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Identification of Criminal and Missing Child Using AI Technique

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Abstract: The artificial intelligence makes significant use of face recognition. In this study, we employ cutting-edge technology to recognize the many faces included in the image. Locating missing children in cities, towns, etc. and tracking down offenders who have escaped from prison. By uploading photos of criminals from the criminal department's database as well as more recent photos of criminals arrested in recent crimes, this project makes it easy for the crime branch to identify offenders. In the proposed research, we will identify faces in photos using machine learning techniques including HAAR (High Altitude Acute Response), facial landmarks, and CNN (Convolution Neural Network algorithm). This algorithm can operate in real time and can recognize faces in photos regardless of their size or position. The user's old image and fresh image are submitted into this system, which then determines whether or not the two images match. This technology will make our society more secure while reducing crime.

I. INTRODUCTION

A subfield of artificial intelligence called machine learning uses statistical models to create predictions. In recent years, AI cameras and camerasurveillance have been used to detect crimes in major cities. The majority of offenders are wise enough to avoid leaving their biometrics behind when committing crimes. But even though we sometimes can't find the suspect's information in the database, we can still find the suspect by using the recorded video. By using the suspect's image from the crime and comparing it to the earlier pictures.

Different algorithm are:

- HAAR Cascade Classifier
- Facial landmark
- CNN

An algorithm that can locate objects in photos is called HAAR cascade. This method can operate in real-time and is not overly complicated. Haar cascade takes the input images from the user and checks whether the face is or not in the image. It removes all the objects in the image except face.

Facial landmark extracts all the features of the face. There are 68 coordinates for face. But these coordinates were randomly distributed for different face features such as eyes, nose, ear, mouth, etc.

A part of machine learning is the CNN (Convolution Neural Network). It is one of several different artificial neural network models that are employedfor diverse purposes and data types. CNN is utilized in this research to forecast whether or not the photos will match.

In previous work for Criminal and Missing Children Identification was done by using machine learning algorithm the aim of this project is to implement using Deep learning to give more accurate result. It helps to crime department to control crimes in our environment. It also helps to identify missing children is one of the kind to rescue children life.
The project is planned in an ensemble approach, by selecting some already established models, and some models of our own, and predicting on all of these models at the same time. All the models make use of different approaches in order to extract several features, which are mostly age invariant, and perform predictions in their own unique way, thus overcoming almost all loopholes which might be encountered while predicting using one single approach. Along with the pre-existing approaches, a different approach is being applied, where only the age invariant the image's characteristics are being extracted before any predictions are made.

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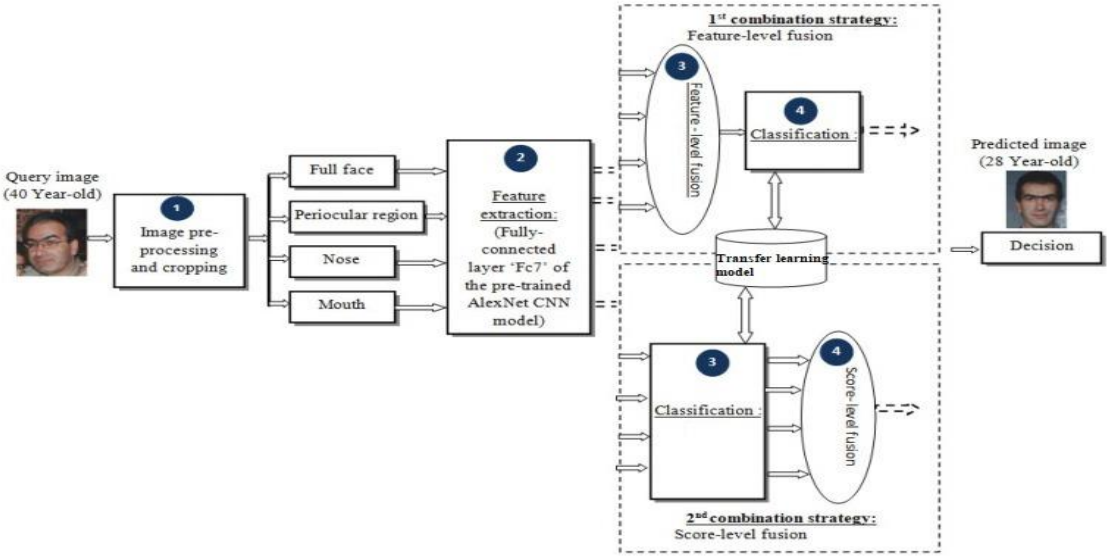


Fig 1. System Architecture

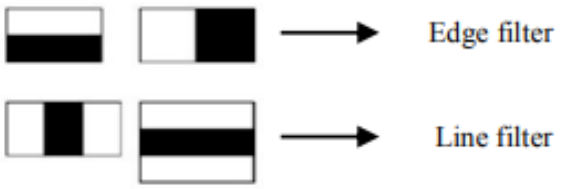
II. PROPOSED MODEL

A. Image Acquisition

The image is captured, scanned and converted into amanageable entity. This process is known as imageacquisition. In this face images are given as input through digital camera and stored in the hard disk. Two images have to be given as input, an old and young photograph of a person.

B. Face Recognition

The Haar Cascade Classifier is used to detect faces.The input images are checked for faces. If faces aredetected, then the faces are cropped and are furtherpassed on to the next process. Else, the user is prompted to input a proper photograph.



$$F(Haar) = \sum F_{White} - \sum F_{Black}$$

Where:

$\sum F_{Black}$ = sum of pixels of the dark area

$\sum F_{White}$ = sum of pixels of the bright area

$F(Haar)$ = the Haar-like feature

Fig 2. Haar filters

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C. Image Pre – processing

The aim of pre-processing is an improvement of the image data that suppresses the unwanted distortions or enhances some image feature. Firstly images are converted into gray scale image, then are resized to a specific shape and perform some filtering operations for image enhancement.

D. Feature Extraction

Any machine learning task relies heavily on feature extraction. It might be viewed as a dimensionality-reduction method where highly important features are taken into account for training. Multiple models are taken into account in this case, so each model-specific feature extraction technique is used.

E. Predictions using Multiple Models

A model would extract features using vgg16 model, and LBP features are extracted from the output of the vgg16 model, and a feature vector isobtained. Then this feature vector from both the images is used for final prediction. Another model include generating image of different age using cyclegan and extracting age invariantfeatures using that generated image, and then applying those features onto the input images anddoing the predictions.

F. Final Predictions

Predictions from different models are obtained. The predictions will be binary classification fromeach model. Once all the predictions are collected, the maximum occurrence of a particular class of prediction “Yes” or “No” will be predicted.

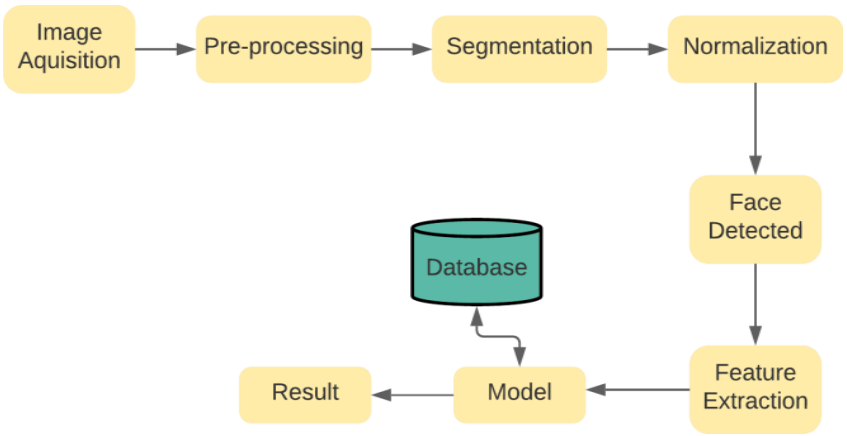

Fig 3. Flow diagram for face recognition

III. RESULT

A variety of photos taken in various fields are usedto test the proposed method. In the experiment, wecompare the same face with several images, suchas childhood photos, blurry photos, and aadhar card photos, to determine the accuracy level. It accepts both old and new photographs from the user as input and uses the Haar cascade, Facial landmark, and CNN algorithm to forecast if the images are matched or not. We give 90% of accurate result.

IV. CONCLUSION

In this work, it compares the various types of images and the accuracy level of results is very satisfiable. It performs well with the images. It requires less memory space to implement and takes less time when compared with other approaches. By using this the criminals and missing children/person can be easily identifiable and it keeps on updating dynamically.

Future Enhancement

The system for facial recognition has done major role in the face recognition but with some limitations of the existing system. Haar cascade currently uses a single-stage classifier to detect objects in an image. By using a multi-stage classifier, it would be possible to increase the precision of the system by using more complex and accurate models at each stage.

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Improved feature selection in Haar cascade relies on Haar characteristics of the thing detection. Combining several methods for extracting features could lead to better performance.

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