

A Review on Criminal Facial Emotion Recognition and Detection

Nisha Dubey, Dr. Deepak Chandra Uprety

Research Scholar, Dept. of Computer Science & Engineering, IEC University Baddi, H.P., India
 Associate Professor, Dept. of Computer Science & Engineering, IEC University Baddi, H.P., India

Date of Submission: 15-08-2023

Date of Acceptance: 25-08-2023

ABSTRACT

Human emotions are very difficult to find out that is called a non verbal communication only emotion and body parts are performed like when someone is angry not speak to anything else to anyone or speak rudely to anyone. I similar way to find out the criminal face and emotion using computer or AI (Artificial Intelligence) technique. In AI Technique firstly capture the face and then recognition the face second step is detection of face or testing face. Third step is recognition the face. Forth step is found out the ratio of face. It's using to publicly find out one person or recognition criminal or particular person. In latest technology using Python language to find out the emotion of person with the help of CNN algorithm. Algorithm is used to solve the problems and performed step by step. In this paper, we propose a novel technique called facial emotion recognition using Convolutional Neural Networks (FERC). The FERC is based on two-part Convolutional neural network (CNN): The first-

part removes the background from the picture, and the second part concentrates on the facial feature vector extraction. When you recognition the criminal image and detect the emotion of criminal with special technique.

I. INTRODUCTION

Human faces play an important role in communication. This communication is called a non-verbal communication. Only emotion and body parts are performed. Emotion can express the feelings of human with the help of face. In digital way to find out the emotions of human follows the five steps.

- Input Image
- Face Detection
- Feature Extraction
- Image Classification
- Image Output

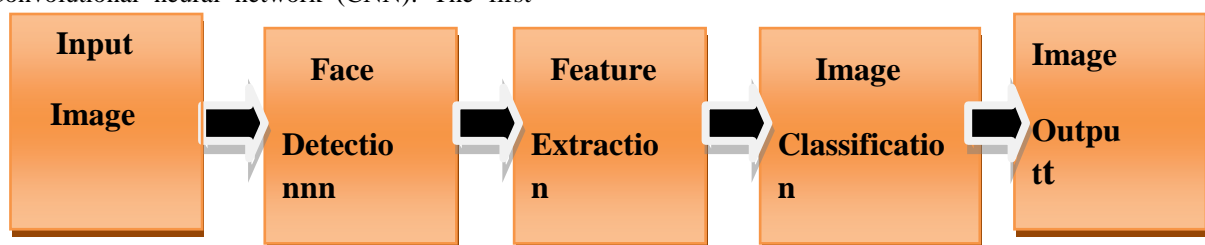


Fig 1.

These are the simple steps to recognition the image.

- Recognition the live face with the help of CCTV Camera.
- Compare the live criminal picture and previous picture.
- CNN for Classify the picture.
- Track the live location of criminal using CCTV
- Detect the live face emotion using face ratio.
- Mood: Happy/Sad/Surprised/Angry/Cry

Facial expression detection can be described as two major approaches.

- Distinguishing Expressions: that are identified with an explicit classifier, and
- Characterization Dependent: on the extracted facial highlights.

In the facial action coding system (FACS), action units are used as expression markers.

II. LITERATURE REVIEW

Facial expression conveys the mood of all humans' beings. There are many attempts to make an automatic facial expression analysis tools such as robotics, medicine, driving assist systems, and lie detector. There are seven basic emotions, irrespective of a human grows with the seven expressions (anger, feared, happy, sad, contempt, disgust, and surprise). Recent study on the facial recognition technology (FERET) dataset, found out the impact of facial asymmetry as a marker of age estimation. The right face asymmetry is better compared to the left face asymmetry. Face pose appearance is a big issue with face detection. Approach of face emotion recognition aims to detect faces in still image and sequence image from video have many method such as local, global, and hybrid approach. The main problems of face recognition are intensity, illumination, pose, difficult to controlling and large occlusion. In 3D capture creates larger data files per subject which applies significant storage requirements, slow processing, most new devices can be capture in 3D. This is the problem for our future works that want to solve and create accuracy gain for widely accept in 3D face recognition system.

III. OBJECTIVE OF THE STUDY

The Facial Expression Recognition system is the process of identifying the emotional state of a criminal person. In this system captured image is compared with the trained dataset available in database and then emotional state of the image will be displayed. This system is based on image processing and machine learning.

- To develop a facial expression recognition system
- To experiment machine learning algorithm in computer vision field
- To detect emotion thus facilitating Intelligent Human-Computer Vision.
- To detect the most wanted person and recognition the activity with the help of

emotion.

IV. SCOPE AND APPLICATIONS

The scope of this system is to tackle with the problems that can arise in day to day life. Some of the scopes are:

- The system can be used to detect and track a user's state of mind.
- The system can be used in mini-marts, shopping center to view the feedback of the customers to enhance the business,
- The system can be installed at busy places like airport, railway station or bus station for detecting human faces and facial expressions of each person. If there are any faces that appeared suspicious like angry or fearful, the system might set an internal alarm.
- The system can also be used for educational purpose such as one can get feedback on how the student is reacting during the class.
- This system can be used for lie detection amongst criminal suspects during interrogation
- This system can help people in emotion related -research to improve the processing of emotion data.
- Clever marketing is feasible using emotional knowledge of a person which can be identified by this system.

V. IMPLEMENT OF FACE EMOTION RECOGNITION AND DETECTION

Detect the live location of face and verify the emotion of criminal face. Some steps are following to recognition the live location faces and detects the emotion.

- (i) Recognition the live face with the help of CCTV Camera.
- (ii) Compare the live criminal picture and previous picture.
- (iii) Classify the picture.
- (iv) Detect the live face emotion using face ratio.
- (v) Track the live location of criminal.
- (vi) Output

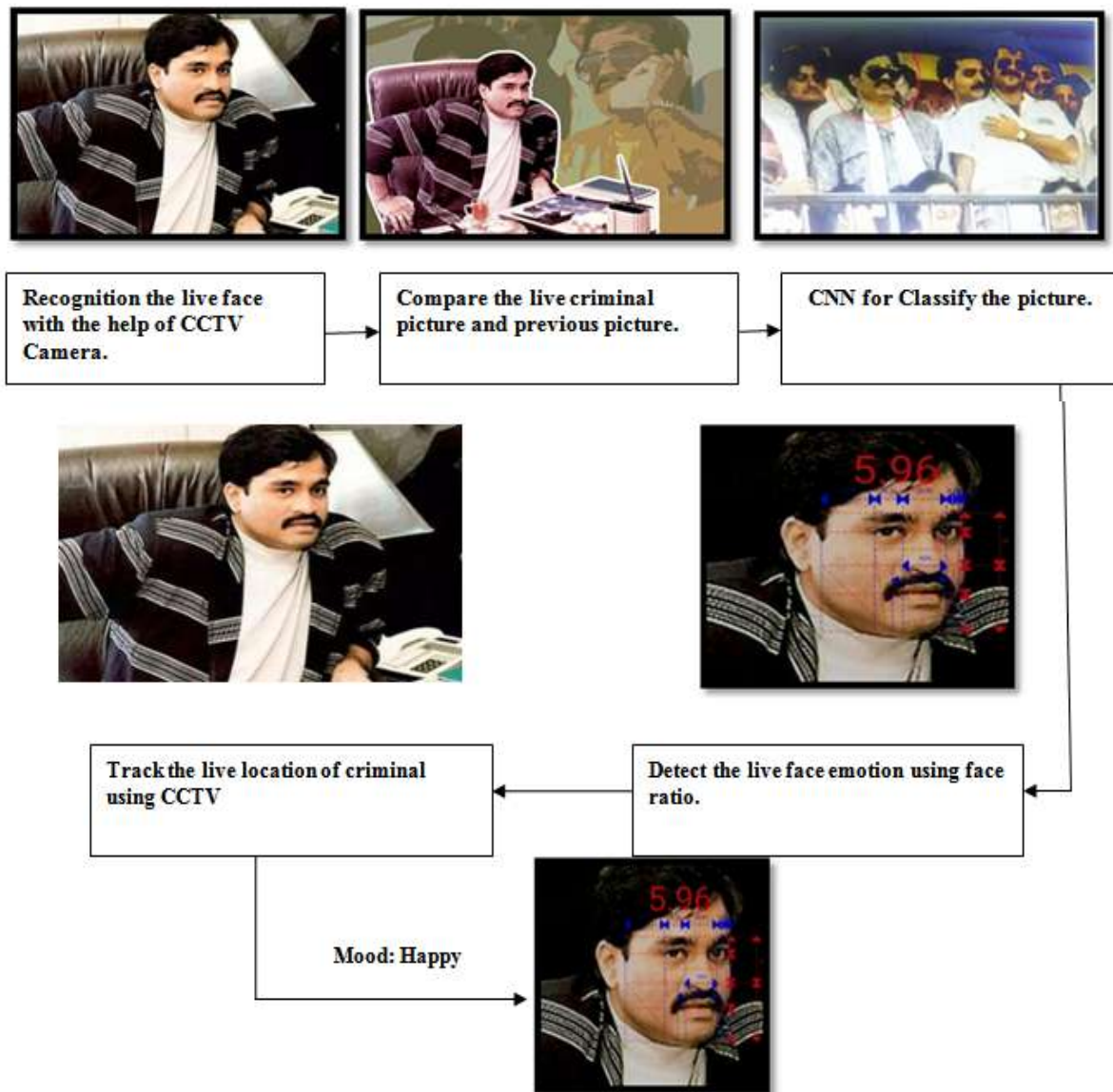


Fig 5.

- (i) **Recognition the live face with the help of CCTV Camera:** The use of face recognition technology can be divided into three basic steps:
 - (a) **Face detection.** At this stage, the algorithm learns a face and the camera finds and detects a face and draws a box around it. The main goal is to find a face, not the identity behind it.
 - (b) **Face analysis.** Then, the mechanism measures the distance between the nose and mouth,

identifies the shape of the chin, etc. When the facial region is found, it can then apply additional tests to validate whether it has, in fact, a detected face. The data then is converted into a face print.

- (c) **Face recognition.** At this stage, the system confirms the identity of the person in a photo. The system recognizes the face and matches it to a name from the database.

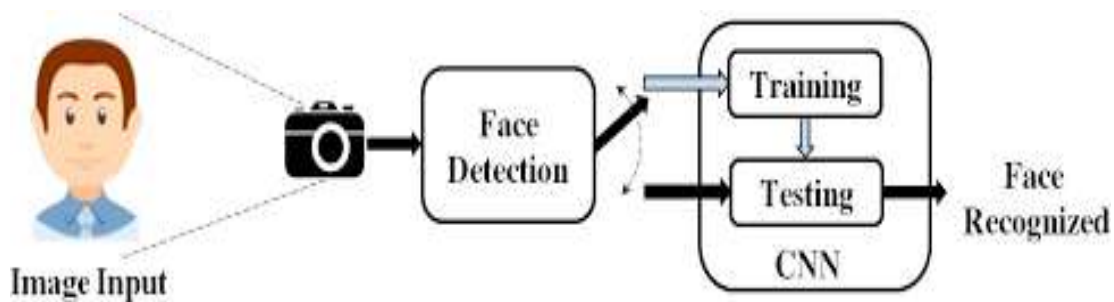


Fig 5(i).

(ii) **Compare the live criminal picture and previous picture:** These steps are used to compare the live image of criminal with old image. Use these techniques to identify the face of criminal and easy to detect any look of criminal. Several steps are use to compare the picture.

- (a) Create the white background.
- (b) Paste the pervious image in background.
- (c) Insert the new live image.
- (d) Now ready to compare the face.

(iii) **CNN for Classify the picture.**

Step 1: Choose a Dataset. The first step is to choose a dataset for the image classification task. ...

Step 2: Prepare the Dataset for Training. ...

Step 3: Create Training Data and Assign Labels. ...

Step 4: Define and Train the CNN Model. ...

Step 5: Test the Model's Accuracy.

(iv) **Detect the live face emotion using face ratio:**

Tag is an app that allows AI to automatically tag your facial impressions. In addition, you can do "Face Type Analysis" and "Face Part

Ratio Analysis"! etc. It automatically measures the proportions of the entire face and each part of the face, including the eyes, nose and mouth. Find out the ratio of criminal face with the help of face ratio app.

Step 1: First insert the image

Step 2: Second analysis the image

Step 3: Third the score of image

Step 4: Forth show the output is called the ratio of face.

(v) **Track the live location of criminal using CCTV:**

In cybercrime and the police need to find the location of Criminal person. They will search for the IP Address. Several websites have all the data and tracking device about the IP Addresses. Once the police get the IP Address and they will approach the ISP.

(vi) **Output:** The output will be show the emotion of criminal person in public place. It's very helpful to both police and cyber crime department to read the current emotion comes on the face of criminal. To read the Facial Emotion we have two methods.

(a) **Mathematical way to represent the image in matrix form:**

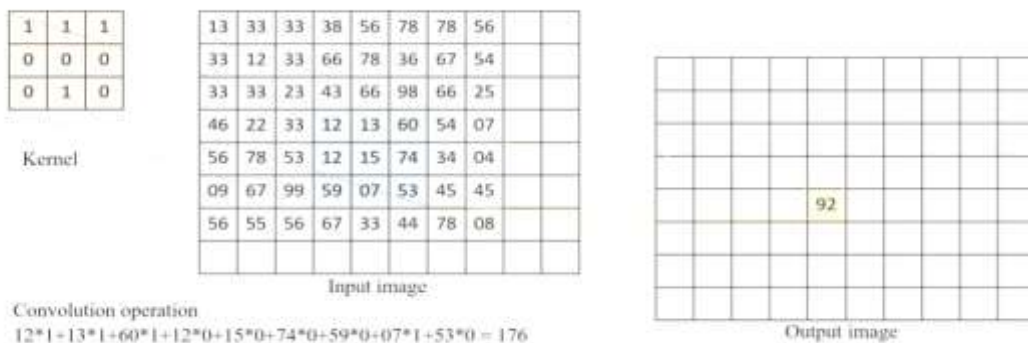


Fig. 5(vi)(a) A block diagram of FERC

The input image is taken from CCTV camera. The first part of image to recognition the live image after recognition compare the live image with old image in digital way then classify

the image with the help of CNN algorithm the next step to track the image location with the help of IP address and final step show the output or emotion.

(b) Mathematical way to represent the image with emotion:

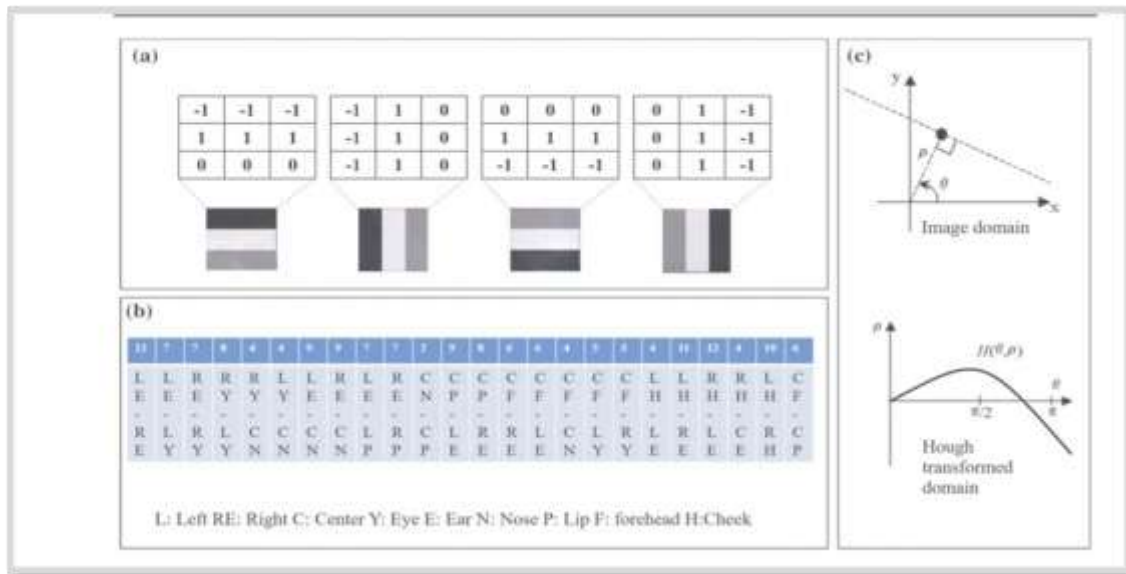


Fig. 5(vi)(b)

Convolution filters operation with the 3 x 3 kernel. Each pixel from the input image and its eight neighboring pixels are multiplied with the corresponding value in the kernel matrix, and finally, all multiplied values are added together to achieve the final output value. A binary image and

used as the feature, for the first layer of background removal CNN (also referred to as the first-part CNN in this manuscript). This skin tone detection depends on the type of input image. If the image is the colored image, then YCbCr color threshold can be used.

(c) Comparison with other Methods: FERC method is a unique method developed with 4 layer network with the accuracy 96%.

	No. of .Emotion	Key Frame N/w Size	N/w Size	Accuracy	No .Fold
FERC	5	Edge Based	8	96	25
Zao et a	6	Last frame	22	99.3	10
Jung et al	7	Fixed Frame	4	91.44	10
Zang et al	7	Last Frame	7	97.78	10

Fig. 5(vi)(c)

VI. CONCLUSION:

By applying the CNN model to facial emotion recognition and detect the criminal emotion. The number of network layers of CNN can effectively improve expression recognition accuracy. The emotion recognition depending on facial expression and guided by the connection

between emotion and psychology provides a direction for the simple analysis of psychological characteristics of criminals and initially combining deep learning methods with psychoanalysis. its very useful and accuracy to detect the emotion and action with the help of face ratio. If Criminal take any wrong action in public place its very easy to detect the save the human or reduce any criminal

action with the help of tracking the live image location. Facial emotions recognition and detection to find out the emotions of one person in group or individual. In normal way to find out the emotion in not easy for every user using AI techniques it's very easy to find out the emotion..

When IB, CID, Police find the emotion of criminal person in group not easy to detect in public place or next move of the person. When using the face recognition and diction it's very useful to find out the criminal person with the help of face ratio and recognition the emotion of criminal person to detect the next step. In AI Technique firstly capture the face and then recognition the face second step is detection of face or testing face. Third step is recognition the face. Forth step is found out the ratio of face. It's using to publicly find out one person or recognition criminal or particular person. In latest technology using Python language to find out the emotion of person with the help of CNN algorithm. Algorithm is used to solve the problems and performed step by step.

REFERENCES:

- [1]. Face recognition
<https://www.datasciencecentral.com>
- [2]. THREE Image source dawood ibrahim
https://www.google.com/search?sca_esv=554398760&sxsrf=AB5stBj3y_VUb6oN_-M4cUvDtn2YzUMsjg:1691401325856&q=dawood+ibrahim&tbm=isch&source=Inms&sa=X&ved=2ahUKEwjK3sz5oMqAAxVSTGwGHXsLBngQ0pQJegQIDRAB&biw=1366&bih=651&dpr=1#imgrc=30H3IevCfiW-JM
- [3]. CNN Classify the image
<https://www.google.com>
- [4]. Comparisons with other method <https://doi>