Integrated Academic Management & Learning Hub With AI Chatbot and Survillence

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Abstract: Attendance management in educational institutions is a crucial yet time-consuming task when handled manually, often resulting in inaccuracies, proxy attendance, and increased administrative workload. To address these challenges, this project presents a Face Recognition–Based Automated Attendance System that utilizes computer vision and machine learning techniques to record attendance accurately and efficiently without human intervention.

The proposed system captures real-time facial images using a standard camera and detects faces using the Viola–Jones Haar Cascade algorithm. For face recognition, the Local Binary Pattern Histogram (LBPH) algorithm is employed due to its robustness and suitability for real- time applications. The system operates through three main phases: dataset creation, training, and testing. During dataset creation, multiple facial images of each individual are captured and stored with a unique identifier. In the training phase, the LBPH algorithm is trained on the collected dataset to generate an effective recognition model. During testing, live images are processed to identify registered individuals, and attendance is automatically recorded in the database upon successful recognition.

Index Terms – **Integrated Academic Management & Learning Hub With AI Chatbot and Surveillance**

INTRODUCTION

Schools and universities are the foundation of knowledge and educational body on which students relay upon. Therefore, they need to maintain a database of its students to keep all the updated records and easily share information with students. Most schools and universities count on an advanced software tool knows as 'Student Management System' to keep all their student records and administrative operations including, examination, attendance, and other activities over the recent years, the performance and efficiency of education industry have been enhanced by using the Student Management System. This tool has productively taken over the workload of admin department of admin department with its well-organized, easy, and reliable online management software. Student Management System is a solution tool that is designed to track, maintain and manage all the data generated by a school, colleges, their attendance, their records, etc.

The student management system is also called the student information system. It is a student management software for managing the students. Student management is an easy way designed to make it easier to track information. This system is a solution tool that is designed to track, maintain and manage all the data generated by a school and universities including students attendance, teachers time table and their personal time table. Think of it as a big database that stores all the day-to-day school and universities information, and student records and also manages the tasks.

Problem Statement.

Smart Attendance System The attendance system in most of the educational institutions is entry based, wherein the faculties are expected to enter the attendance in software. This system has several disadvantages like: The students can get the attendance by means of health, emotional, etc. then punctuality of individuals cannot be recorded and time-consuming process for faculty.

The smart attendance will help to mark the attendance of the students attending a particular lecture. In this system, every student of the institution is giving their thump impression. The students, at the lecture hall entry, are expected to provide their thump impression which will record the student entering the lecture hall and the attendance status updated into the storage and updated into their parents, proctor and faculty database.

An encryption key is generated each time an interaction takes place to prevent other users entering the hall. This is done to make sure that student attends the stipulated lecture only. Every Lecture Hall has what we call the 'Lecture Hall Code'. The key is encrypted with lecture hall code on the card at the entry gate and again decrypted at the exit gate.

To avoid proxy attendance, image recognition technique can be developed for future development of the software. This system has module by module development and dynamic changes till delivery. Stack holders having provision to take the report according to their privileges. parents can take the report of their ward attendance alone; faculty can take an attendance report of their class students like way.

Literature Review

In India there are many academic institutions. But very few institutions are modernized and use software to manage their day-to-day work. In a city like Bengaluru there are around 1000 schools, more than 300 pre- university colleges and degree colleges. Most of these academic institutions still relay on traditional management way which of mainly involves paper-work, much of human effort. The students, who are admitted to those institutions which are dependent on traditional way of managing things, have to struggle a lot just

to get a certificate documents. or any Also other the administrations face difficulty in maintaining all the records, tracking the records and fetching the record of their interest in time. The administrations of those institutions also have to employ a number of employees just to maintain the records required to manage and support their daily work.

Some of the universities like PESIT and Christ University in Bengaluru have their own web application to address previously mentioned issues.

The web application that is being used by these and many other institutions have the following features and functionalities such as, Login/Sign Up, Dashboard, Viewing of results, attendance, courses, time table, assignments and students progress, upload/download documents and notification.

Automation can be defined as the process of reducing or minimalizing the manual hard work with help of computers, computer operated software and devices. There are certain works that are beyond human capacities which can be carried out through automation techniques Library Automation System of the University of Toronto in 1963-1972 was one of the first achievements to manage the data with the help of automated system. The real idea of implementing Automation is to enhance efficiency, reduce delays, increase production flexibility, reduce prices, human error elimination, and alleviate labor shortage, high degree of accuracy. Automation in Educational Assessment created in Nigeria shows how an online automation system can be implemented so eradicate human errors and bring fairness during the exams. Defining the Paperless Workplace with the Paper Metaphor. has explained the difficulties faced by the organization while switching from conventionally used paper based system to in online automated system as they were not able to draw the gap between both the systems but automated Project Grading & Instant Feedback System provides an example of an automated system which enhances the efficiency of manual project grading system with feedbacks can being easily managed.

Existing System

In the existing system attendance is maintained using the attendance register for students. Teachers take attendance of students manually, due to which it increases paperwork, maintaining records and calculating attendance of each student become tedious. The intention of developing Student Management System is to computerize the traditional way of taking attendance. Student Management System is a platform for daily student attendance in schools, colleges and institutes. It facilitates to access the attendance information of a particular student in a particular class. It also avoids proxy attendance.

Demerits of Existing System

- Not user friendly: The existing system is not user friendly because the retrieval of data is very slow and data is not maintained efficiently.

- Difficult in report generating: we require more calculations to generate the report so it is generated at the end of the session.

- Time consuming: every work is done manually so we cannot generate report in the middle of the session or as per the requirement because it is very time consuming.

Proposed System

It helps to fetch the data of student from a specific class just by Student management web-based system is the process of managing student's record in an institutional organization. It is done through the online method which traditionally, was prepared using papers and manual ledgers.

It preserves student's and administrator's resources. This system provides a simple interface for the maintenance of student information. It involves procedures like registering the scholar's details, assignment of the department according to the course chosen, and maintaining records. Being an online system, the availability of information is worldwide which means accessibility and exchange of information is global. This data is stored safely in the repository that makes it simple to acquire and data modification can be done whenever required. It is the software created for everyday student record management in academic institutes.

SOFTWARE DESIGN:

OpenCV (Open-Source Computer Vision) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itrez (which was later acquired by Intel). The library is cross plat-form and free for use under the open-source BSD license. OpenCV supports deep learning frameworks TensorFlow, Torch/PyTorch and Cafe. It has C++, Python, Java and MATLAB interfaces and supports Windows, Linux, Android and Mac OS. OpenCV leans mostly to-wards real-time vision applications and takes advantage of MMX and SSE instructions when available. A full-featured CUDA and OpenCL interfaces are being actively developed right now. There are over 500 algorithms and about 10 times as many functions that compose or support those algorithms. OpenCV is written natively in Ct+ and has a tem-plated interface that works seamlessly with STL containers. In 1999, the OpenCV project was initially an Intel Research initiative to advance CPU intensive applications, part of a series of projects including real-time ray tracing and 3D display walls. The main contributors to the project included a number of optimization experts in Intel Russia, as well as Intel's Performance Library Team. In the early days of OpenCV, the goals of the project were described as: Advance vision research by providing not only open but also optimized code for basic vision infrastructure. No more reinventing the wheel. Disseminate vision knowledge by providing a common infrastructure that developers could build on, so that code would be more readily readable and transferable. Advance vision-based commercial applications by making portable, performance optimized code available for free - with a license that did not require code to be open or free itself.

Once OpenCV is installed, the OPENCV BUILDdirectorywillbepopulatedwiththreetypesof files : Header files : Thesearelocatedinthe OPENCVBUILD and are usedtodevelopnewprojectswithOpen Thesear estaticordynamiclibraries(dependingontheoptionselectedwithCMake)withthefunctionali Thesear executableswithexamplesthatusethelibraries. Thesourcesforthesesamplescanbe.foundin:

.Optimizedandintendededf orreal-time applications.OS/hardware/window-manager independent Provides interface to Intel's Integrated Performance Primitives (IPP) with processor specific optimization (Intel processors)

Methodology

In this study, both quantitative and qualitative approaches will be used. The design phase was studied by examining documents and researching existing systems for clarity and verification of facts to be collected that are going to be adhered in our system. It will be carried out as illustrated For the creation of this automation based application system we have used the process of software life cycle development model. Since the requirement of the project was not exactly defined at the initial stage we have used prototyping model approach for this system. In the prototyping model, the software is created with early requirements provided and further improvements are done as the requirements are made clearer. It is a way of swiftly creating a function with a limited amount of data while gathering more information. Once the information is gathered the prototype is reworked accordingly.
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Limitations

- Not user friendly: The existing system is not user friendly because the retrieval of data is very slow and data is not maintained efficiently.

- Difficult in report generating: we require more calculations to generate the report so it is generated at the end of the session.

- Time consuming: every work is done manually so we cannot generate report in the middle of the session or as per the requirement because it is very time consuming.

APPLICATIONS

- THE SOFTWARE STORES THE FACES THAT ARE DETECTED AND AUTOMATICALLY MARKS ATTENDANCE.
- THE SYSTEM IS CONVENIENT AND SECURE FOR THE USER
- THE SOFTWARE CAN BE USED FOR SECURITY PURPOSES IN ORGANIZATION AND SECURED ZONES.

Result

Face recognition systems have been grabbing high attention from commercial market point of view as well as pattern recognition field. In this research, Principal component analysis approach to the face recognition problem was studied and a face recognition system based on the eigenfaces approach was proposed. The algorithm has been tested for the standard image databases such as ORL and Indian Face Databases and implemented using Open CV.
The algorithm developed is a generalized one which works well with any type of images and with any size.

CONCLUSION

Our project is only a humble venture to satisfy the needs in an Institution. Several user-friendly coding has also adopted. This package shall prove to be a powerful package in satisfying all the requirements of the organization. The objective of software planning is to provide a frame work that enables the manger to make reasonable estimates made within a limited time frame at the beginning of the software project and should be updated regularly as the project progresses. Last but not least it is no the work that played the ways to success but ALMIGHTY.

FUTURE ENHANCEMENTS

The project has a very vast scope in future. This can be implemented on internet in future. Project can be updated further as and when requirement for the same arises, as it is very flexible in terms of expansion. With the proposed software of this student management system project, the faculties or the authorities can work in a much better, accurate and error free manner. The following are the future scope for the project.
"Student Management System" is software developed for maintaining the attendance of the student on the daily basis in the collage. Here the staffs, who are handling the subjects, will be responsible to mark the attendance of the students. Each staff will be given with a separate username and password based on the subject they handle. An accurate report based on the student attendance is generated here. This system will also help in evaluating attendance eligibility criteria of a student. Report of the student's attendance on weekly and monthly basis is generated.

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