

# Novel HAAR Based Approach of Criminal Detection

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**Abstract :** In Today we are living in the world of uncertainty and with the growing changing in the world living conditions, the crime is also increasing at the rapid rate. The manual identification of the criminals using the photo traced from the CCTV, is quite the time consuming task and also error prone. We suggests the automated facial feature examination system for the criminal identification using the HAAR approach for the Facial Feature Examination. We have compared the approach using the base paper, which is based on the LBP (Local Binary Pattern) approach, the deficiency of the base papers like inability of recognising the side face , similarity percentage are improved in the proposed approach. The results which are obtained are quite satisfactory and better than the base approach.

**IndexTerms – HAAR , LBP. Crime Detection.**

## I. INTRODUCTION

Face recognition is an extremely testing errand for the explores. Because of the trouble of the face recognition task, a few methodologies have been utilized.

The for the most part utilized strategies are Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Independent Component Analysis (ICA), Kernel Principal Component Analysis (KPCA), Line Edge Map (LEM) and Locality Preserving Projection (LPP).

Face identification is a significant piece of face review as the initial step of programmed face review.

Eigen faces coefficients to perceive faces. Because of the progressions of lighting condition, appearance, hindrance, revolution, and so on., the human face appearance could change extensively.

Face recognition, both by people and machines, is creating as a functioning exploration territory. So as to all the more likely plan machine based face recognition, it is important to see how people see faces.[1]

The essential job that needs to be done, given still or video pictures, requires the distinguishing proof of at least one people utilizing a database of put away face pictures. To do this the face must be portioned and separated from the scene, where upon it tends to be recognized and coordinated. Face Recognition gets perhaps the most measurement confirmation procedures from the previous not many years. Face recognition is a fascinating and fruitful utilization of test recognition and Image investigation. Face recognition framework has two fundamental undertakings: confirmation and recognizable proof Jigar M. Pandya et al.[3].

Face confirmation implies a 1:1 match that looks at a face pictures against a format face pictures whose personality being proclaim. Face confirmation implies a 1: N issue that separate a question face picture against all picture formats in a face database. [1]

### 1.1 Human and Faces Machine Recognitions

Machine recognition of faces from still and video pictures is emerging as a functioning examination zone crossing a few teaches, for example, picture preparing, test recognition, PC vision and neural systems.[2]

Furthermore, face recognition innovation (FRT) has various business and law requirement applications. These applications go from static coordinating of direct organization photos, for example, international IDs, bank cards, photograph ID's, driver's licenses, and head shots to ongoing coordinating of look at video pictures introducing various constraints as far as preparing prerequisites. In spite of the fact that people appear to perceive faces in disarrange scenes without hardly lifting a finger, machine recognition is a significantly more perturbing errand. A general explanation of the issue can be make as pursues: Given still or video pictures of a segment, distinguish at least one people in the scene utilizing a show database of faces. Accessible promise

data, for example, race, age and sexual orientation might be utilized in narrowing the pursuit. The arrangement of the issue includes division of faces from jumbled scenes, extraction of highlights from the face area, recognizable proof, and coordinating.

The conventional face recognition task in this way presented is a focal issue in issues, for example, electronic line up and perusing through a database of faces. [2]

In the course of recent years broad research has been directed by psychophysicists, neurophysiology, and specialists on different element of face recognition by people and machines. Psychophysicists and neurophysiology have been worried about issues, for example, Uniqueness of faces; regardless of whether face recognition is done comprehensively or by neighborhood include investigation: examination and utilization of outward appearances for recognition: how in certainties see faces: association of memory for faces: powerlessness to precisely perceive: presence of a grandma neuron for face recognition: job of the correct side of the equator of the cerebrum in face observation: and failure to perceive faces because of conditions, for example, face visual deficiency.

A portion of the hypotheses set forward to clarify the watched exploratory outcomes are conflicting. A considerable lot of the theory and hypotheses set forward by looks into in these controls have been founded on rather little arrangements of pictures. All things considered, a few of the discoveries have significant outcome for engineers who structure calculations and frameworks for machine recognition of human faces.

### Essential of Face Recognition

The square chart of a run of the mill face recognition framework can be appeared with the assistance of Figure. The face discovery and face extraction are done at the same time [4] The total procedure of face recognition can be appeared in the Figure 1.



Fig 1 Block Diagram of a Face Recognition System

## II. LITERATURE SURVEY

**Pramila et al [5]** Face Detection with Photo-layout utilizing 3D Face Expressions composite and Recognition. This paper exhibits another thought for identifying an obscure human face in input symbolism and perceiving his/her outward appearance, or face location, utilizing the photograph layout of faces with 3D surface. For this reason two fundamental issues are significant for example face recognition and area of faces. For this we need to require that the heading/side of face or what is the measurement (to such an extent that 2D) of face and their face contact, face extraction's, and outward appearances.

In this procedure utilizing a 3D face, in light of the fact that a 3-D face is spoken to by a low dimensional Shape Space Vector (SSV). Dispatch data about individual's unique face or visual face .Many face recognition frameworks the picture handling it is intriguing to perceive the human sign by watching the diverse development of eyes, mouth, nose and so forth.

For face identification it is additionally significant that a novel face photograph layout composite and recognition strategy utilizing a multistage Markove Random Field (MRF) model. For this framework three parts are significant i.e.1) given face photograph 2) face plot drawing 3) scanning for face photograph in the database dependent on an inquiry diagram drawn by a craftsman.

**Bruin et al. [6]** proposed a method which is utilized to decide the bunching of hoodlums dependent on the criminal professions. The criminal profile per offense each year is removed from the information base and a profile distance is determined. From that point forward, the distance lattice in profile each year is made. The distance lattice including the recurrence esteem is made to frame bunches by utilizing credulous grouping calculation. They made a criminal profile which is set up in a method of addressing the wrongdoing profile of a wrongdoer for a solitary year. With this data, the huge gathering of crooks is handily broke down and they anticipated the future conduct of individual suspects. It will be helpful for building up the unmistakable picture on various existing sorts of criminal professions. They tried the instrument on genuine Dutch National Criminal Record Database for separating the components for distinguishing the lawbreakers vocations of an individual.

**Kiani et al. [7]** played out a wrongdoing investigation work dependent on the bunching and arrangement procedures. Their work incorporates the extraction of wrongdoing designs by wrongdoing examination dependent on accessible criminal data, forecast of violations dependent on the spatial dispersion of existing information and wrongdoing recognition. They proposed a model in which the examination and forecast of wrongdoings are done through the streamlining of anomaly recognition administrator boundaries which is performed through the Genetic Algorithm. The highlights are weighted in this model and the low-esteem highlights were erased through choosing an appropriate limit. After which the groups are bunched by the k-implies bunching calculation for characterization of wrongdoing dataset.

**Satyadevan et al. [8]** has accomplished a work which will show high likelihood for wrongdoing event and can imagine wrongdoing inclined regions. Rather than simply zeroing in on the wrongdoing events, they are zeroing in mostly on the wrongdoing elements of every day. They utilized the Naïve Bayes, Logistic Regression and SVM classifiers for characterization of wrongdoing examples and wrongdoing components of every day. Their strategy comprises of an example recognizable proof stage which can distinguish the patterns and examples in wrongdoing utilizing the Apriori Algorithm. The expectation of wrongdoing spots is finished with the assistance of Decision Tree calculation which will distinguish the wrongdoing potential zones and their examples.

**Chakka Mounica1 and Venugopal [9]** this paper adopts the Local Binary Pattern Histogram (LBPH). This cascade classifier is then using in the process of the face detection and also in the process of the face recognition which is then carried out in the following of the three stages, the feature extraction, the matching and classification.

### III. PROPOSED WORK

#### 3.1 Algorithm 1: Database Formation of Proposed Approach

Step 1: Read the Criminal Details.

Step 2: Select the Photo of Criminal

Step 3: Perform the Face extraction process using the HAAR Cascade Facial Feature Approach.

Step 4: If Face Detected then:

Save the Record in CRDATAPROP table .

Else:

Error No Face Detected

[End of If Structure]

Step 5: End

#### 3.2 Algorithm 2: Criminal Analysis using the proposed Approach

Step 1: Input the Suspect Photo.

Step 2: Perform the Face extraction process using the HAAR Cascade Facial Feature Approach.

Step 3: If Face Detected then:

- i. Search record in CRDATAPROP table .
- ii. Perform the similarity match
- iii. Show the Best match similarity percentage

Else:

Error No Face Detected

[End of If Structure]

Step 4: End

#### IV. IMPLEMENTATION

This is the main menu page, which will appear after the successful login and it contains the options which we will require for the project navigation purpose.

These options which are used for performing the operations which are related to the base as well as proposed operations.



Fig 2 Main Menu

#### 4.1 Criminal Record Addition: Base Approach

In this section, we have added the page or form for the record addition of the criminal using the base approach, which is using the LBP Cascade classifier for the face detection. In this, the details of the criminal are stored in the crdatabase table, which structure is shown in the previous chapter.



Fig 2 Criminal Record Addition Base LBP Approach

#### 4.2 Criminal Record Addition: Proposed Approach

In this section, we have added the page or form for the record addition of the criminal using the base approach, which is using the HAAR Cascade classifier using the feature extraction approach for the face detection. In this, the details of the criminal are stored in the crdataprop table, which structure is shown in the previous chapter.

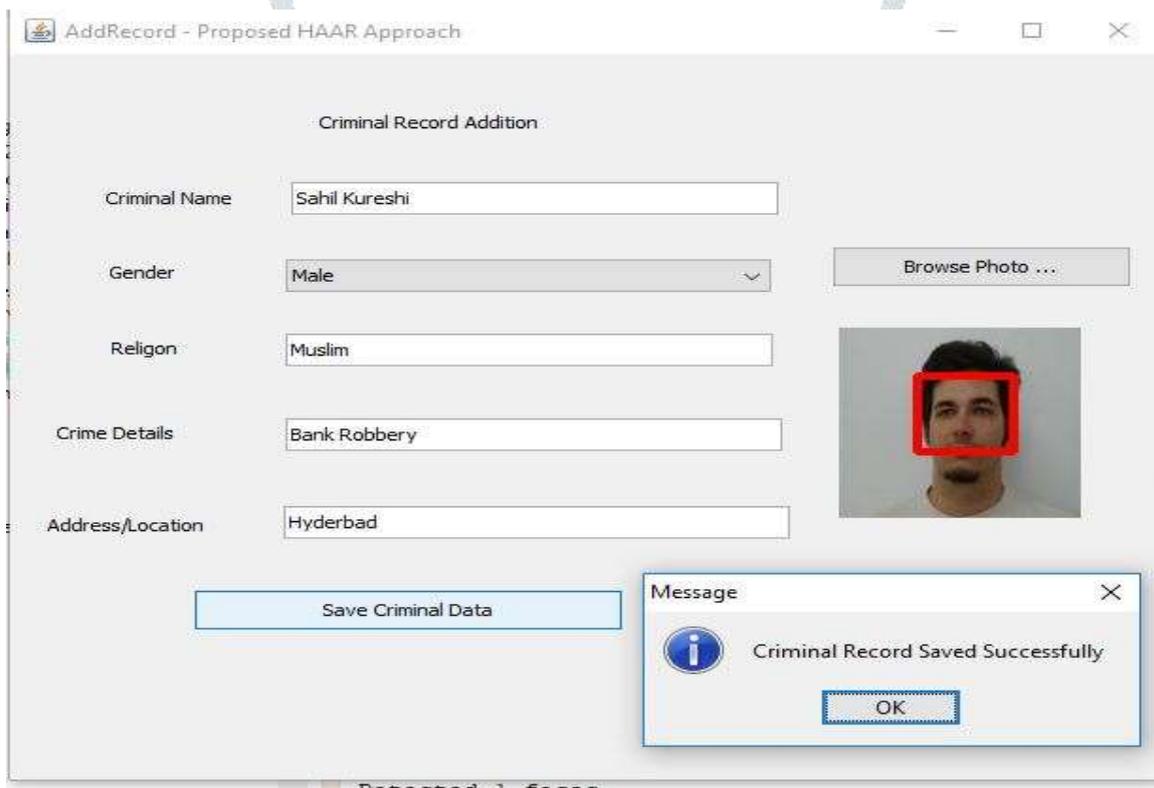


Fig 3 Criminal Record Addition Proposed HAAR Feature Extraction Approach

## V. RESULTS AND DISCUSSION

In this section, we will compare the performance evaluation of both the base as well as the proposed approach.

### CASE – I: SIMILARITY COMPARISON

In this, we have performed the similarity comparison of the criminal using the base as well as the proposed approach.



Fig.4 Suspect for Case I

In the case I, first we have performed the base approach, LBP based analysis in this we have received the following result as shown in the fig 5.

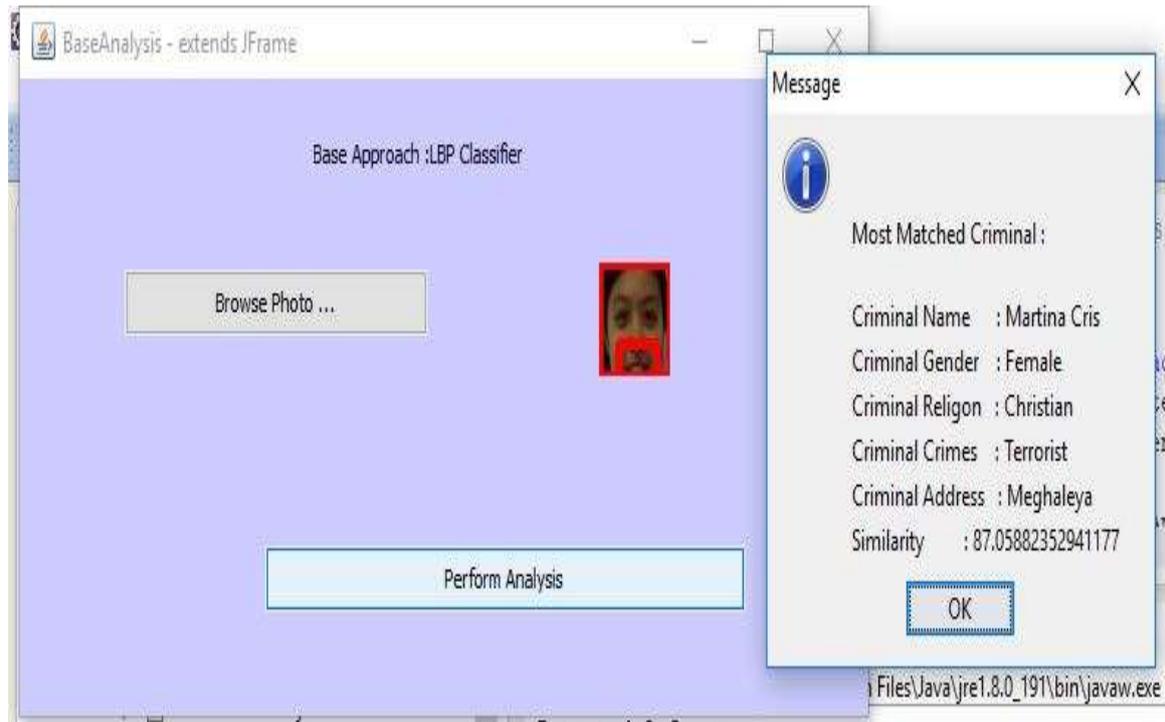


Fig 5 Result for Case I according to Base LBP Approach

The Similarity maximum for the suspect achieved using the Base LBP approach is 87.05 and the error in the face detection approach as it **detects 2 faces**.

In the case I, now we have performed the proposed approach, HAAR Cascade Feature based analysis in this we have received the following result as shown in the fig 6.

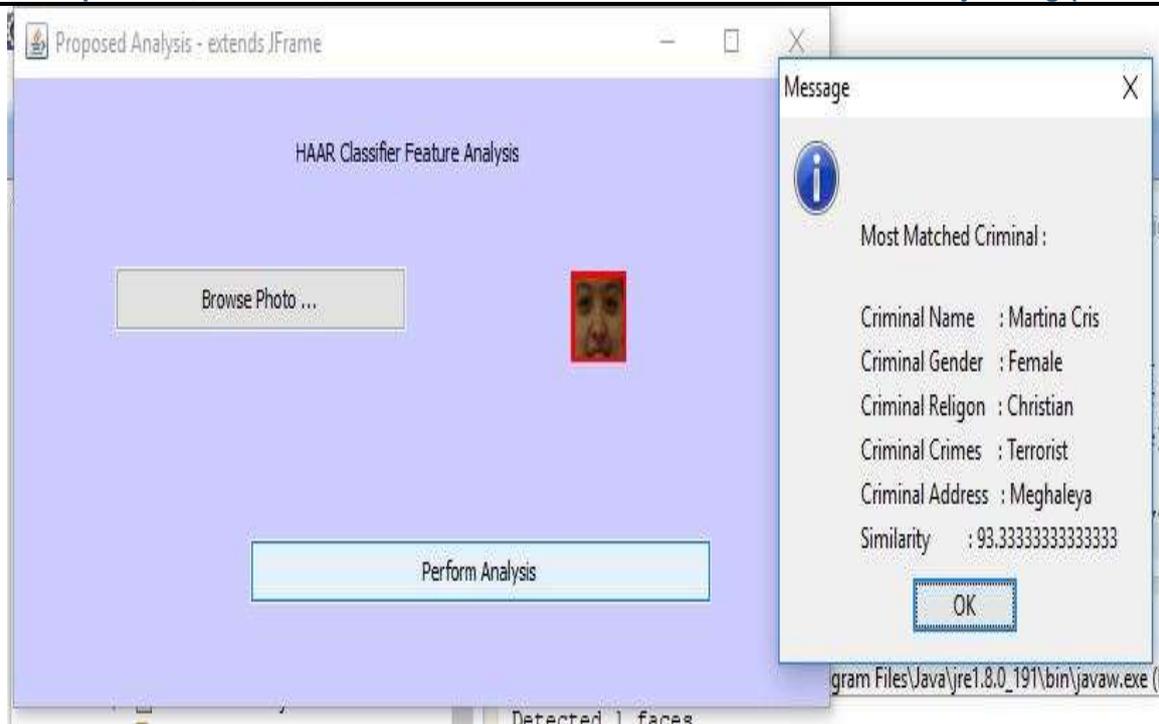


Fig 6 Result for Case I according to Proposed HAAR Feature Based Approach

The Similarity maximum for the suspect achieved using the proposed HAAR Feature Based approach is 93.33 and face detection approach work correctly as it **detects 1 face**.

**Table 1 Similarity Comparison**

	Base	Proposed
Similarity Match	87.05	93.33

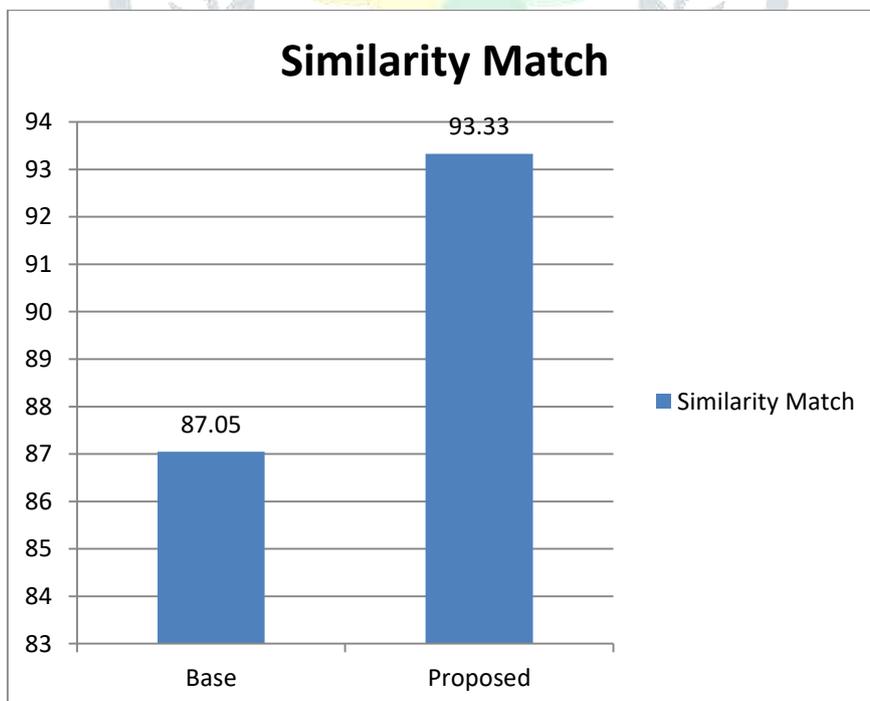


Fig 7 Similarity Gaps

## CASE – II: IDENTIFICATION MISMATCH IN BASE

In this we have performed the identity comparison of the criminal using the base as well as the proposed approach.



Fig 8 Suspect for Case II

In the case II, first we have performed the base approach, LBP analysis in this we have received the following result as shown in the fig 9.

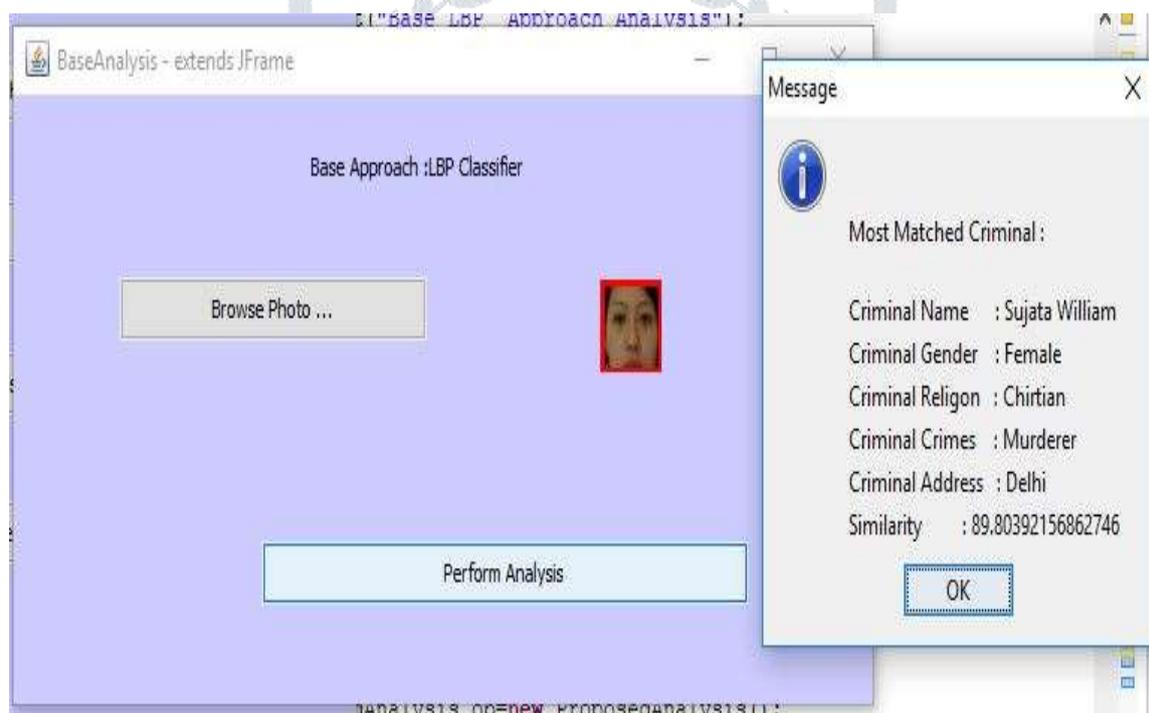


Fig 9. Result for Case II according to Base LBP Approach

The mismatch with the database and incorrect criminal is matched with the greater similarity.

In the case II, now we have performed the base approach, HAAR Cascade Feature based analysis in this we have received the following result as shown in the fig 10.

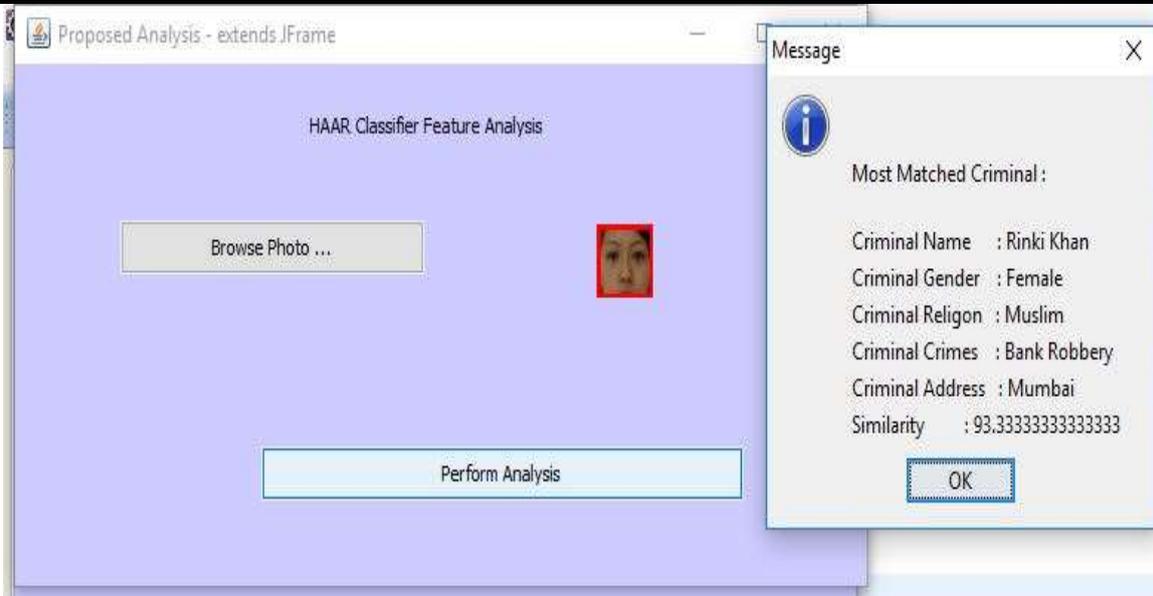


Fig 10 Result for Case II according to Proposed HAAR Feature Based Approach

According to this approach we detected the face correctly.

**CASE – II: DETECTION FAILED IN BASE**

In this we have performed the identity comparison of the criminal using the base as well as the proposed approach.



Fig 11 Suspect for Case III

In the case III, first we have performed the base approach, LBP analysis in this we have received the following result as shown in the fig 4.19.

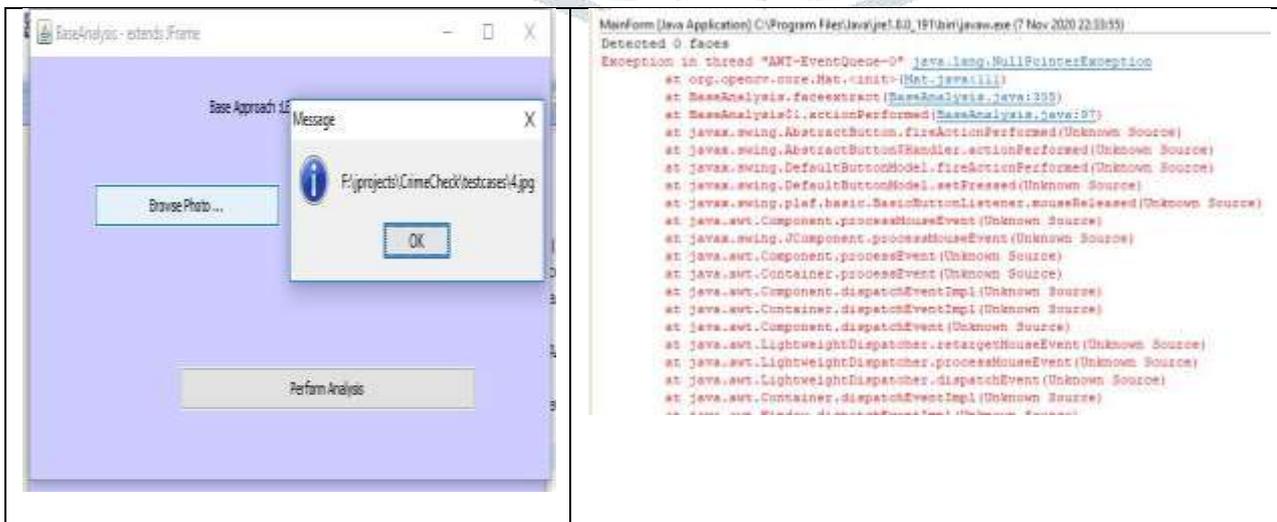


Fig 12 Result for Case III according to Base LBP Approach

Error in the face detection , the approach failed by giving the error in the face detection process.

In the case III, now we have performed the base approach, HAAR Cascade Feature based analysis in this we have received the following result as shown in the fig 20.

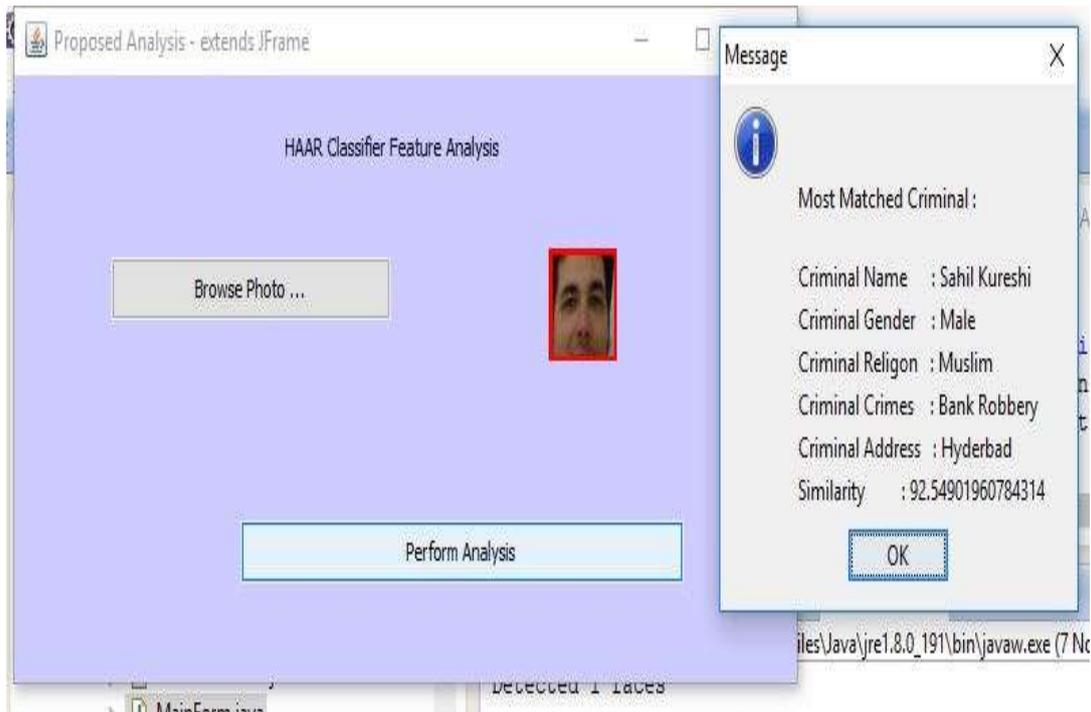


Fig 13 Result for Case III according to Proposed HAAR Feature Based Approach

## V. ACKNOWLEDGMENT

The documentation is at long last arranged to be alluded as client manual for further successful consequences of this product arrangement. Presently the undertaking is finished and prepared to submit to the leader of the division of the school for further procedure.

From the above proposed procedures, it is reasoned that HAAR approach is greatly improved when contrasted with others methods in mistake happening conditions like lighting conditions, present varieties, outward appearance. Our proposed HAAR is precise in each condition and accomplishing 96% exactness which is a lot higher than different methods.

The methodology displayed in this work utilizes picture divide calculation in which information picture is checked at pretty much every pixel area and scale, to improve the exhibition of the identifier alongside the fuse effectiveness. In this, we have ordered picture handling activities into three classifications, low, medium and elevated level. The methodology introduced in this work utilizes picture partition calculation in which info picture is filtered at pretty much every pixel area and scale, to improve the exhibition of the finder alongside the consolidate proficiency. In this, we have arranged picture preparing tasks into three classifications, low, medium and undeniable level.

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