FACE EMOTION RECOGNITION USING CNN MODEL

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ABSTRACT

This project involves the design and implementation of face emotion recognition system using convolutional neural network models. Face Emotion Recognition plays an important role in the fields like computer vision and artificial intelligence to its significant academic and commercial potential.The work focuses on studies on facial expression because expressions are one of the important channel in interpersonal communication.

KEYWORDS: CNN, Deep Learning, Face expression, Image processing, LBP.

1. INTRODUCTION

Nowadays,with advanced technologies in computing and telecommunications technologies, digital images and video are playing important roles in today information era. the facial expression is an important biometric object in image and video databases of surveillance systems. Face expression recognition has a important role in biometric systems and is attractive for numerous applications including visual surveillance and security.

Although many work and research went on past, there are some challenges, number of problems remain unsolved. Research on face detection refers with many challenging problems like, especially when dealing with outdoor illumination, pose variation with large rotation angles, low image quality, low resolution, occlusion, and background changes in complex real-life scenes.

1.1 OBJECTIVE

The main objective is to create face expression recognition system :

To detect faces real time.

To identify the extracted faces by the use of a suitable algorithm.

To update the any time detected face emotions .

1.2 SCOPE

We are setting up to design a system comprising of modules. The first module (face detector) which is a mobile component, which is basically a camera application that captures faces and stores them in a file using computer vision face detection algorithms and extraction techniques. The second module is a desktop application which does face recognition of the captured images.

2. RELATED WORK

S.no	YEAR	AUTHOR	DESCRIPTION
01	2018	Neha Jain, Shishir Kumar, Amit Kumar, pourya shamsolmoali,Masoumeh zareapoor	Hybrid deep neural networks for face emotion recognition
02	2019	Hongli Zhang, Alireza jolifaei, mamoun alazab	A Face Expressions Recognition Method Using CNN networks and Image Computing
03	2021	Yousif Khaireddin, zhuofa chen	Facial Emotion Recognition: State of FER2013
04	2018	Byoung Chul Ko	A Review of Facial Emotion/expression

			Recognition on basing Visual Information
05	2020	Ninad Mehandale	Face expression recognition using convolutional neural networks (FERC)

3. EXISTING SYSTEM

The existing face emotion recognition system have Discriminated function analysis and probabilistic models such as hidden Markov Models

3.1 DISADVANTAGES

- Low discriminatory power and high computational load.
- In geometric based methods, the geometric features like distance between facial muscles.
- Lack of detection

4. PROPOSED METHOD

Convolution neural network is used to classify the emotion LBP is applied to enhance the pattern recognition Face Emotion recognition for transform features system through textural analysis and CNN classifier.

4.1 ADVANTAGES

- Face detection for best-shot selection

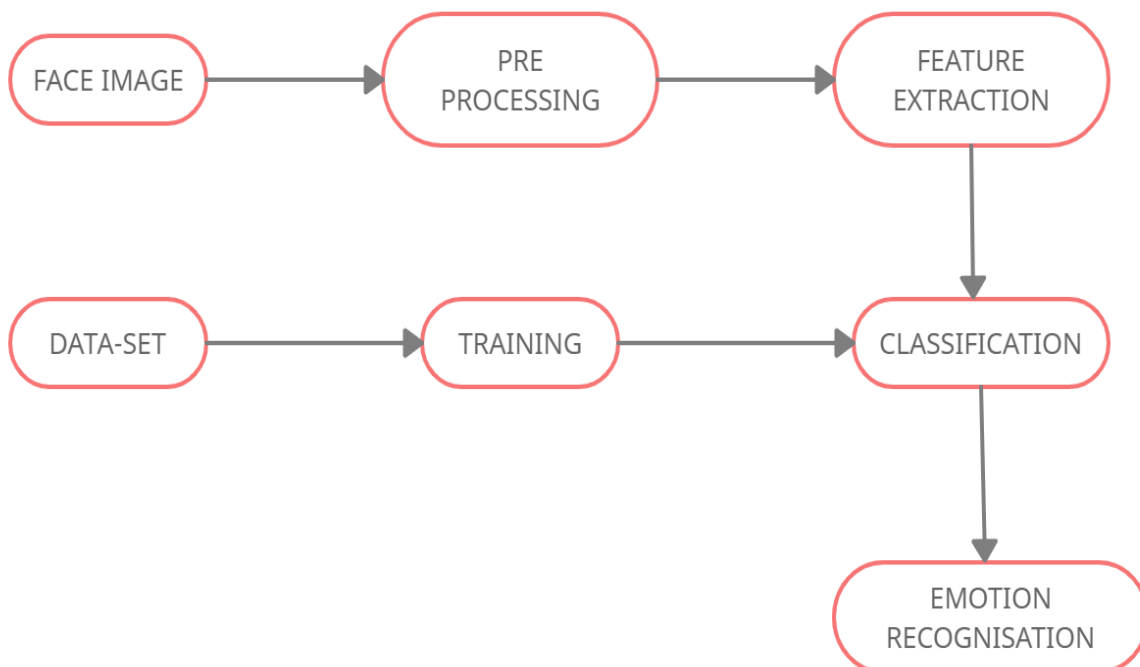- Facial feature detection and extraction

- Face tracking

5. ARCHITECTURE

FIG 5.1 Face emotion recognition system

INPUT MODULE

The facial expression recognition system is train and developed using supervised learning approaches in which it takes images of different number of facial expressions. The system including the training and

testing phase follows by image acquisition in real time, face detection, image preprocessing,the feature extraction and classification. Face detection and feature extraction are carried out from face images and then classified into six classes which belonging to six basic expressions which are outlined below:

- ✓ Image Acquisition

- ✓ Face detection

- ✓ Image Pre-processing

- ✓ Feature Extraction

PROCESSING MODULE

Processing module have phases:

- ● IMAGE ACQUISITION

In image acquisition images are used for face expression recognition ,this images are static images.Images of face can be captured using camera.

- ● FACE DETECTION

In face detection ,the facial parts extracted from the input images detection is carried out in training dataset using Haar classified and implemented through Open Cv. Haar like features encodes the difference in average intensity indifferent parts of the image and consists of black and white connected rectangles in which the value of the feature is the difference of sum of pixel values in black and white regions.

- ● IMAGE PROCESSING

Image processing includes the removal of unwanted and noise and normalization against the variation of pixel position or brightness,blurs.

a) Color Normalization

b) Histogram Normalization

- FEATURE EXTRACTION

Feature extraction is the process of extracting the face features from a face image .This is the most challenging and imperative stage in facial emotion recognition.the efficiency of fer is very much emulated by performance of feature extraction technique.The image of face after processing is used for extract the important features. The inherent problems related to image classification includes the scale, pose,translation and variations in illumination level. The important features are extracted using LBP algorithm.

OUTPUT MODULE

By using given input images or data ,after the completion of image processing and feature extraction using HAAR,LBP algorithms and convolutional neural networks ,finally based on all the expression of face image is detected and displayed.
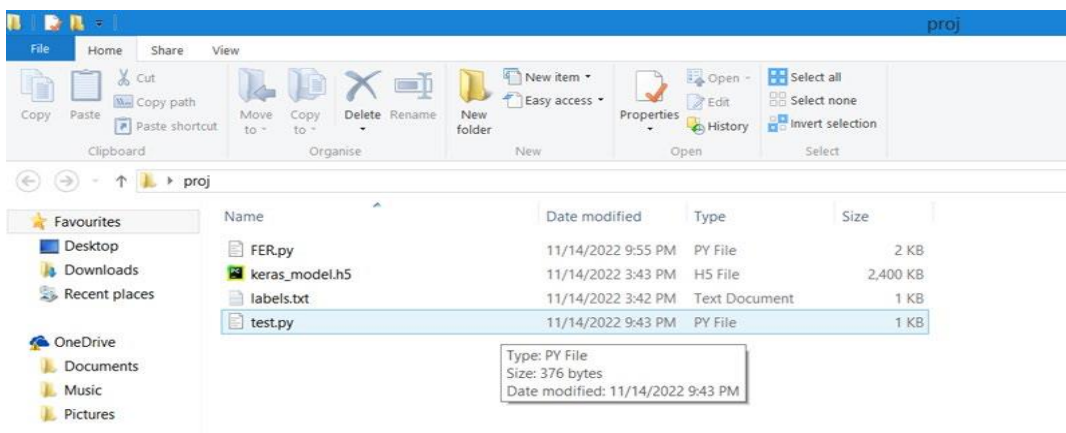
6. RESULTS

FIG 6.1 Working directory of face emotion recognition system

The data which given as input is processed by using the CNN model and stored in a file and extract feature and then it will show

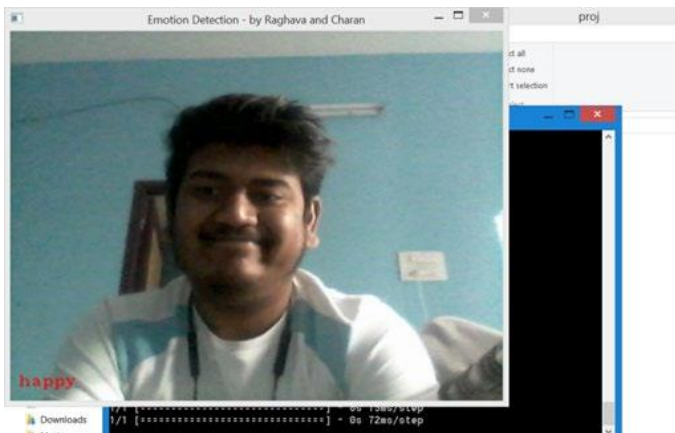the output of the processed data in the open CV window as below figures.

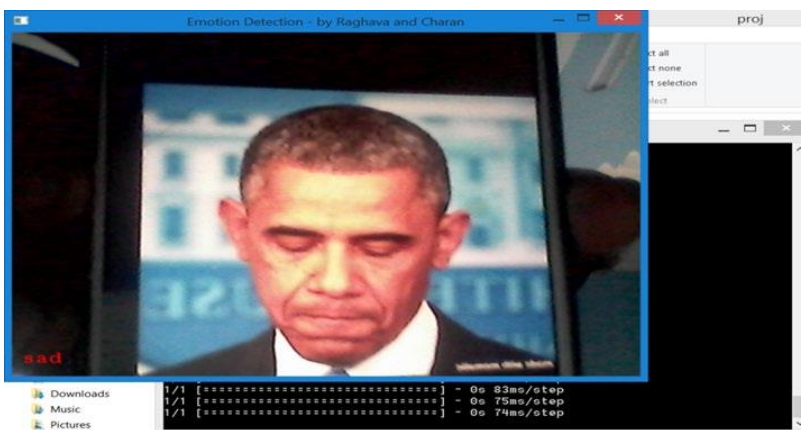FIG 6.2 Open CV window of FER system shows happy expression(succesfully detect)

FIG 6.3 OPEN CV window of FER system detects sad expression

CONCLUSION

This work proposes an system for recognizing the category of facial expressions.Face Detection and Extraction of expressions from facial images is useful in many applications, such as robotics vision, video surveillance, digital cameras, security and human-computer interaction.

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