computer interaction. Identifying emotions is not an easy task because there is no difference between the emotions of a face, and there is also a lot of complexity and variability. Deep learning is a subset of machine learning. It can handle huge amounts of data. The machine learning algorithm uses some open features to model the face. In this work, convolutional neural networks (CNNs) were developed to identify the expression of facial emotions. Facial expressions play an important role in the nonverbal communication that takes place in a person's inner emotions that are reflected on his or her face. This work has used the Viola-Jones algorithm to detect the eye and lips region from a face and then with the help of the neural network. Also, Machine Learning techniques, Deep Learning models, and Neural Network algorithms are used for emotion recognition. This work will be proposed as an effective way to detect anger, contempt, disgust, fear, happiness, sadness, and surprise.

KEYWORDS: Machine Learning, Deep Learning, CNN Algorithm etc.

I. INTRODUCTION

In this world, humans are very much addicted to the mobile. It can not express his feelings or emotions. So, we designed our project as real time video facial recognition. Facial Expressions play an important role in interpersonal communication. Facial expression is a non verbal scientific gesture which gets expressed in our face as per our emotions. Automatic recognition of facial expression plays an important role in artificial intelligence and robotics and thus it is a need of the generation. Real-time facial emotion detection using deep learning is a cutting-edge technology that leverages advanced algorithms and neural networks to analyze and interpret human emotions based on facial expressions. This technology has gained significant attention and application across various domains, including psychology, marketing, human-computer interaction, and even entertainment.

Deep learning, a subfield of artificial intelligence, enables machines to learn and recognize patterns in data through the use of deep neural networks. Facial emotion detection focuses on extracting meaningful information from facial expressions, such as the arrangement of facial muscles, to accurately identify and classify different emotions, including happiness, sadness, anger, surprise, fear, and disgust. The traditional approaches to facial emotion detection relied on handcrafted features and shallow classifiers, which often struggled to capture the complexity and nuances of human emotions. However, with the advent of deep learning techniques, such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs), significant advancements have been made in this field.

Real-time facial emotion detection systems utilize deep learning models trained on large datasets of labeled facial images. These models learn to extract high-level features automatically and make predictions about the emotional state of the person in real-time. The process involves several steps, including face detection, facial landmark localization, and emotion classification. Face detection algorithms identify and locate faces in an input image or video stream, allowing subsequent analysis to focus on the regions of interest. Facial landmark localization



techniques precisely identify key points on the face, such as the position of the eyes, nose, and mouth, which provide crucial information for emotion analysis. Deep learning models, such as CNNs or hybrid architectures like Convolutional Recurrent Neural Networks (CRNNs), are trained on large-scale labeled datasets containing facial images with associated emotion labels. These models learn to recognize and classify emotions by generalizing from the training data, allowing them to predict emotions accurately on unseen data.

II. METHODOLOGY

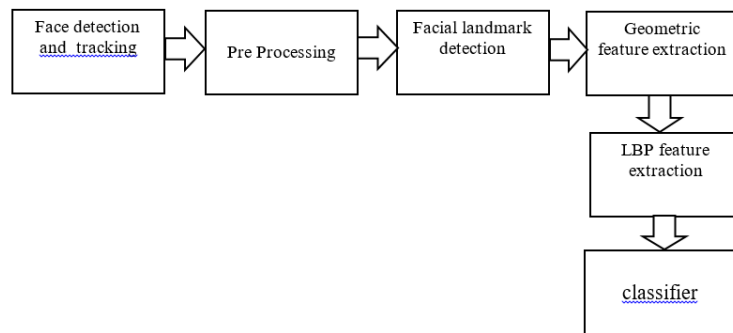


Fig. block diagram of facial emotion detection

- Face detection and tracking: In this block take the video using laptop camera. First face is tracking using green rectangle box in this only face is detect.
- Pre processing: it is only face is cropped and region of interest in the video face detection: It is work by identifying and measuring facial feature in an video.
- Facial landmark detection: in this block detect facial landmarks on filtered face.14 facial landmarks it is proposed work on extract the geometric features
- Geometrical feature Extraction: geometric feature are extracted from the 14 points obtained facial landmark detection block.
- Local binary pixel:LBP is the compare pixel values in cropped image it is divided into block.
- Classifier: It is classified as our emotion. Fear, sad etc.

III. EXPERIMENTAL RESULTS

FEAR



ARE YOU ALRIGHT

SAD



WHAT HAPPEN

IV. CONCLUSION

Conclusion, real-time facial emotion detection using deep learning is a powerful technology that allows machines to analyze and interpret human emotions from facial expressions. Its ability to operate in real-time opens up numerous possibilities for applications in various fields, making it an exciting and promising area of research and development.

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