ATTENDANCE USING FACIAL RECOGNITION SYSTEM

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ABSTRACT

Facial recognition technology uses computer algorithms to identify and verify individuals based on their unique facial features. This technology has many potential applications, including security and surveillance, access control, and biometric authentication. One application of facial recognition technology is in attendance systems, where the system uses a camera to capture images of individuals and then uses facial recognition algorithms to identify and record the attendance of those individuals. The technology is implemented using Python and OpenCV, an open-source computer vision library. OpenCV provides a wide range of tools for image and video processing, including facial detection and feature extraction. Python is a popular programming language for machine learning and is often used to train and implement facial recognition models.

<u>**Keyword**</u> **:** *OpenCV-Open Source Computer Vision Library*

1. INTRODUCTION

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 exists 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.

2. MILESTONES

In 2012, "Algorithm for efficient attendance management: Face recognition based approach"[1]. was published by Naveed Khan Balcoh. Students attendance in the classroom is very important task and if taken manually wastes a lot of time. There are many automatic methods available for this purpose ie biometric attendance. All these methods also waste time because students have to make a queue to touch their thumb on the scanning device. This work describes the efficient algorithm that automatically marks the attendance without human intervention. This attendance is recorded by using a camera attached in front of classroom that is continuously capturing images of students, detect the faces in images and compare the detected faces with the database and mark the attendance. The paper review the related work in the field of attendance system then describes the system architecture, software algorithm and results.

In 2005, "Face Recognition-based Lecture Attendance System"[2]. was published by Yohei KAWAGUCHI. In this paper, we propose a system that takes the attendance of students for classroom lecture. Our system takes the attendance automatically using face recognition. However, it is difficult to estimate the attendance precisely using each result of face recognition independently because the face detection rate is not sufficiently high. In

this paper, we propose a method for estimating the attendance precisely using all the results of face recognition obtained by continuous observation. Continuous observation improves the performance for the estimation of the attendance We constructed the lecture attendance system based on face recognition, and applied the system to classroom lecture. This paper first review the related works in the field of attendance management and face recognition. Then, it introduces our system structure and plan. Finally, experiments are implemented to provide as evidence to support our plan. The result shows that continuous observation improved the performance for the estimation of the attendance.

In 2010, "Using real time computer vision algorithms in automatic attendance management systems"[3]. was published by Visar Shehu and Agni Dika. This paper introduces a new approach in automatic attendance management systems, extended with computer vision algorithms. We propose using real time face detection algorithms integrated on an existing Learning Management System (LMS), which automatically detects and registers students attending on a lecture. The system represents a supplemental tool for instructors, combining algorithms used in machine learning with adaptive methods used to track facial changes during a longer period of time. This new system aims to be less time consuming than traditional methods, at the same time being nonintrusive and not interfere with the regular teaching process. The tool promises to offer accurate results and a more detailed reporting system which shows student activity and attendance in a classroom.

In 2007, "Class Room Attendance System Using Facial Recognition System"[4]. was published by Abhishek Jha. The face is the identity of a person. The methods to exploit this physical feature have seen a great change since the advent of image processing techniques. The accurate recognition of a person is the sole aim of a face recognition system and this identification maybe used for further processing. Traditional face recognition systems employ methods to identify a face from the given input but the results are not usually accurate and precise as desired. The system described in this paper aims to deviate from such traditional systems and introduce a new approach to identify a student using a face recognition system ie the generation of a 3D Facial Model. This paper describes the working of the face recognition system that will be deployed as an Automated Attendance System in a classroom environment.

In 2012, "Study of implementing automated attendance system using face recognition technique"[5]. was published by Nirmalya Kar. Authentication is a significant issue in system control in computer based communication. Human face recognition is an important branch of biometric verification and has been widely used in many applications, such as video monitor system, human-computer interaction, and door control system and network security. This paper describes a method for Student's Attendance System which will integrate with the face recognition technology using Personal Component Analysis (PCA) algorithm. The system will record the attendance of the students in class room environment automatically and it will provide the facilities to the faculty to access the information of the students easily by maintaining a log for clock-in and clock-out time.

In 2012, "Computing the Principal Local Binary Patterns for face recognition using data mining tools"[6]. was published by Francisco A. Pujol and Juan Carlos García. Local Binary Patterns are considered as one of the texture descriptors with better results; they employ a statistical feature extraction by means of the binarization of the neighborhood of every image pixel with a local threshold determined by the central pixel. The idea of using Local Binary Patterns for face description is motivated by the fact that faces can be seen as a composition of micro-patterns which are properly described by this operator and, consequently, it has become a very popular technique in recent years. In this work, we show a method to calculate the most important or Principal Local Binary Patterns for recognizing faces. To do this, the attribute evaluator algorithm of the data mining tool Weka is used. Furthermore, since we assume that each face region has a different influence on the recognition process, we have designed a 9-region mask and obtained a set of optimized weights for this mask by means of the data mining tool RapidMiner. Our proposal was tested with the FERET database and obtained a recognition rate varying between 90% and 94% when using only 9 uniform Principal Local Binary Patterns, for a database of 843 individuals; thus, we have reduced both the dimension of the feature vectors needed for completing the recognition tasks and the processing time required to compare all the faces in the database.

In 2006, "A face recognition system based on automatically determined facial fiducial points"[7]. was published by Stefano Arca, Paola Campadelli and Raffaella Lanzarotti. In this paper, a completely automatic face recognition system is presented. The method works on color images: after having localized the face and the facial features, it determines 24 facial fiducial points, and characterizes them applying a bank of Gabor filters which extract the peculiar texture around them (jets). Recognition is realized measuring the similarity between the different jets. The system is inspired by the elastic bunch graph method, while it does no assumption on the scale, pose, and the background. Comparison with standard algorithms is presented and discussed.

In 2013, "Smart Application For AMS using Face Recognition"[8]. was published by K MuthuKalyani. Attendance Management System (AMS) can be made into smarter way by using face recognition technique, where the authors use a CCTV camera to be fixed at the entry point of a classroom, which automatically captures the image of the person and checks the observed image with the face database using android enhanced smart phone. It is typically used for two purposes. Firstly, marking attendance for student by comparing the face images produced recently and secondly, recognizing a human who are strange to the environment, ie, an unauthorized person. For verification of image, a newly emerging trend 3D Face Recognition is used which claims to provide more accuracy in matching the image databases and has an ability to recognize a subject at different view angles.

In 2019, "Automated Facial Recognition Attendance System Leveraging IoT Cameras"[9]. was published by Royston Dmello, Sai Yerremreddy, Samriddha Basu, Tejas Bhitle, Yash Kokate and Prachi Gharpure. In recent years, biometrics using facial recognition has become an important part of many industries like security, retail, marketing, health-care, etc. Internet of Things has played a pivotal role in enhancing and automating technology for practical applications. However, there exist some issues with implementing these systems practically. In this paper, an attendance management system is proposed which can detect and recognize faces of an entire class from a few pictures and mark the attendance of the recognized students. IoT cameras have been used instead of a smartphone camera to increase coverage and reduce the number of missed attendances. In addition to reducing manual work, it has also been ensured that this system is completely secure. The system proposed mainly comprises of IoT Camera Module, custom back-end server and separate Android apps for teachers and students. The system is also able to provide high accuracy at low cost as compared to other other similar applications and hence is suitable for real-life use.

In 2014, "A conceptual model for automated attendance marking system using facial recognition"[10]. was published by Mashhood Sajid, Rubab Hussain and Muhammad Usman. Attendance marking in a classroom during a lecture is not only burdensome but also a time consuming task. Due to a usual large number of students present in the lecture hall there is always a possibility of proxy attendance. It is extremely difficult for lecturers to manually identify the students who skip their lectures on regular basis. Attendance management of students through the conventional methods had been a challenge in the recent years. The growing need of efficient and automatic techniques of marking attendance is a growing challenge in the area of face recognition. In recent years, the problem of automatic attendance marking has been widely addressed through the use of standard biometrics. However, majority of the previously proposed techniques lack the element of reliability. The focus of this research is to analyze and critically evaluate the recent attendance marking techniques using face recognition methods. Literature review reveals the fact that the intelligent application of iterative facial recognition techniques can make attendance management systems more reliable. In this paper, we propose a conceptual model for automated attendance system through facial recognition. Our proposed model uses an integral validation process which enhances the reliability of your model.

3. CONCLUSIONS

Before the development of this project. There are many loopholes in the process of taking attendance using the old method which caused many troubles to most of the institutions. Therefore, the facial recognition feature embedded in the attendance monit oring system can not only ensure attendance to be taken accurately and also eliminated the flaws in the previous system. By using technology to conquer the defects cannot merely save resources but also reduces human intervention in the whole process by handling the entire complicate complicated task to the machine. The only cost to this solution is to have sufficient space in to store all the faces into the database storage. Fortunately, there is such existence of micro SD that can compensate with the volume of the data. In this project, the face database is successfully built. Apart from that, the face recognizing system is also working well. At the end, the system not only resolve troubles that exist in the old model but also provide convenience to the user to access the information collected by mailing the attendance sheet to the respected faculty.

4. REFERENCES

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