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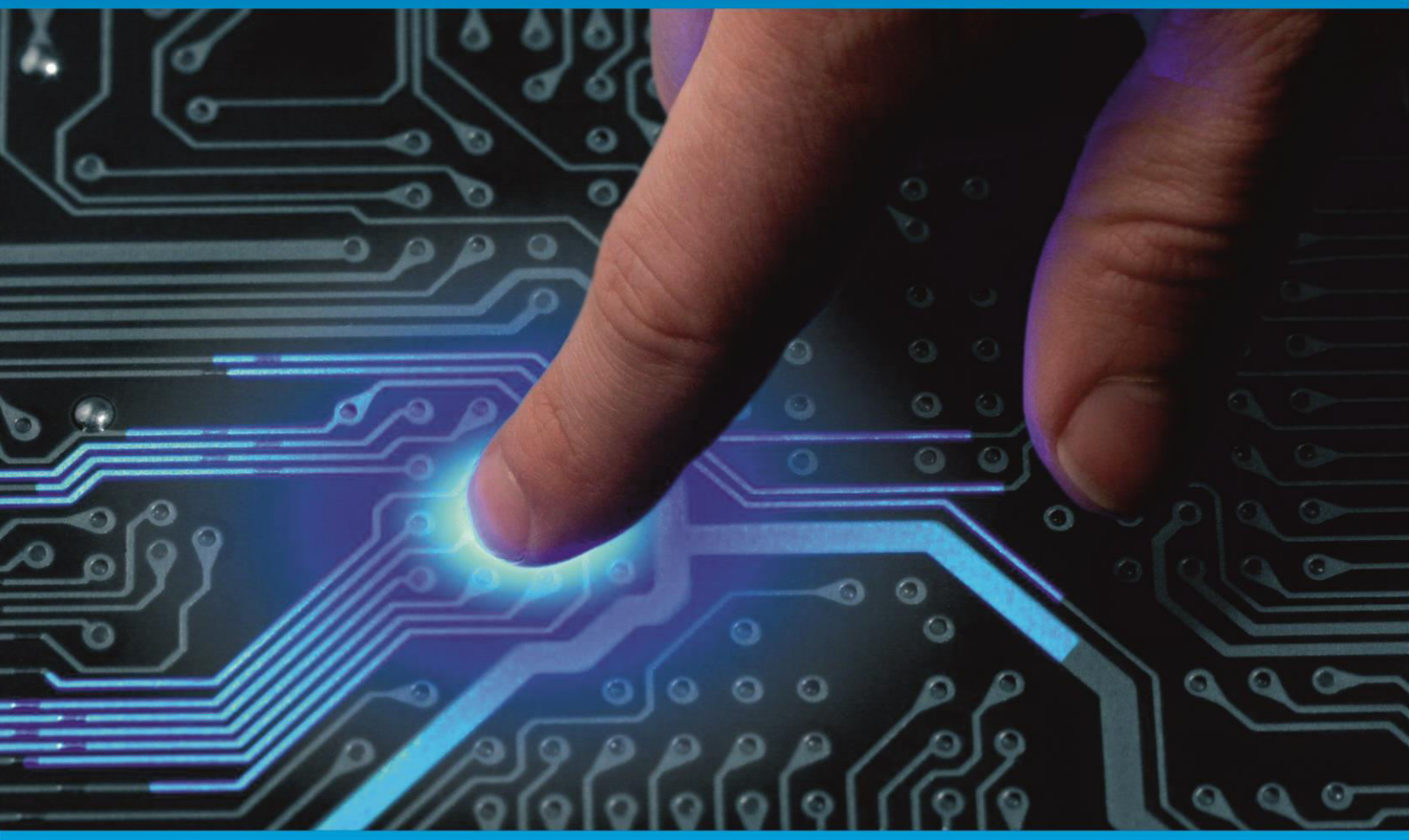

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# Smart Selfie Using Computer Vision

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**ABSTRACT:** Facial expression analysis assumes a critical part in dissecting human feelings. Expression detection is an uncommon assignment in facial expression analysis with different potential applications. Traditional methodologies regularly extricate low-level face descriptors to detect smile and different expressions, for example, neutral, surprise; based on a robust binary classifier. This paper incorporates a detailed audit of various face detection and processing methodologies proposed with their pros and cons. The proposed system aims to separate significant level features by a well-designed model which utilize both recognition and verification signals as oversight to learn expression features, which helps lessen same-expression varieties and develop distinctive expression contrasts.

**KEYWORDS**: Expression Detection; Smart Selfie; Face Detection; Classifier; Recognition

## I. INTRODUCTION

When computer vision began to come to fruition as a field during the 1960s, it aimed to imitate the human visual system and know what computers see computerized image analysis interaction. As computer vision advanced, calculations began to be customized to address only difficulties. They became better at doing the work the more they repeated the task. In today's world, computer vision systems are a technique widely used for image processing algorithms to attempt to perform copying of vision at a human scale. Computer vision is the innovation behind the excellent camera applications that make us look at our best.

Selfies have become a part of the lifestyle for this new generation. They help our confidence and improve how we take a look at ourselves, and we can share it with others. Smart selfie utilizing Computer Vision clicks users' photographs when they put their best self forward while expressing themselves such as smiling or expressing happiness. Commonly, taking a decent group selfie can be tricky; keep everybody's faces in the frame, look at the camera, make good expressions, try not to shake when we pose and hope no one blinks when we finally press the click button. A smart selfie will do that tricky part. It will click the picture once we turn on our webcam, detect facial expressions of all the subjects looking into the camera and save it to our system. Our work is specifically focu sing on an agent interacting with groups of people.

In this proposed system, we have presented a smart selfie model, where we also aim to deploy the model in a responsive software component. Smart selfie Using Computer Vision has not been a much discovered topic. This model will without a doubt lessen human endeavors and along these lines increment the photograph precision while giving the users an incredible selfie experience.

## II. RELATED WORK

Researcher [2] introduced a forward-thinking survey of face detection techniques, including feature-based, appearance-based, and knowledge-based and template matching; this mix of two acclaimed Haar-like Features and Neural Network in a comprehensive framework can diminish the impediments of a classifier. Furthermore, in the paper [4], the researcher incorporates eye blink detection calculations as Haar-like features perform well because of their higher calculation speed contrasted with other techniques. Authors [6] introduced the new face detection algorithm based on the Haar-Like feature in which it contains a weak classifier cascade classifier to determine the child window contains a face macro template, in line with the sub-window template was convicted human face and on the other hand were identified as a non-human face. The real-time emotion recognition system by [10] for recognizing the emotions

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normal, happy, and surprised using face images with CNN architecture and face images with pre-trained models give better performance than the pre-trained models for recognizing the emotions in real-time video. The author proposed a new FER technique dependent on geometric features in [12], in which an SVM classifier is utilized to classify the expressions. Further exploration is required when the face is covered or turned sideways. Likewise, researchers proposed a system in which [15] LBP feature extraction, edge identification, reinforcing of picture attributes are a few points of interest of this proposed technique. The experiment by researchers [19] shows that the system utilizing the Harris corner detector gives a higher recognition exactness contrasted with the system utilizing the FAST corner detector. Further exploration should be performed to locate a superior method to figure the threshold in any case.

## III. PROPOSED SYSTEM

### A. *Design Considerations:*

The proposed method starts with a live video and extracts images at regular intervals. The Haar Cascade face recognition algorithm is then used to detect the face. Each 3x3 kernel moves across the image and performs matrix multiplication with every 3x3 part of the image in Haar-Cascade, enhancing some features while smudging others. Use sliding windows to extract 160,000+ features.

Series of Haar-cascade classifiers will be used. The AdaBoost algorithm will be performed to select the best features among all features we calculated, most of them irrelevant. Adaboost finds the set of best weak haar-cascade classifiers and combines them to produce a robust classifier that will produce good results on unseen data. In this way, it selects the best features from 160,000+ features. By using the selected features, faces will get detected.

Detected face images will get cropped and resize to 350*350. Once the face is identified using the Haar-Cascade algorithm, the features are extracted from the face, such as the mouth and eyes, using the VGG16 model. These features are called bottleneck features. In VGG16, the activation maps just before fully connected layers are called bottleneck features. Facial expressions are defined using a curious ratio computed from the characteristic points of the forehead, eyes, nose, and other essential features. These phrases can clearly be described as fascination, disinterest, happiness, and a person's enthusiasm. Based on these determined characteristics, the proposed algorithm will detect whether people present in the frame are making specific expressions such as joyful, neutral, or shocked. The machine will take photographs if all individuals observed are performing the chosen expressions. These images will be stored in the memory of the computer. Fig. 1 shows the flow of the proposed model.

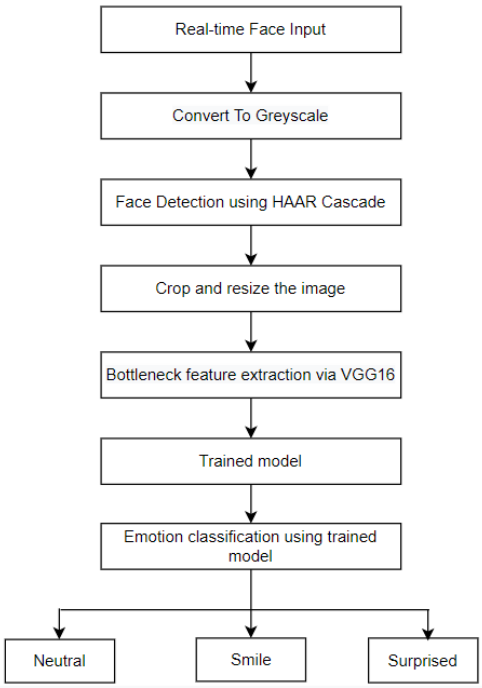


Fig. 1. Flow chart of the proposed system

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B. *Dataset:*

We have used a combined dataset for training our model. We created our dataset by combining three well-known publicly available datasets: Karolinska Directed Emotional Faces(KDEF), Japanese Female Facial Expression(JAFFE), and FacesDB dataset. This dataset contains seven different emotion expressions: happy, neutral, angry, afraid, surprised, sad, and disgusting. KDEF has 4900 pictures of human articulations having size 562*762 pixels. While JAFFE has 213 pictures of 10 Japanese female subjects with 256x256 pixels and FacesDB has pictures of 38 people with size 640*480 pixels. The dataset contains frontal face images and faces with angles having left or right profiles of the face. For training, 70% of the images will be used, and the remaining 30% will be used for testing. Fig. 2 shows some images in the dataset.

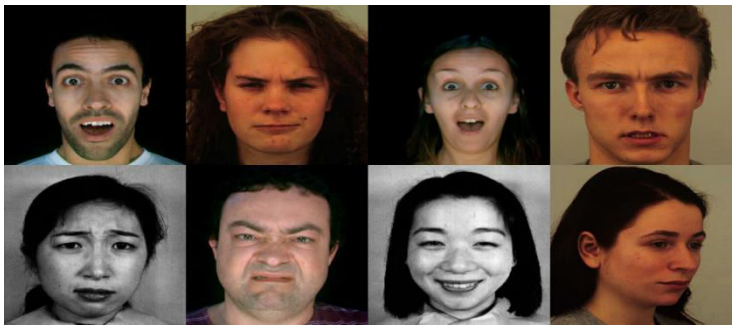

Fig. 2. Some sample images in the KDEF, JAFFE, and FacesDB dataset

## IV. CONCLUSION

The fascinating employment of Computer Vision, from an AI angle, is image recognition, which enables a machine to decipher the info obtained through computer vision and categorize what it "sees". Emotion recognition is undoubtedly challenging yet exciting as broad examinations have just been directed in this field for around recent years. We have proposed a facial expression detection and classification for Smart selfie based on CNN in the proposed model. It will capture the photograph automatically from the input given through the camera. As computer vision keeps improving, later on, we may trust smart cameras to choose an excellent second to capture.

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