

Face Recognition based Attendance System

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Abstract - The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institution to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that caused inaccurate and inefficient of attendance taking. Many problems arise when the authority is unable to enforce the regulation that exist in the old system. The technology working behind will be the face recognition system. The human face is one of the natural traits that can uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a face to deviate or being duplicated is low. In this project, face databases will be created to pump data into the recognizer algorithm. Then, during the attendance taking session, faces will be compared against the database to seek for identity. When an individual is identified, its attendance will be taken down automatically saving necessary information into a excel sheet. At the end of the day, the excel sheet containing attendance information regarding all individuals are mailed to the respective faculty.

Key Words: Smart Attendance System, NFC, RFID, OpenCV

1. INTRODUCTION

An attendance system using a camera-based on a face recognition system has been developed by several researchers to produce a face attendance system that is accurate and able to store a large-scale face image database. The design and manufacture of facial attendance systems using cameras are very useful effective and efficient to further improve the accuracy of user data and is useful for the high mobility of users who use it. Facial attendance system using a camera is

very safe and accurate for detecting users because it has a more accurate data process and high accuracy so that it can produce a system that is reliable and robust to identify human faces to be used as a time attendance on attendance machines. Research on Face Recognition for human interests has been carried out, especially for various interests such as security systems, surveillance, General identity verification, Image database investigations, Criminal justice systems, "Smart Card" applications, Video indexing, Multi-media environments and Witness face reconstruction . According to , based on data acquisition methodology, Face Recognition is divided into 3 categories, namely Face Recognition Method based on image intensity (Intensity Image), a method that works based on video sequences and Faces Recognition Method which requires other sensors such as 3D Information and infra-red image (infra-red imagery).

2. Propose system

In this research, the development of a face recognition model as a face attendance machine using a hybrid feature extraction method using CNN-PCA was built using a combination of face detection and face recognition framework model using real-time cameras that function as a face detection tool and human face identification. The stages of the facial recognition process that will be carried out consist of the processes performed on data acquisition, face detection process, preprocessing, feature extraction process, and classification processes can be seen in Fig. The camera that used in face detection process is performed using face detection based on the Viola-Jones from the OpenCV package. Face detection is done by a camera to take face images of objects taken. The image taken from the camera lens is a raw image containing a background image and a face image. In this face detection

process is carried out the process of detecting and searching for facial features in the camera image, which at this stage the system recognizes patterns as faces or not. The face image detected in the background image produced by each camera lens is marked by the position of the region of interest (RoI) coordinate point of the face image which is the location point and the size of the RoI face image produced. Normalization or preprocessing is a process that result a face image that has detected on process of face detection.

In this normalization phase, a combination of several face image processing models is used. We used the cropping method, resizing, RGB-Gray, and using histogram equalization as a contrast-brightness adjustment to optimize the facial recognition. The preprocessing method is used to improve the sharpness of the image to anticipate several variations in illumination that commonly appear when capturing facial images.

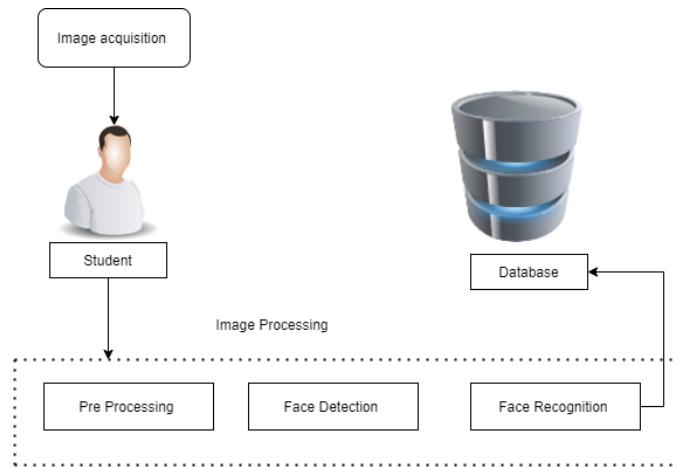


Fig: System Architecture

3. RESULTS AND DISCUSSION

From the research that has been done, it can produce an attendance system based on face recognition using CNN. The result of the attendance system is shown in Fig. 3 and Fig. 4. Testing experiments on the proposed face attendance system as shown in fig. The face recognition system on the proposed attendance machine can produce accuracy between 90% -96% on the use of feature extraction using CNN. The use of CNN in the proposed research can produce an accuracy of between 90% -98%. An attendance system based on face recognition using CNN can work better than using only PCA.

4. LITERATURE SURVEY

Sr. No.	Reference	Description	Publication Year
1.	Face Recognition Based Smart Attendance System	Used an intelligent system based on face recognition. Implementation includes facial identification that is time saving. Raspberry pi, open CV and Dlib using python are basic requirement.	2020
2.	Real-Time Multiple Face Recognition Using Deep Learning on Embedded GPU System	Propose multiple face recognition framework which is implemented on embedded GUI. Framework contains face detection based on CNN with face tracking and state of art deep CNN face recognition algorithm.	2019
3.	Video-based face recognition based on deep convolutional neural network	Propose a model based on deep convolutional network for video based face recognition. It introduce spatial pyramid pooling and center loss to our method for classification task.	2019
4.	An improved face recognition algorithm and its application in attendance management system	This paper represent a new method using Local Binary Pattern(LBP)algorithm combine with advanced image processing techniques such as contrast adjustment, bilateral Filter, Histogram Equalization, Image Blending to improve LBP codes, thus improve the accuracy of whole system.	2020
5.	Implementation of Face Recognition Eigenface Method Approach To Detect Visual Hacking	Designed a visual hacking detection system by implementing the Eigenface method for facial recognition and for detecting faces using Viola-Jones method and the Haar feature.	2021

5. CONCLUSION

From several studies on face recognition, there are still many methods and algorithms that have not been investigated specifically the use of reconstruction algorithms from 2D images to 3D forms that are used as a database in face recognition. In this study, a study of facial recognition using an approach to the development of 2D to 3D image reconstruction models using Convolutional Neural Network (CNN) and the use of PCA are used as the feature extraction method. The CNN method is used to produce a 3D face image from a 2D face image. The PCA method used as a feature extraction method used as a classification method on the proposed face recognition based attendance system can work well. The proposed method can produce a face recognition that has a high accuracy of up to 98%.

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