A Project Abstract on

**FACIAL EMOTION DETECTION USING CONVOLUTIONAL NEURAL NETWORKS BY COMPUTING IMAGE EDGES**

submitted to

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**ABSTRACT**

Human emotion recognition plays an important role in the interpersonal relationship. Emotion detection from image is one of the most powerful and challenging research task in social communication. The automatic recognition of emotions has been an active research topic from early eras. Therefore, there are several advances made in this field. Emotions are reflected from speech, hand and gestures of the body and through facial expressions. Hence extracting and understanding of emotion has a high importance of the interaction between human and machine communication.

When it comes to image processing, deep learning (DL)-based emotion recognition outperforms classical methods. This paper proposes a face expression identification approach based on a convolutional neural network (CNN) and image edge detection to avoid the complex process of explicit feature extraction in traditional facial expression recognition. The edge of each layer of the image is retrieved in the convolution process after the facial expression image is normalised. To maintain the texture picture's edge structure information, the retrieved edge information is placed on each feature image. The maximum pooling method is then used to reduce the dimensionality of the extracted implicit features. Finally, a Softmax classifier is used to classify and recognise the expression of the test sample image.

**INTRODUCTION**

Emotion is a mental state associated with the nervous system associated with feelings, perceptions, behavioural reactions, and a degree of gratification or displeasure . One of the current application of artificial intelligence (AI) using neural networks is the recognition of faces in images and videos for various applications. Most techniques process visual data and search for general pattern present in human faces in images or videos. Face detection can be used for surveillance purposes by law enforcers as well as in crowd management. This paper presents a method for identifying seven emotions such as anger, disgust, neutral, fear, happy, sad, and surprise using facial images. Previous research used deep-learning technology to create models of facial expressions based on emotions to identify emotions. The typical human computer interaction (HCI) lacks users emotional state and loses a great deal of information during the process of interaction. Comparatively, users are more efficient and desired by emotion-sensitive HCI systems.

A rapid R-CNN (Faster Regions with Convolutional Neural Network Features) facial expression identification approach is presented to sidestep the complicated procedure of explicit feature extraction and low-level data manipulation in traditional facial expression detection. The convolution core of FRR-CNN (A Feature Redundancy Reduced Convolutional Neural Network), unlike classic CNN, diverges due to greater discriminant differences between feature maps at the same level, resulting in less duplicated features and a more compact picture representation. To retain the edge structure information of the texture picture, the edge of each layer of the input image is recovered, and then the extracted edge information is superimposed on each feature image. The maximum pooling method is utilized in this paper to reduce the dimension of the retrieved implicit features, which reduces the convolutional neural network model's training time.

# STATEMENT OF THE PROBLEM

The problem statements in this model are having robust and automated face detection, analysis of the captured image and its meaningful analysis by facial expressions, creating data sets for test and training. A model design is proposed which is capable of recognizing up-to seven emotions which are considered universal among all walks of cultures. Mainly being anger, disgust, neutral, fear, happy, sad, and lastly surprise. The system should be able to understand a face and its characteristics and then make a weighted assumption of the facial emotions of a person.

# OBJECTIVE

The proposed model uses the deep learning (DL) open library “Keras” provided by Google for facial emotion detection, by applying robust CNN to image recognition. It detects expressions and image edges by means of an emotion model created by a CNN using deep learning. Emotion detection is implemented using keras with the proposed network. The networks are program on top of keras, operating on Python, using the keras learn library.

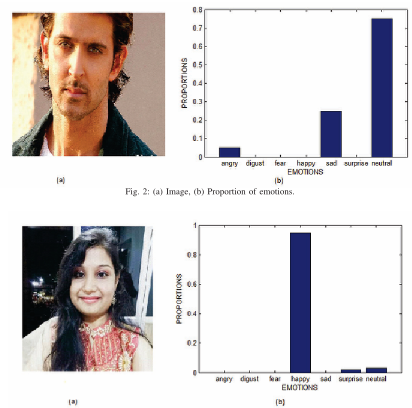
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Fig. 3: (a) Image, (b) Proportion of emotions.

1. **SYSTEM SPECIFICATIONS**

# HARDWARE SPECIFICATIONS:

# Processor : i5/Intel Processor

# RAM : 8GB (Min)

* Hard Disk : 128 GB

**SOFTWARE SPECIFICATIONS:**

* Operating System : Windows 10
* Server-side Script : Python 3.6
* IDE : PyCharm, Jupyter notebook
* Libraries Used : Numpy, Flask, keras, pandas,

FER(Face Emotion Recognizer)

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**Signature of Project Supervisor**