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RESEARCH ARTICLE

SMART SURVEILLANCE SYSTEM FOR FACE RECOGNITION

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Abstract— Smart surveillance system refers to video level processing techniques for identification of unwanted (terrorist) faces from real time video. Video object segmentation is an important part of real time surveillance system. For any video segmentation algorithm to be suitable in real time, must require less computational load. The work presented here is divided into two main parts: (1) Face Detection, (2) Matching of detected faces with the unwanted faces (terrorist). To detect a face from video frame we use CAM shift algorithm that gives us sub faces, which can be used by Sift technique for feature extraction and matching with the faces of unwanted person (terrorist). Further for identifying object as a face from the video of a stationary camera, there are different face detection techniques. Once the face detection in video frame is done then the feature extraction and matching to be done. When face matches with any of unwanted face then the system raise the alarm, so that at sensitive areas like airport, railway station, tourist place etc the security guard or other person get alert tone, thus they can take necessary action and make system secure. Many developed and developing country are using smart surveillance system for viewing the unwanted faces remotely.

Keywords— Smart Surveillance System, Face detection and recognition, CAM shift, Feature Extraction

I. INTRODUCTION

Nowadays, the use of closed-circuit television (CCTV) has increased to secure the premises with the decrease in installation and video storage cost. The excess of terror and crime makes the selective access to place a major concern for many organizations. Conventional methods e.g. password and smart card are unauthentic and fallible. Comparably, face recognition is a reliable and an intelligent biometric identification method. Automatic face recognition has been a challenging task for the research community. It has been

extensively adopted by the applications including biometrics, surveillance, security identification, and authentication. Face recognition usually exploit high-dimensional information which makes it computationally intensive. In addition, wrong detected features can make the recognition process even slower [1]. Thus, the interest in robust face recognition techniques to determine whether two facial images belong to same person is increasing rapidly.

Security being popular domain of face recognition, allows us to mount a CCTV camera on fixed position and have a controlled flow of people, thus restricting pose and illumination. Although this reduces the complexity of face recognition, there is still a concern regarding the real time protection of sensitive portion. It should be noted that this problem is somewhat a hard task and can be solved by automatically shooting the unauthorized person attempting to trespass the sensitive area.

Feature observation frameworks have long been being used to screen security touchy areas. The history of feature reconnaissance comprises of three eras of frameworks (era observation frameworks) which are called 1GSS, 2GSS and 3GSS. [2]

II. LITERATURE SURVEY

This chapter covers the studies and work related to the topic. A lot of work has been carried on object detection, tracking and calibration of cameras. A Smart Surveillance System makes utilization of programmed picture understanding method to concentrate data from the observation information. Pictures are recognized as a standout amongst the most essential medium of passing on data. A vital part of machine taking in is to comprehend the picture and to concentrate data out of it. To comprehend a picture the first step is to portion it and discover distinctive questions in it. Although division is recognized to be one of the essential steps in article detection, it is additionally acknowledged to be a standout amongst the most prominent issues in workstation vision. B & Yung in his audit of past related studies, ordered these procedures into taking after: threshold methodologies, shape based methodologies, district based methodologies, grouping based methodologies and other streamlining based methodologies utilizing a Bayesian framework, neural systems. A couple of division systems for article recognition have been examined underneath. [5].

- (1) **Video Surveillance System**
- (2) **Color Image Segmentation**
- (3) **Moving Object Detection**
- (4) **Face Detection**
- (5) **Feature Extraction**
- (6) **Face recognition**

III. PROPOSED METHODOLOGY

Currently, in Smart Surveillance System, the stationary cameras are just recording a video, and store it in their database. These stored videos are later on viewed if necessary or to be checked that who has done any malfunction. Thus we later on come to know who has done such malfunction activity. Therefore we need a Surveillance system in which on detecting any of such person's face, it should give us a signal or raise an alarm.

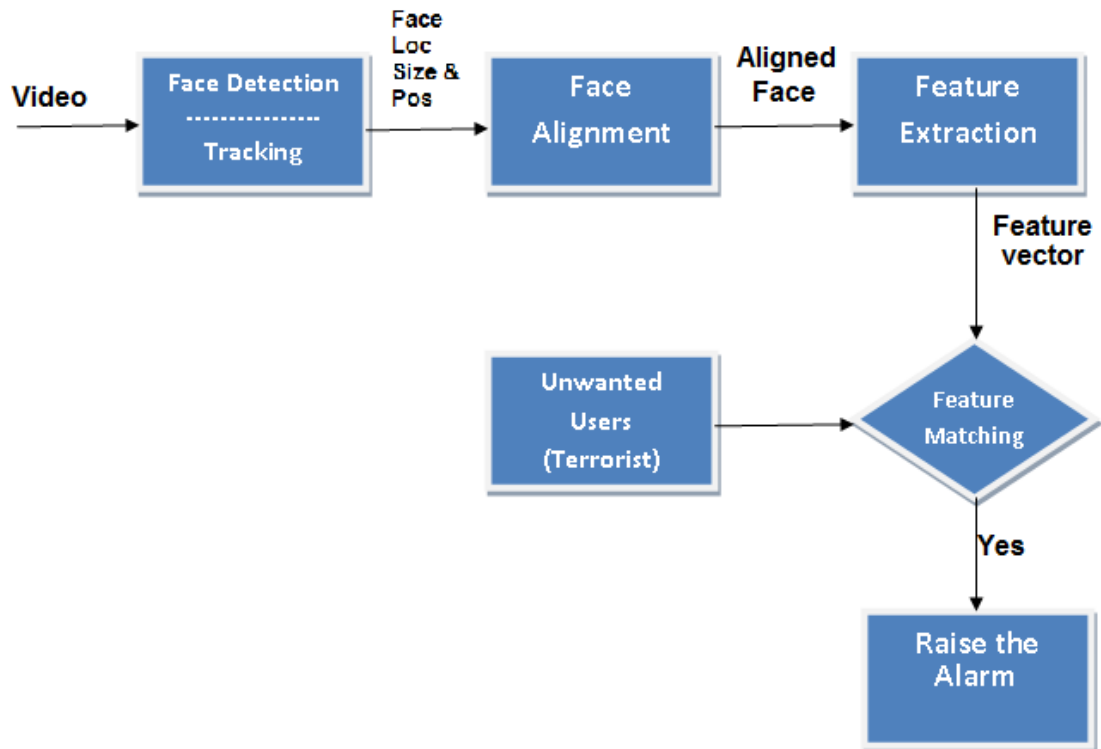


Figure 1: Data Flow of the Proposal

In order to develop a Smart Surveillance System, first we consider that a stationary camera is capturing video and that video is further processed. This process takes video as input and generate the different frames. Each frame may contain multiple faces. Each face's location, size and position is different, therefore the face alignment process is to be done. After face alignment the sub faces are matched by a feature extraction or matching technique with already build dataset of unwanted users or Terrorist. If any of the face is matched with the unwanted user or Terrorist then alarm is raised. Only terrorist faces to be matched, in case of other person, no alarm should raise and further process with new frames to be processed.

A. CAM SHIFT

Cam shift is called Continuously Adaptive Mean Shift focused around the mean movement Calculation [2]. Cam shift utilizes the Hue channel to follow objects subsequent to by utilizing the Hue channel focused around HSV shade model, objects with distinctive colours might be perceived. In view of the colour data, Cam shift tracks questions speedier and devours generally little CPU assets. More level registering asset necessity empowers Cam shift to turn into a one of constant face following calculations.

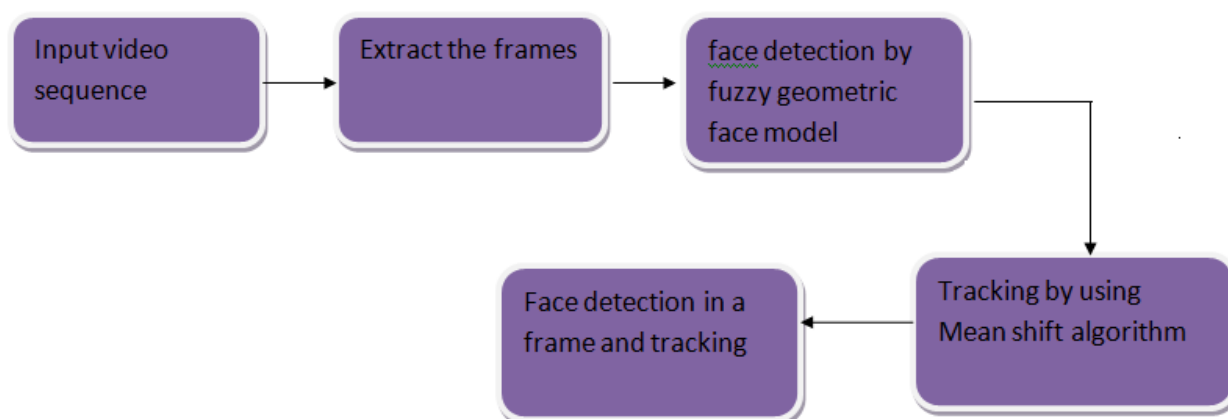


Figure 2: Block diagram of the proposed approach

IV. CONCLUSION

We have developed a Smart Surveillance System, where a camera is stationary and continuously recording a video, this video processed further for frame generation, face localization, positioning, aligning, generating sub faces and then extracting features to match with the unwanted faces using any feature matching technique. If any faces from the database of unwanted person, matches then the system raise an alarm and for non-matching faces there is no action. This raised alarm alerts to the security person that an unwanted parson is in range or entering the system. We can use these systems at any sensitive places like Airport, shopping mall, railway station, any tourist place etc.

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