A Synopsis on

ML Based Student Activity Monitoring System for an Educational Institute

Submitted in partial fulfillment of the requirements
of the degree of

Bachelor of Engineering

in

Information Technology

by

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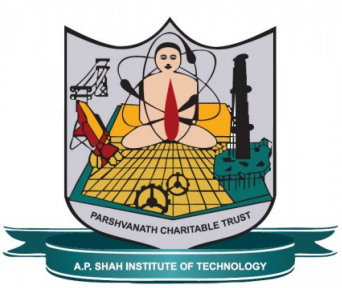

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CERTIFICATE

This is to certify that the project Synopsis entitled ***"Activity Monitoring System"*** Submitted by ***"Loveritu Itnare, Simran Choudhary, Janhavi Kulkarni"*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology*** to the University of Mumbai,is a bonafide work carried out during academic year 2022-2023

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Abstract

Humans have always been identified by visual methods and obtain observable facts through our eyes. These statistics are diagnosed by our mind as ground rules. The device must detect among statistics which ideas represent specific information, and large-scale facial recognition includes technologies relevant to building facial recognition machines . Using this technique of facial recognition for retrieving information related to an individual ,we came up with a solution to the problem faced by many educational institutions. Student tend to break/neglect rules and regulations given by the institute. To avoid such violation of rules we are building a system in which we will store image data of students along with other details. Identified student image will be captured and with the help of machine learning algorithm like SVM, PCA,KNN image identification will be done and related student information will be fetched Also fetched information will be used to notify authorities. For those who are out of discipline and ignorant towards the rules of the college and surrounding premises this system will be beneficial.This image will collate with the images in the database and result will be displayed after scanning on the web page.This system will act as disciplinary tool for maintaining discipline in college.

Introduction

The human face is a compelling aspect of communication and human computer interaction.Image Processing is a method to convert an image into digital form and perform some operation on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Usually image processing system includes treating images as two dimensional signals while applying already set signal processing methods to them Convolutional neural network is a feed forward neural network with deep structure composed of many layers which can seprate required data from a huge data set. Face recognition makes work unchallenging and firm in several fields like identification verification, security services, retail shops, surveillance structures, leisure enterprise, etc.

The Acknowledgment of a human face is a functioning problem for validation purpose explicitly.Students are not wearing identity card and are practicing mischievous activities in college campus.Students skip lectures and roam in the hall ways which leads to in disciplinary practices.Students are out of discipline and ignorant towards the rules of the college and surrounding premises which are not beneficial for one's personal growth and personality development.If the student neglects to convey their identity card, they will not be accepted.Developing improvements have made numerous upgrades within the evolving scene of technology wherein identification verification may be done by the usage of face recognition method to avoid mischievous and ignorant behavior of students towards college rules and guidelines.

Automatic face recognition has been widely used in applications from social media to advanced authentication systems.Similarly Automatic face recognition will be used in application to advanced authentication systems.To overcome this, we have proposed a system in which we will add image of individual so that it will be easy to find the student and revert their details to authorities quickly.For those who are out of discipline and ignorant towards the rules of the college and surrounding premises these techniques can be beneficial.This image will collate with the images in the database and result will be displayed after scanning on the web page.Proposed system will use image of students to identify the students and also to retrieve detail of student and accordingly notify to concerned department.This system will act as disciplinary tool for maintaining discipline in college.

Objectives

- To design and develop comprehensive cross platform application for monitoring and identifying students involved into notorious activities.
- To orchestrate use of ML in the application developed for calling students doing notorious activities.
- Physically it takes time and efforts in finding student's as professor's can't be present everywhere and at every instance around the campus looking for students who are misbehaving , disobedient and rebellious.
- Image of student will be captured in the application system and will be sent to the authorities for arguing with the security guard when asked follow the rules as per guidelines. orchestrate use of cloud computing for providing scalability to comprehensive student monitoring system developed.

Literature Review

- Deep Unified Model For Face Recognition Based on Convolution Neural Network and Edge Computing:- paper by M. Z. Khan, S. Harous, S. U. Hassan etal stated
  An efficient paradigm is needed to deal with the bulk amount of data produced by the Internet of Things (IoT). This paper proposes an algorithm for face detection and recognition based on convolution neural networks (CNN), which outperform traditional techniques. The system can detect approximately 35 faces and recognizes 30 out of them from a single image of 40 students. Moreover, generated data by smart classrooms is computed and transmitted through an IoT-based architecture using edge computing. Face recognition technology has a slight edge over other biometric systems like fingerprints, palm-print, and iris due to its non-contact process. A comparative performance study shows that our architecture outperforms in terms of data latency and real-time response.

- Recent Advances in Deep Learning Techniques for Face Recognition:-paper by MD. TAHMID HASAN FUAD 1 , AWAL AHMED FIME etal stated
  In recent years, researchers have proposed many deep learning (DL) methods for various tasks, particularly face recognition (FR) made an enormous leap using these techniques.In this paper a comprehensive analysis of various FR systems that leverage the different types of DL techniques.They have discussed the papers related to different algorithms, architectures, loss functions, activation functions, datasets, challenges, improvement ideas, and current and future trends of DL-based FR systems.Additionally in the paper it is summarized that different datasets are used widely for FR tasks and discuss challenges related to illumination, expression, pose variations, and occlusion.

- Review of Face Recognition Technology paper by L. Li, X. Mu, S. Li and H. Peng stated
  This paper will describe the development stages and related technologies of face recognition, including early algorithms, artificial features, and classifiers, deep learning. They have used a simple process of feature extraction wherein PCA is combined with face recognition by using the K-Nearest-Neighbor (KNN) algorithm.PCA requires the data variance after dimensionality reduction to be as large as possible so that the data can be divided as widely as possible and LDA requires the variance within the same category of data groups after projection to be as small as possible.

- Multi-view intrinsic low-rank representation for robust face recognition and clustering paper by Wenyun Gao, Xiaoyun Li stated
  In this paper, the author proposed a novel multi-view low-rank representation method. The method follows hierarchical Bayesian methods and learns intrinsic and specific representation among each view via a consistent structure and diversity regularization. The intrinsic representation holds the consistent information between different views while the specific representation unfolds the diversity information across views. Meanwhile, our model combines the clustering structure and low-rank local manifold to learn both the relationship in data and the clustering structure. Furthermore, by adjusting the

clustering structure adaptively during optimization, our method can achieve a better performance on face recognition and clustering simultaneously. Several experiments on face datasets, in comparison with the state-of-the-art algorithms, show the effectiveness of our method. In the future, we will try to extend this method to handle incomplete face data.

- A Real-Time Framework for Human Face Detection and Recognition in CCTV Images paper by Ullah, Rehmat Hayat etal stated
  In this paper the author have developed a framework for automatic face recognition based on CCTV images using different machine learning algorithms in this work. One of the objectives of this work is to collect more than 40,000 face images and compare the performance of algorithms to obtain the highest recognition accuracy. They have implemented different algorithms and have obtained high accuracy for CNN. CNN is much more reliable than PCA with DT, RF, and KNN. KNN is a lazy algorithm, and it checks all the instances in the dataset for prediction while CNN recognizes in very little time from its model. Thee other reason is that 41,320 images were used for 90 classes for PCA, and for CNN,they have used ten classes and 30 images per class, and it has obtained good accuracy compared to PCA. The collected number was more than 41,320 images. The system can be enhanced by making it a complete security system. We recognize a single face from the image the next step for this could be to recognize multiple faces in a live-streaming video

Problem Definition

Problem Identified:-
Students are not wearing identity card and are practicing mischievous activities in college campus.Students skip lectures and roam in the hall ways which leads to indisciplinary practices.Students are out of discipline and ignorant towards the rules of the college and surrounding premises which are not beneficial for one's personal growth and personality development.

Solution Proposed:-
To overcome this, we have proposed a system in which we will add image of individual so that it will be easy to find the student and revert their details to authorities quickly.For those who are out of discipline and ignorant towards the rules of the college and surrounding premises these techniques can be beneficial.This image will collate with the images in the database and result will be displayed after scanning on the web page.Proposed system will use image of students to identify the students and also to retrieve detail of student and accordingly notify to concerned department.This system will act as disciplinary tool for maintaining discipline in college.

Proposed System Architecture/Design Prototype

Architecture of Facial Recognition System:- The architecture of the System consists of three modules, namely:

- Enrolment Module
- Database
- Identification Module

Enrolment Module:-
It scans and captures analog or digital image of a living being.
Database:-
An entity which handles compression, processing, storage and also accounts for comparison of the captured data with stored data.
Identification Module:-
This module interfaces with the application system. Facial Recognition process generally includes three stages:

- Face Detection
- Extraction
- Recognition

Face Detection:-
It accepts the image as an input and checks if 'Face' appears in the image and calculates its position on the image. The output of this stage is 'Patches' which contains 'Face' and Face alignment is done which acts as pre-processing stage for Feature Extraction.

Feature Extraction:-
Face Patch is transformed in to a set of Fiducial Points corresponding to their locations or it is transformed into vectors with specific dimension.

Face Recognition:-
This step includes recognition of Face from the database. When the system receives Face image, it undergoes Face Detection and Feature Extraction process. Then, the features are compared with each Face in the Database using the nodal points on the Face.
Identification and Verification procedure is carried out where the system makes a probable identification of the Image and is verified whether the probability is True or False. i.e. comparison of the input vectors with the stored vectors in the Database occurs using different classification techniques.

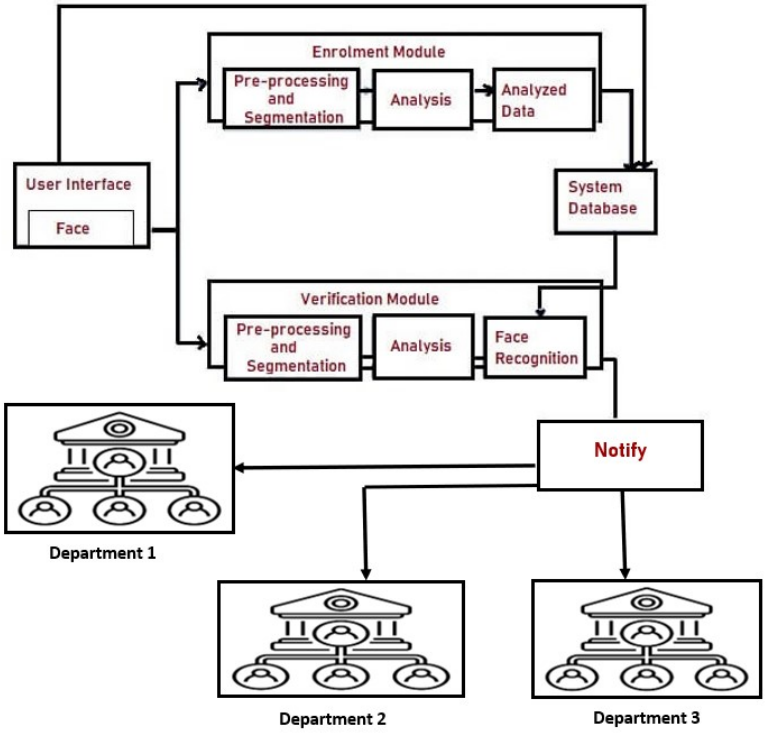

Figure 1: Architecture of Activity Monitoring System

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Ullah, Rehmat Hayat, Hassan Siddiqui, Afsah Siddiqui, Uzma Khan, Jebran Ullah, Farman Hassan, Shoaib Hasan, Laiq Albattah, Waleed Islam, Muhammad Karami, Mohammad. (2022). A Real-Time Framework for Human Face Detection and Recognition in CCTV Images. Mathematical Problems in Engineering. 2022. 10.1155/2022/3276704.

1 Publication

Paper entitled **"Paper Title"** is presented at **"International Conference/Journal Name"** by **"Author Name".**