



Depression Detection Using Deep Learning Algorithm

B. Akhila¹, G. Jyothi², S. Sai Kumar³, G. Rajasekhar⁴

^{1,2,3,4}Student, Department of Electronics and Communication Engineering, AITAM College, Tekkali, Srikakulam, Andhra Pradesh, India, 532201.

ABSTRACT

A person's daily life and mental health can be greatly impacted by depression, a common mental illness. Depression and mental disease are significant problems in today's culture. Suicidal thoughts and a loss of interest in daily activities may come from it. As a result, it is becoming clear that we need an automated system that can help us detect depression in people. This study analyses facial expressions to identify depression using deep learning and image processing techniques. An updated analysis of the previous stress, this study incorporates ongoing worker analysis, live discovery, and the identification of both internal and external stress circumstances through the provision of useful stress management tools and routine follow-up assessments. Playing calming music can help us control people when we see that they are acting strangely or upset.

Keywords: *Deep learning, image processing packages, facial expression*

I. INTRODUCTION

It is well known that depression is a major health problem. Depression has a tremendous impact on society as one of the most common and incapacitating mental disorders. According to the World Health Organisation (WHO), daily living with depression affects more than 300 million people. Depression can affect people of any age. It can cause serious health problems like anxiety attacks, heart attacks with fatalities, problems with blood pressure, and diabetes. In order to find the right treatment, it is necessary to understand it and its causes. Being unable to exit a mental state is the worst state a person may be in. Examples include when they experience sadness, rage, disgust, and a general lack of interest in practically all productive pursuits. Self-destruction is a secondary factor in depressed mortality that also contributes to other psychological disorders. The fields of digital pictures and image processing are currently the subject of extensive research. Development has occurred at an exponentially increasing rate. Image processing research has several uses nowadays and is conducted across many different academic fields.

Images are used as both input and output signals in the field of signal processing for images. among the crucial applications of image processing, the way our faces express ourselves depends on how we behave as people and is a nonverbal scientific gesture. To detect faces and study human behavior, the study uses video streaming. This allows us to identify a person's habits that can be used to identify depression in that person. Some of the applications elated this include forensic applications, automated surveillance, cosmetology, videophone and teleconferencing, personal identity and access control, human-computer interface, and others.

Deep Learning:

A machine learning technique called deep learning teaches computers to learn by mimicking human behaviour. Deep learning is a crucial component of driverless automobiles' ability to recognise stop signs and distinguish between a pedestrian and a lamppost. For voice control of consumer devices like hands-free speakers, tablets, TVs, and smartphones, it is necessary. Deep learning has recently generated a lot of attention and for good reason. It is generating results that were previously unachievable.

Deep learning is used to train computer models to perform categorization tasks directly from images, text, or sound. In terms of cutting-edge precision, deep learning models have the potential to outperform human performance. A significant amount of labelled data and multi-layered neural network architectures are used to train the models.

Proposed algorithm

Haar Cascade: Haar cascade files are utilized in this paper. This algorithm is used to find things in pictures. With this simple, real-time approach, it is feasible to identify objects in video streams. The Haar cascade detector can be trained to recognize different things. So, while Haar cascades are faster than other algorithms, numerous methods are more accurate than it.

Cascade Classifier:

The algorithm works by dividing an image into smaller sub-windows and applying a series of classifiers to each sub-window in a cascade fashion. Each classifier is trained to distinguish between the target object and background, and the output of each classifier is used to determine whether to continue

evaluating the current sub-window or to reject it as not containing the target object. The cascade structure allows for efficient processing, as sub-windows that are unlikely to contain the target object can be quickly rejected without further processing.

For a range of object detection applications, such as face detection, pedestrian detection, and vehicle detection, cascade classifiers have been employed. They are a popular option for many computer vision applications because of their excellent accuracy, low computing demands, and real-time performance.

II. LITERATURE SURVEY

In 2022, Jie Hou developed a deep learning-based system for facial expressions-based human emotion recognition. Its proposed goal is to identify and estimate feelings, and facial expression measures 87.16 [1].

In 2022, Nirmal Varghese Babu proposed Sentimental Analysis in Social Media Data for Depression Detection Using AI. In order to develop a method for separating the polarity from social media texts, this research introduces a novel sentimental analysis system based on AI approaches. According to the test findings, this method is more than 95% successful in analysing social media data [2].

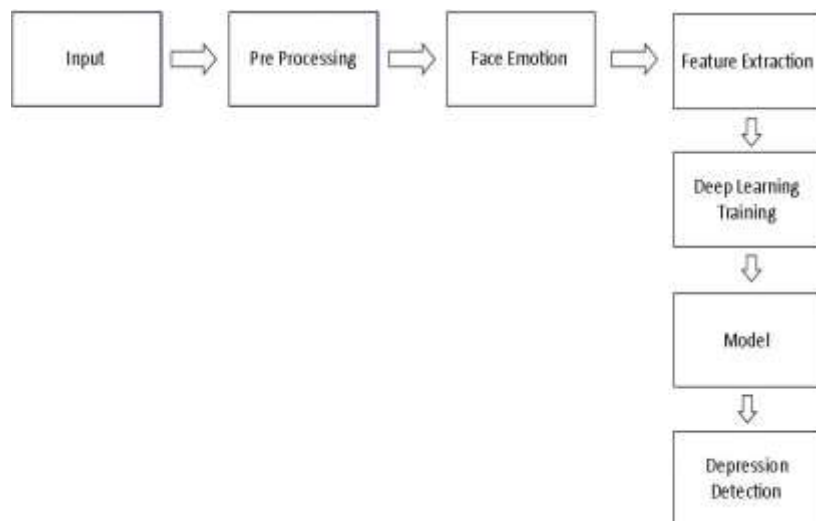
For the detection of substance abuse and mental health disorders on social media in 2021, Ramirez- Cifuentes proposed Enhanced Word Embedding Variations. Its goal is to analyse textual clues that distinguish and define depression-related Reddit posts and define each mental health condition. Our augmented representations take on different forms as a result of this strategy, which also increases accuracy [3].

The use of AI for mood analysis was proposed by Zohuri and Bahman. Suicide Risk Management and Depression Detection in 2020. Detection of depression by various techniques: combining OCR with AI, Deep learning models.

Use of chatbots, Emotional AI and Combined inputs. (Text, Audio, Image, Video) [4].

III. METHODOLOGY

The project's goal is to use video streaming to identify faces and learn about human behaviour. With the use of this, we can recognise a person's habits and detect depression. The introduction of a deep learning training module aims to increase accuracy and produce better outcomes.



Pre-processing

The process of converting raw data into an understandable format is known as pre-processing. Pre-processing seeks to enhance the image data by minimising unwanted distortions or enhancing specific components that are essential for post-processing.

Feature extraction

The dimensionality reduction process, in which a starting set of the raw data is separated and reduced to more manageable groups, includes feature extraction. The best feature can be extracted from those big data sets by choosing and combining variables into features, which substantially reduces the amount of data.

The feature extraction method is beneficial for removing features that allow for resource reduction without losing any important data. It aids in removing superfluous information from the data set.

Data base face emotional signals

A collection of still images or videos with a variety of facial expressions representing various emotions is also available. Facial emotions recognition technology is used to analyze the expression from both static photos and real-time video. (Sad, angry, scared, happy, neutral... etc.).

Deep learning training

Deep learning training refers to the process of training a deep neural network model to learn from data and make predictions or decisions based on that learning. The training process involves feeding the model with input data and output labels, allowing it to learn and adjust its internal parameters to produce accurate predictions. The training process typically involves several stages, including data preparation, model architecture design, initialization, optimization, and evaluation. The objective is to identify the ideal set of parameters that reduces the discrepancy between the predicted and actual output.

IV. PACKAGES

Keras: This highly sophisticated deep learning API was created for people, not computers. Best practices for reducing cognitive load have been strictly adhered to by Keras, which delivers dependable and simple APIs, minimizes the number of user steps required for typical use cases, and gives clear and helpful feedback in the case of mistakes made by users.

Imutils: Basic image processing activities including translation, rotation, resizing, skeletonization, display Matplotlib pictures, sorting contours, and edge detection are made easier with the help of a number of convenience functions.

CV2: Having the ability to read videos is part of the cv2 program. Pass 0 in the function parameter allows us to access our webcam. The RTSP URL can be used as a function parameter if you want to record CCTV footage, which is very helpful for video analysis.

Argparse: It makes it simple to design command line interfaces that are user-friendly. The programme specifies the arguments that are needed.

Parser: The core parser and byte code compiler of Python are accessible through the parser module. This interface's main objective is to make it possible for Python code to alter the parse tree of Python expressions and generate executable code.

NumPy: With NumPy, arrays can be subjected to a wide variety of mathematical operations. It continues that Python offers a sizable library of advanced mathematical functions that can be used with these arrays and matrices in addition to strong data structures that guarantee accurate computations when using them. **OPENCV-PYTHON:** The ability to do image processing and computer vision tasks is provided by the OpenCV Python module. Tracking, face recognition, and object detection are just a few of the features it offers.

V. RESULT

An updated analysis of the previous stress, this study incorporates continuing worker analysis, live discovery, and the identification of both internal and external stress circumstances through the provision of useful stress management tools and routine follow-up assessments. Playing calming music can help us control people when we see that they are acting strangely, as when they are upset.



VI. CONCLUSION

The aim of the project is to face recognition and emotion by using Deep Learning technique. In this we proposed real time video surveillance, what human face expressions it in front of camera and they were recognizing the face. After completion, we should find exactly stress detection on face.

VII. ACKNOWLEDGMENT

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