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NVIDIA Based Smart Attendance System in Industries and Education Systems

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Abstract

These days' attendance and monitoring manually is extremely difficult for the supervisor in working sectors especially coal mining industries. Manual entry of the attendance in logbooks may increase the chance for error in attendance and it may also through burn the time, by employing a clever, automated attendance management solution to address this issue. By using this approach, it will be simple to resolve the issue of proxies and employee being counted as present even when they are not. In this approach, the live video stream will be used to record attendance. The facial landmarks algorithm is used to extract the picture frames from the clip. Face detection and recognition are the primary implementation processes, which involve matching the detected (recorded) face with the faces that have already been stored in open CV and the employee database. This strategy will be an effective way of managing employee attendance. Our work was implemented on an NVIDIA board, and this method will make use of the benefits of Python libraries like Open CV. Its memory is supported by the MySQL database management system. The MySQL database will store the recorded attendance for later use or for archival purposes. This system is capable enough to be integrated with any applications to increase automation and user friendliness thanks to its fasted rand more accurate performance when employing the facial and mark algorithm. The attendance records of employee will be more accurate and reliable thanks to this intelligent and automated technology, which will also give the data security.

Keywords: *Mining, MySQL, NVIDIA, Neural Networks, NANO Technology, Python*

1.0 Introduction

Attendance monitoring is one of the significant functions in all the organizations to monitor the performance of the employee. Every university tracks the number of students or individuals who attended a specific lecture using some sort of attendance system. A facial recognition system is nothing but it is AI-based software that is for determining or validating a person by processing the patterns based on their facial appearances[1]. In recent years, facial recognition has seen many improvements, because of the lots of option sand advantages it provides facial recognition is validly used in various objectives like security and commercial operations. Facial recognition is a powerful field of research that is an AI and machine learning based technology[2]. Marking attendance using a facial recognition technology is one of the resourceful applications of an attendance system, by doing some modifications it can be used as a security system as well and it can be compared with other available systems like biometric and eye iris recognition systems. Attendance is necessary in any organization or an in state it is used to evaluate the performance of any person or a candidate.

Automatic attendance is accurate and requires very less time it will take the attendance with in a fraction of seconds due to its advantage it is been implemented in an enormous organization. The facial recognition process

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can be summarized as the process of taking a video stream and converting it into a digital image frame and comparing it to the existing facial images for identification or verification of an individual[3]. The selected faces within the database can be compared to accomplish this. Because the procedure has common applications like control and security, it can be contrasted to other systems like fingerprint or eye iris recognition systems. This system is contact less and a profitable one, despite the fact that its accuracy falls short of iris and fingerprint detection. Technology that allows for a variety of other applications, including AI interaction, video monitoring, automatically indexing images, and video databases, is ground-breaking[4].

2.0 Literature Review

The ability to recognize a person's face is crucial for their individual identification. At the moment, it is extensively employed in numerous industrial applications[1]. Based on methods, detecting faces in various patterns. The primary patterns for identifying a face is the nose, eyes, hair, and ears; occasionally, the skin tone is also taken into consideration. Face detection involves finding a face based on its position and whether it appears in photos. The Ada-Boost Face Detection Algorithm, Viola-Jones SMQT Features, SNOW Classifier method, Local Binary Pattern, and Face Detection Algorithm are a few examples of different face detection techniques (LBP)[5]. HO and a quick PCA method are used for face identification. Intelligent Data Analysis and applications in Europe and China (pp.10-21). Cham Springer. The author demonstrates how to recognize a distinct person's or employee's face. Utilizing facial identification and recognition of employee or employees, attendance is submitted to the main database. Human labour is reduced from this manual attendance-taking process since an automated attendance system will identify and record attendance based on processed faces.

3.0 System Design

The below-mentioned Figure 1, shows our project's block diagram, which includes important components like an NVIDIA board, a camera, a monitor, a DC voltage maintainer, a database, a 68-point facial landmark algorithm, and CSV files. It is decided to use the NVIDIA jets on bard as the main source for all other project components[5]. The NVIDIA board itself will be in control of all operations in this initiative. Have to enter employee information, such as name, photo, and registration number, into the system database for first take on the project. For look at the system's real operation, it first records the classroom's live video stream then turning

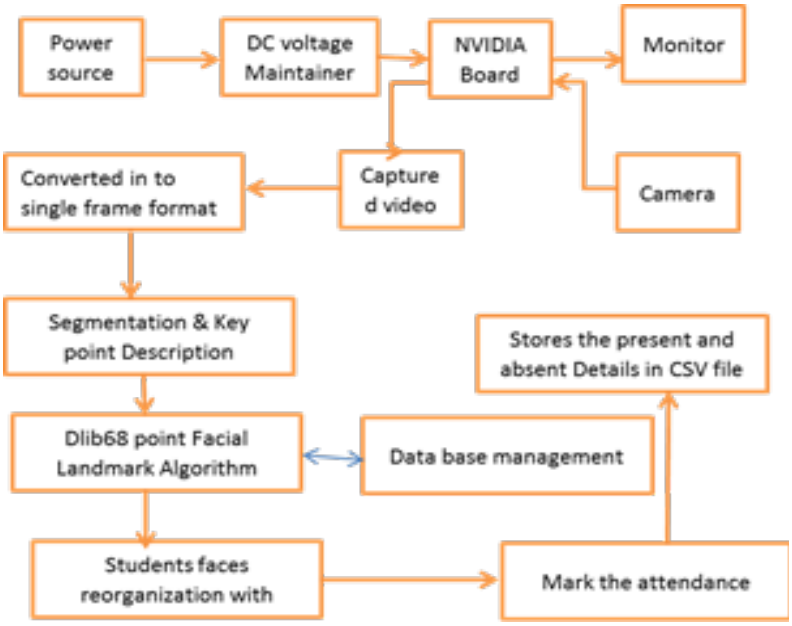


Figure 1. Block diagram of the proposed system.

it into a single-frame image. The system will count the faces in this single frame and then use the Dib68 point's facial landmark algorithm to compare each face to the pre-stored data in the database[6]. If the faces match the data for that specific person, the system will mark that person as present in class; otherwise, it will mark them absent[7-8].

4.0 Results and Outcomes

The system's facial detection and recognition technique is essential for optimizing attendance management in many environments, including classes, meetings, and events. After collecting a single frame, the system's algorithms carefully examine it to detect faces and determine the number of faces present in that frame. The first step is critical for accurately monitoring attendance in real time.

After detecting the faces, the system employs the sophisticated Dib68 point facial landmark algorithm. We specifically developed this algorithm to identify and locate specific features on a person's face, such as the eyes, nose, and mouth. It then uses this information to create a distinct and individualized facial profile. The system can accurately match each detected face to its matching individual by comparing these facial signatures with the pre-stored data in its database.

Matching procedures are critical for ensuring precision in attendance monitoring. The system definitively registers an individual as present in the class or event when a recognized face matches the database's linked information. On the other hand, if the system does not detect a match, it correctly identifies the person as absent.

practical execution of this system requires a thorough configuration, as illustrated in Figures 2, 3, and 4. The above Figure 2 displays the tangible elements of the



Figure 2. Hardware kit.

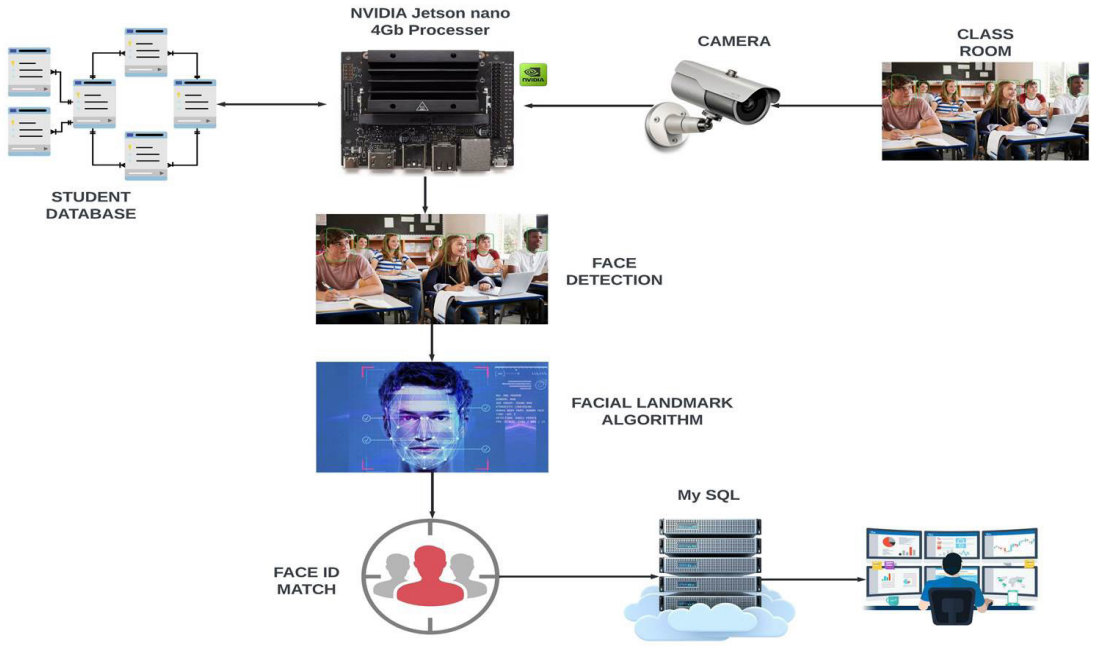


Figure 3. Circuit diagram.

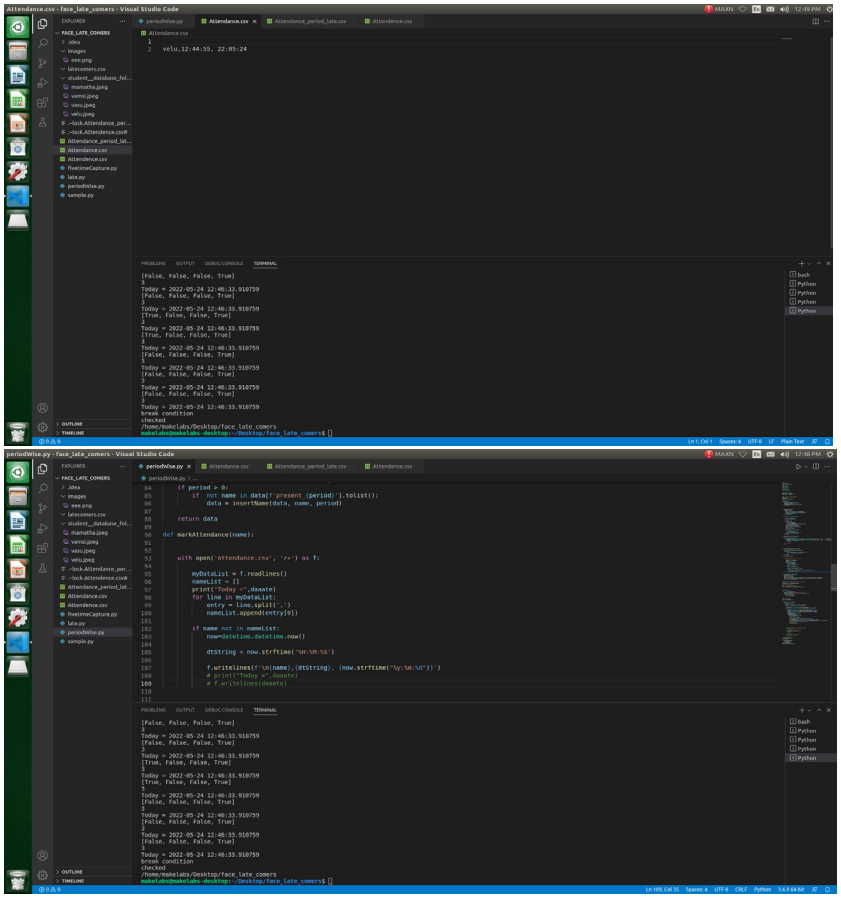


Figure 4. Shows the software test results.

system, such as cameras or sensors for recording faces, computing units, and storage devices for managing data.

The above Figure 3 presents an intricate circuit diagram that demonstrates the interconnections between various components and the path of data throughout the system.

The above Figure 4 is important because it demonstrates the results of the software testing. These results validate that the system's face detection, recognition, and attendance tracking features are in line with real-world settings. To verify its accuracy and dependability, the validation procedure often entails comparing the system's recorded attendance with manually recorded attendance or other dependable sources of data.

To summarize, the system's ability to tally faces, use sophisticated facial landmark algorithms, and precisely associate faces with pre-stored data allows for effective and dependable attendance management. This system optimizes administrative processes, fortifies security protocols, and offers important analytics on attendance patterns and trends.

5.0 Conclusion

This project has been proposed, and to made an effort to build an effective system for tracking attendance and ensuring security especially in mining areas. This system makes use of artificial intelligence-based facial detection technology. The facial landmark algorithm is used to do this. By matching the employee prepared and pre-stored data with the real-time video stream, the attendance will be recorded which increases protection in mining areas. The MySQL database and CSV files will be used to store this marked data and attendance information. Finally, yet importantly, by using this system, it can save time that would be wasted greatly if the attendance were taken manually. It is also improving the maximum security for the institution or organization because the system

is not only capable of taking the attendance but also has the ability to detect unauthorized individuals in the workplace and employee behaviour.

6.0 Future Scope

By making some updates to the algorithm this project can be used to analyse staff and employee uniform guidelines and employee behaviour and also utilize this system in public areas to keep an eye on people's suspicious behaviour.

7.0 References

1. Agarwal R, Jain R, Regunathan R, Kumar CSP. Automatic attendance system using face recognition technique. In: Proceedings of the 2nd International Conference on Data Engineering and Communication Technology. Springer; 2019. p. 525–33. https://doi.org/10.1007/978-981-13-1610-4_53
2. Hidayat MA, Simalango HM. Students attendance system and notification of college subject schedule based on classroom using IBeacon. In: 3rd International Conference on Information Technology, Information System and Electrical Engineering (ICITISEE); 2018. p. 253–8. https://doi.org/10.1109/icitisee.2018.8720948
3. Byalpi AS. Alexa based real-time attendance system. In: 3rd International Conference on Communication and Electronics Systems (ICCES); 2018. p. 121–4. https://doi.org/10.1109/cesys.2018.8724006
4. Li XY, Lin ZX. Face recognition based on HOG and fast PCA algorithm. In: Proceedings of the Fourth Euro-China Conference on Intelligent Data Analysis and Applications; 2018. p. 10–21. https://doi.org/10.1007/978-3-319-68527-4_2
5. Alam TT, Chowdhury AN, Rahman MZ. An intelligent road traffic management system using NVIDIA GPU. In: 19th International Conference on Computer and Information Technology (ICCIT); 2016. p. 419–24. https://doi.org/10.1109/iccitechn.2016.7860235
6. Wu Y, Ji Q. Facial landmark detection: A literature survey. Int J Comput Vis. 2019; 127(2):115–42. https://doi.org/10.1007/s11263-018-1097-z
7. White D, Kemp RI, Jenkins R, Matheson M, Burton AM. Passport officers errors in face matching. PLoS One. 2014; 9(8). https://doi.org/10.1371/journal.pone.0103510
8. Zeng W, Meng Q, Li R. Design of intelligent classroom attendance system based on face recognition. In: IEEE 3rd Information Technology, Networking, Electronic and Automation Control Conference (ITNEC); 2019. p. 611–5. https://doi.org/10.1109/itnec.2019.8729496