SMART ATTENDANCE AND PAYROLL MANAGEMENT USING FACE RECOGNITION

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Abstract
The process of tracking working times is always difficult. Traditional methods of tracking attendance can be a time-consuming process. Some of the traditional methods for keeping track of time include calling out a person, using time sheets, using a time card, and using a perforation clock. Each of these options has its own drawbacks such as risk of human error, time theft, time consuming, ineffective and outdated, excessive paperwork, outdated systems, proxies To overcome this, we intend to develop a deep learning model to automate the attendance tracking process We will start training our model by using the images of students and the faculty. The proposed model captures class snapshots for a specified period of time and detects the face to recognize the person by comparing the detected face to the images in the training dataset using deep learning algorithms such as Haar Cascade and Edge Detection All the data related to attendance could be retrieved through a web application built with ReactJS and all the data is stored in cloud storage technologies like MongoDB and Amazon S3. By upgrading to this automated model we gain major benefits like prevent payroll errors for staff, prevent time consumption, improve efficiency and productivity

Keywords: Haar Cascade, Edge Detection, ReactJS, MongoDB, Amazon S3

1 INTRODUCTION

Many educational institutions still use traditional methods to track attendance, which is a more tedious task. The most common traditional methods practiced in daily life are, the student is supposed to sign the attendance sheet by hand, which is passed throughout the class while the lecturer is giving the lecture, and sometimes this particular approach allowed students undoubtedly to cheat about attendance, as a student in class may sign for a student who is physically absent This attendance sheet is often misplaced or forgotten without the lecturers' knowledge. Another more rigorous traditional method that is actually commonly used is the role number calling system, where students are supposed to answer role calls by faculty members. In this way, students can also cheat on attendance by responding. This is also a time-consuming task Human errors can lead to missing attendance data for faculty, which could lead to conflict over payroll for staff. Using face recognition technology for attendance recognition is a smart way to manage attendance. Face recognition is a more accurate and faster technique than other techniques, which reduces the chance of prattendance.
The ability to recognize faces is a passive process that does not require any action on the part of the person being identified. With the help of face recognition, we could save time spent on attendance marking and make the entire process much more efficient by eliminating the setbacks caused by traditional methods and also the accurate calculation of payroll for staff.

2 DESIGN

The main purpose of this project is to track the faces of the students and faculty, identify who is present, and calculate the payroll. This work uses deep learning algorithms like Haar Cascade and Edge Detection to identify and recognize the student and lecturer faces from the real-time images captured by using a camera. The images are processed to match with the pre-trained dataset. The

eight modules of the design are divided into subsections. Fig.1 is a flowchart of the entire idea of the work, which shows how it will be implemented step-by-step.

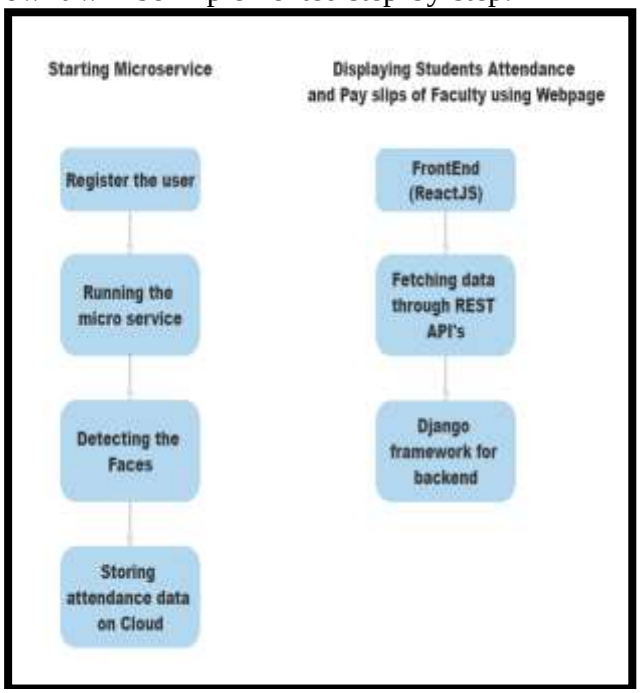

Fig.1: Smart Attendance and Payroll Management Using Face Recognition

2.1 **Dataset Creation**

A dataset of students and faculty is created before the recognition process begins. The data set was created only to train this system. We have created a dataset of 5 students which includes their roll number, department, and images of student and faculty IDs and faculty images. Whenever we register student data and images in our system, deep learning applies to each face to compute facial features and store in student face data file to help us later recall that face in recognition process. The data of student images and personal information is stored in Amazon S3 cloud storage technology. This process is repeated for each image taken during registration.

2.2 **Training**

The next step is to train the system with the data that was created. Whenever we get localization of facial features, 128 key facial points are extracted for each image. These points are highly accurate and are stored in a data file for face recognition. A model is built by using these images which is then trained using Haar Cascade and Edge Detection, which are deep learning algorithms that analyze visual imagery. The algorithm is more effective at detecting important points in data than regular machine learning algorithms, making the model more reliable

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2.3 **Image Acquisition**

In order to take the second phase of the project, the team first obtained images of the students and faculty in the classroom. Each classroom has a High Definition Video Camera so that you can see the class proceedings. From the video footage taken during the lecture hour, numbered frames are extracted from the video for further processing. From the selected frames, two or more frames are selected at random and processed further.

2.4 **Face Detection**

Each face image needs to be isolated and classified. For this purpose, we will use the process of face region bounding box methodology, usually called 'marking the region of interest' using HAAR cascade classifiers and available in the OpenCV and face-recognition library respectively. After separating the frame, the first frame is selected and the face image is detected. Then a second image

is taken of the face, and the detected face image is marked. The process is repeated for all the available frames.

2.5 Face Recognition

The face image detected in each frame is compared with the pre-trained face image of the student who has resided in that frame previously. Internal Euclidean distance is computed between the face in the image and all of the faces in the dataset. If the current image with the 60% threshold matches the existing data set, it is moved to mark presence. The procedure is repeated for all the frames. The Edge Detection Deep Learning algorithm is used to compare the images.

2.6 Attendance Marking

If the face image in frame1 matches the pre-trained image, then the attendance for the particular student or the lecturer for that day is guaranteed. If a student named frame1 is not available in the trained dataset, the student's face saved as image1 does not belong to a particular class, so a particular student may belong to another class. The attendance is maintained in JSON format which is an unstructured form of data in MongoDB database for further easier retrieval of attendance data of a student and faculty and also payroll of the faculty is calculated in the backend based on the number of working days and the actual days attended by the concerned faculty.

Fig 2 : Test Image of students for attendance marking

2.7 Data Storage

The training data of students and faculty which include images and their unique Id are stored in Amazon S3 whereas the attendance data of student for a particular day is stored in JSON format in MongoDB.

2.8 Attendance and Payroll retrieval

Once the faces are recognized and attendance is marked. The attendance data of students and payroll details of the faculty can be viewed through a front end web application built with ReactJS. By providing the details like month, department, year and section, the entire list of students of that particular class is displayed in the form of table along with attendance data. Each faculty is provided with a unique ID and by submitting other details like month and year a pop up is displayed with the details of current payroll and the actual payroll .The data from the cloud storage is processed with the help of backend application built using Django Framework.

3 RESULTS

This web application is built using ReactJS for the frontend and Django for the backend. The user interface is simple and easy to use. The required data is retrieved from MongoDB using the Django framework and displayed on the frontend through ReactJS. These images show the work. On fig. Figure 2 shows the job attendance page, where the user can download the required data such as month, year, department, and section to view student attendance details for that particular month, and Figure 2. 3 shows the payroll page, where the teacher provides his unique ID along with month and year to generate actual wages and current payroll p details will not be displayed in case of wrong Unique ID.

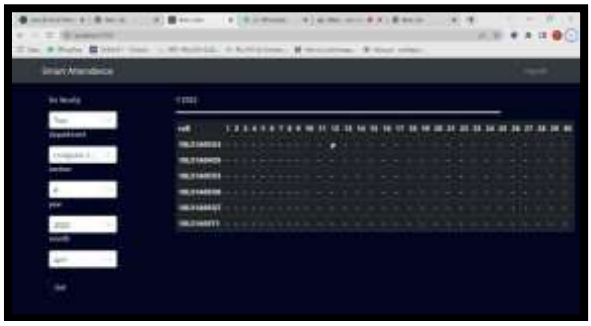

Fig. 3: Attendance page of a particular class for a particular month

Fig. 4: Payroll details based on the uploaded Unique ID and required inputs

4 CONCLUSIONS AND FUTURE WORK

There are numerous ways we can mark student attendance. Each has its own benefits and drawbacks. The face recognition system is very effective and reliable. Deep learning and image processing are two techniques which are highly spoken of for their precision and efficiency. These advantages are major factors that make these techniques popular. The applications of face detection and face recognition are used for clustering and classifying diseases that affect plant leaves. Identifying the disease accurately and efficiently is the main purpose of the proposed approach. The experimental results suggest that the proposed approach is a reliable way to detect leaf diseases with modest

computational effort. Along with the supply of growing tools, farmers also need access to accurate information that they can use to effectively manage their crops, and there is no better way than to provide them with the right information that they can use through the software. This work can be integrated with IoT devices and can be installed in fields to capture real-time images. By following this approach, the disease can be identified in its early stages which will help in reducing the spread of the disease.

5 ACKNOWLEDGEMENT

We are grateful for the help that we have received from several people while doing the B. Tech Final year major projects. We are very grateful to Professor R.V.L.S.N. Sastry for his support and guidance throughout the course of our work. His sincerity, thoroughness, and perseverance have been a constant source of inspiration to us. We would also like to thank Professor Dinesh Reddy of the Department of Computer Science & Engineering for his support and help during the development of this paper. We thank all of the faculty in the department for their help in developing our paper. We thank our friends for their help in completing the paper.

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