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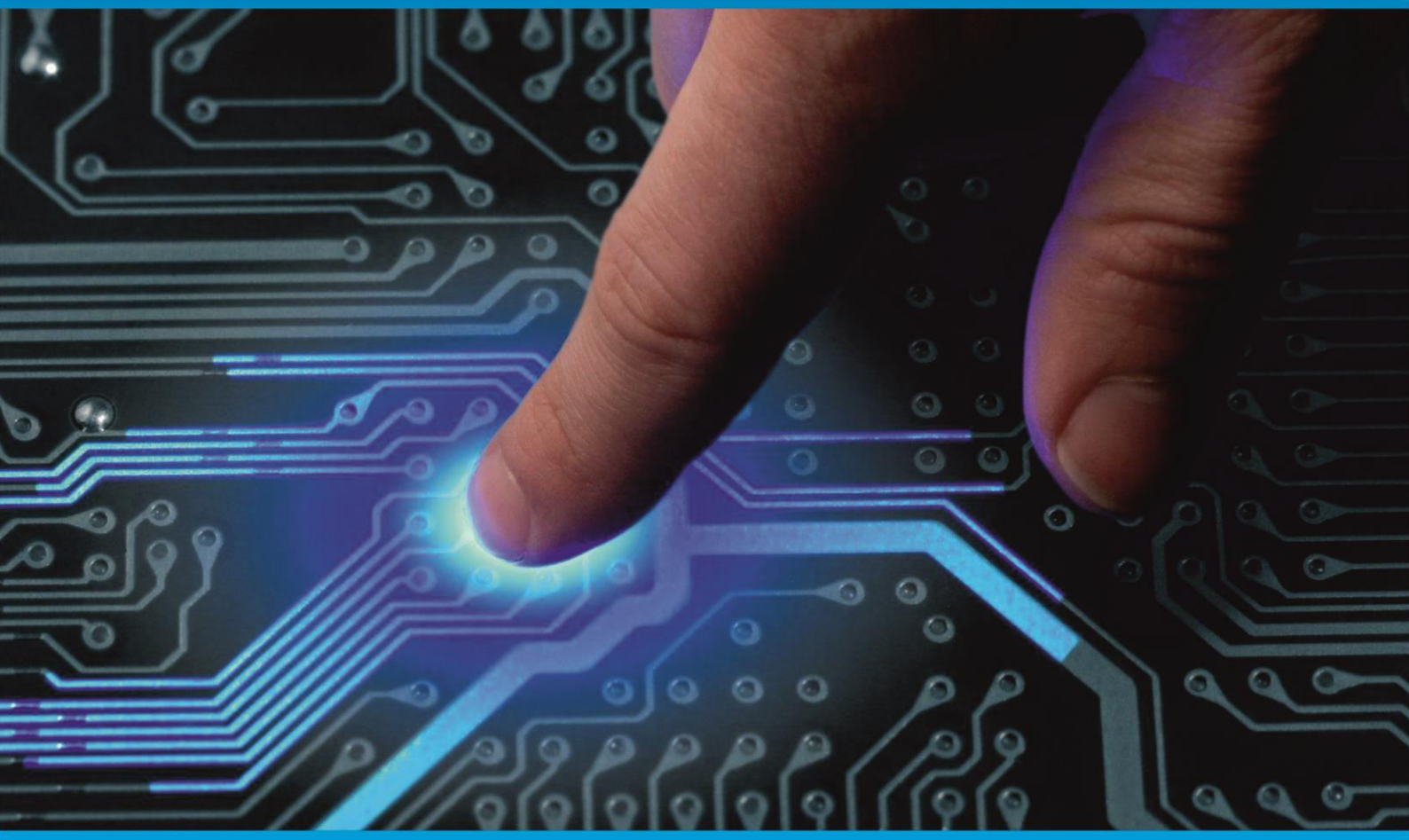

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Detection of Anomalous Behaviour in an Examination Hall towards Automated Proctoring

Karthick R, Shivasakthi S, Venkat Kishore A, Mr. Ezra Vethamani

UG Student, Department of Computer Science and Engineering, Velammal Institute of Technology, Chennai, Tamil Nadu, India

Department of Computer Science and Engineering, Velammal Institute of Technology, Chennai, Tamil Nadu, India

ABSTRACT: Surveillance is the monitoring of behavior. Systems surveillance is the process of monitoring the behavior of people, objects or processes within systems for conformity to expected or desired norms in trusted systems for security or social control. The surveillance system exercised in the examination hall is the physical or virtual presence ofproctor. The greatest impact of computer-enabled surveillance is the large number of organizations involved in surveillance operations. Computer vision is a field of artificial intelligence that trains computers to interpret and understand the visual world. This projectproposes a workflow for the automatic detection of anomalous behavior in an examination hall, towards the automated proctoring using head pose estimation techniques. Anomalies behavior patterns that are relatively different. While not every anomalous behavior may be cause for suspicion, the system is designed to detect typical patterns for actions of concernsuch as discussions during an exam or the turning around or the passing of notes, etc. As of online examination, the examinee head position is monitored. This type of surveillance is automated using deep learning model trained with the landmark features collected from the head orientation dataset. Also proctor decision of validating the user is automated using face recognition model. While there may be false positives, the system is intended as a decision support system to facilitate automatic proctoring of tests and deters malpractice.

KEYWORDS: SystemSurveilace, Security, Deep Learning, Machine Learning, Preprocessing.

I. INTRODUCTION

The main aim of this project is to provide a reliable and secure online exam platform which uses machine learning to avoid the errors in classical proctoring methods (in-person) and reduce malpractice behaviour by tracking the head position of the examinee using a trained deep learning neural network.

The main purpose of automated proctoring is to maintain the dignity of the online examination portal.In this project, the dedicated processes carried out by the proctor is automated using computer vision.Using primitive techniques to validate the examinee with the help of respective identification card presented by the examinee and physical or virtual presence of proctor is needed to monitor the eye, head position of the examinee for identifying the examinee is indulging in any malpractice behaviour.To overcome all these challenges in the present proctoring system, computer vision is enabled in the system that uses face recognition and head movement tracking to validate and monitor the examinee.

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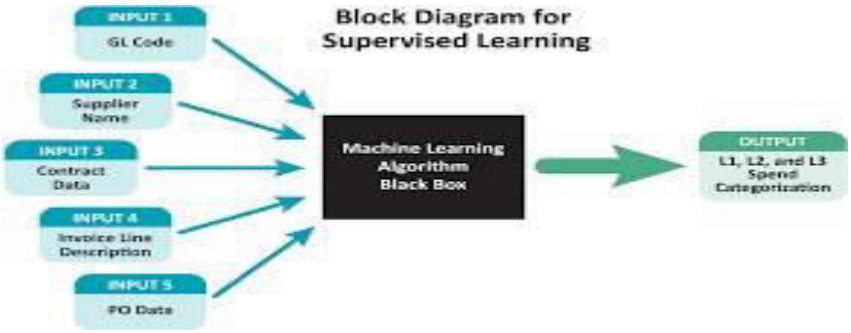

Figure 1 SUPERVISED LEARNING

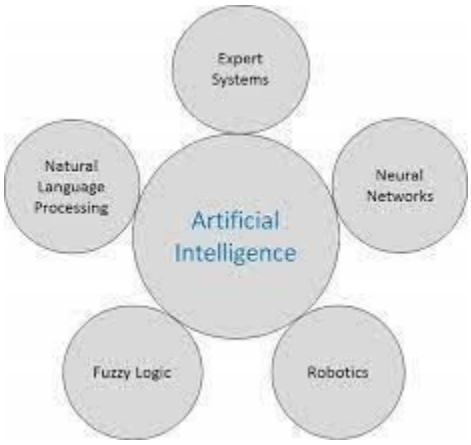

Figure 2 AI

II. LITERATURE SURVEY

In 2016,AnjanaGosain published a paper about "Performance Analysis of Various Fuzzy clustering" which describes about Fuzz+y clustering is a useful clustering technique which partitions the data set in fuzzy partitions and this technique is applicable in many technical applications like crime hot spot detection, tissue differentiation in medical images, software quality prediction etc.

In 2018,Jérôme Thevenot, Miguel Bordallo López, and Abdenour Hadid published a paper about "A Hybrid Algorithm of Otsu and Adaptive Region for Image Segmentation" which describes about, The traditional Region Growing (RG) algorithm is a semi-automatic image segmentation algorithm that requires manual selection of seed points, manual setting of thresholds, which may cause the cavity and over-segmentation while deals with the uneven and undivided image for noise and grayscale. Therefore, the classical Otsu method is adopted to find the optimal threshold in HSV space to obtain the initial binarized segmentation image. Then, the Adaptive Region Growing (ARG) algorithm is applied to find the image edge. To be specific, the initial seed point is confirmed automatically through histogram firstly. Secondly, the threshold of growth condition is determined according to the average similarity of image. Finally, the image is grown into the contour edges. This image is mixed together with the initial Otsu segmentation image can obtain the final processed image. Experimental results show that the proposed algorithm has strong anti-interference, which can effectively reduce the mis-segmentation rate.

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III. EXISTING SYSTEM

In a surveillance system like an examination hall, the physical presence of the proctor is mandatory. The proctor validates the examinee writing the examination and monitors the conduct of the examination hall.To automate this process, there are several computer vision techniques ,face detection methods and classification algorithms. Exams results are the crucial judging parameters in many life changing scenarios like college admission, ranking, scholarship and justice to deserved candidates. The best algorithm should be implemented to support the proctoring processes and examinee. Face detection must be accurate, to avoid any indherence to the examinee during examination.

IV. PROPOSED SYSTEM

The proposed systemcarries out face recognition using feature vector and encodings using histogram oriented gradients technique to detect faces, and support vector machines to train the positive data set and negative data set.The head tracking is completely implemented by calculating the yaw, roll and pitch of the examinee with the help of neural network model.

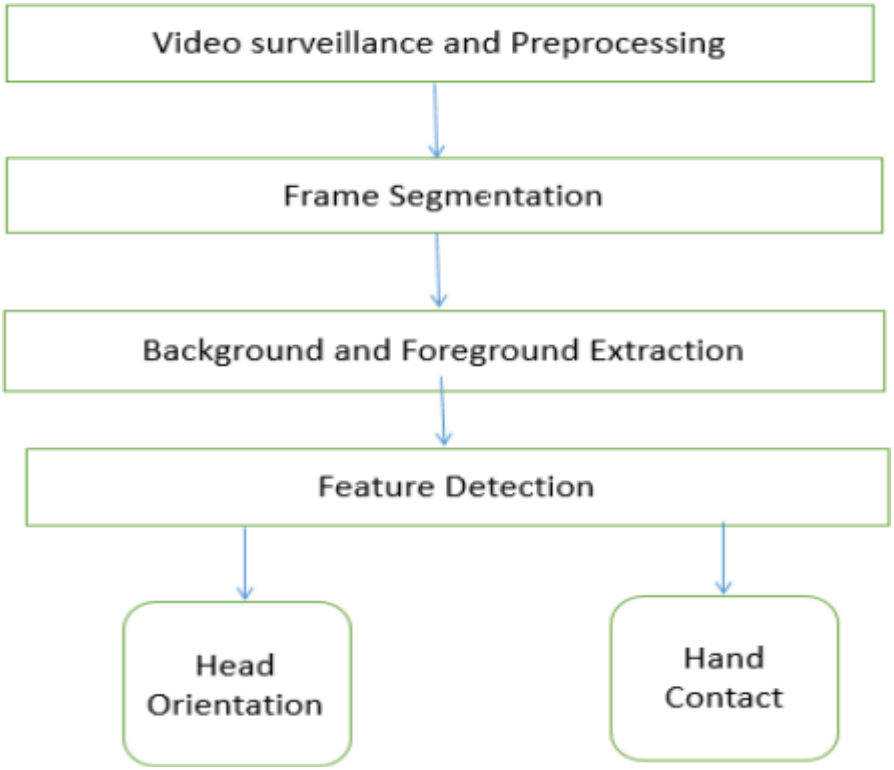

Figure 3 BLOCK DIAGRAM

V. MODULES

FACE RECOGNITION:

Face recognition is a method of identifying or verifying the identity of an individuals using their face. There are various algorithms that can do face recognition but their accuracy might vary.

Face Detection: The very first task to perform is detecting faces in the image or video stream.

Feature Extraction: A neural network takes an image of the person's face as inputand outputs a vector which represents the most important features of face.

While training the neural network, the network learns to output similar vectors for faces that look similar.

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HEAD POSITION TRACKING

In order to allow high-resolution images of the people in the scene to be acquired it is reasonable to assume that such people move about in the scene. To monitor the scene reliably it is essential that the processing time per frame be as low as possible. Hence it is important that the techniques which are employed are as simple and as efficient as possible. For that reason the well known technique of background subtraction [2, 3, 5] was selected for this application. • Background subtraction allows moving objects to be detected by taking the • point-by-point absolute difference of the current image and a background image which must be acquired when there are no moving objects in the scene (See equation Movingt(i; j) = |Imaget(i; j) - Background(i; j)|

Such a mechanism is impractical for the surveillance system described in this paper as it may not be possible to obtain a background image with no moving objects, and more importantly the background of the scene may change due to lighting conditions or `stationary' objects being moved (e.g. a gate being opened and then left open). As Bartolini et al. point out, algorithms based on direct grey-level comparison are not robust enough against sudden lighting changes". It is possible though to overcome these problems by using a dynamic background together with normalized cross correlation to evaluate any changes. The dynamic background is initialized with the first image acquired (whether or not that image contains any moving objects), and is updated if a point changes and remains changed for a number of frames.

Head orientation of the students are detected using the Principal Component Analysis along with the Haar-cascade algorithm, the head movement is based on the threshold, the main aim of this process is to detected suspicious activities by detecting the movement of head based on the threshold.The detection of hand contact is positive as compare to the head movement detection, in this overlapping grid is detected outside own body grid. Since the face of a person is a 3D object, it can rotate over all three axis — but with some limitations, of course. In a face pose estimation problem, we call these movements as roll, pitch, and yaw, better visualized in the figure below.

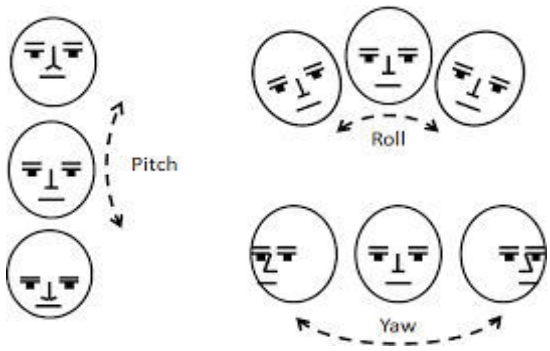

Figure 4 PITCH ROLL YAW MOVEMENTS

VI. RESULT

In order to allow high-resolution images of the people in the scene to be acquired it is reasonable to assume that such people move about in the scene. To monitor the scene reliably it is essential that the processing time per frame be as low as possible. Hence it is important that the techniques which are employed are as simple and as efficient as possible

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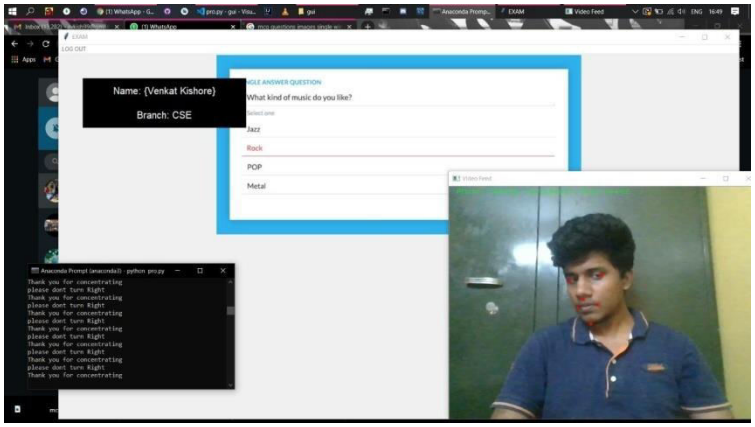

Figure 5: Tracking Head Movement

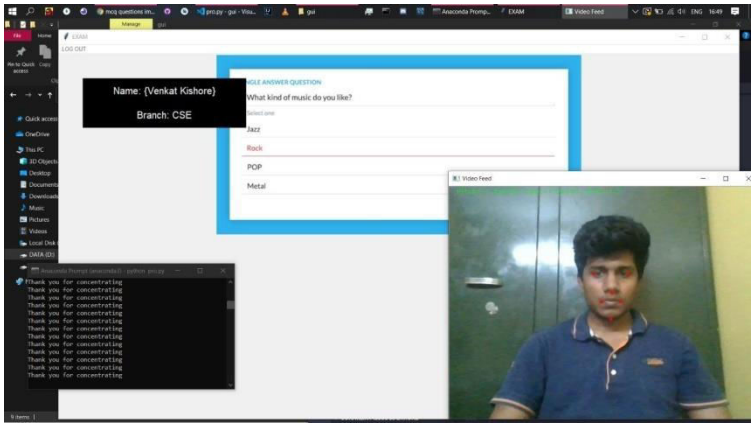

Figure 6: Face Detection

VII. CONCLUSION

The automated proctor system is a big help in the current situation of online examination. This system helps to reduce human errors during proctoring.This workflow for the automatic detection of anomalous behavior in an examination hall, towards the automated proctoring of tests in classes. Certain assumptions about normal behavior in the context of proctoring exams are made. Anomalies are behavior patterns that are relatively (and significantly) different. While not every anomalous behavior may be cause for suspicion, the system is designed to detect typical patterns for actions of concern such as discussions during an exam or the turning around or the passing of notes, etc.This can help the staff predict if the student is exercising any malpractice behavior

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