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Face Based Attendance System using Convolutional Neural Network

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ABSTRACT: The management of the attendance can be a great burden on the teachers if it is done by hand. To resolve this problem, smart and auto attendance management system is being utilized. By utilizing this framework, the problem of proxies and students being marked present even though they are not physically present can easily be solved. This system marks the attendance using Camera. The frames are extracted using opencv. The main implementation steps used in this type of system are face detection and recognizing the detected face, for which dlib is used. After these, the connection of recognized faces ought to be conceivable by comparing with the database containing student's faces. This model will be a successful technique to manage the attendance of students.
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KEYWORDS: Attendance system, Automated attendance, Image Processing, Face detection, Feature matching, Face recognition.

I. INTRODUCTION

Traditional method of attendance marking is a tedious task in many schools and colleges. It is also an extra burden to the faculties who should mark attendance by manually calling the names of students which might take about 5 minutes of entire session. This is time consuming. There are some chances of proxy attendance. Therefore, many institutes started deploying many other techniques for recording attendance like use of Radio Frequency Identification (RFID) , iris recognition, fingerprint recognition, and so on. However, these systems are queue based which might consume more time and are intrusive in nature.

Maintaining the attendance is extremely important altogether the institutes for inspection the performance of employees. Every institute has its own method during this regard. Some are taking attendance manually using the old paper or file based approach and a few of have adopted methods of automatic attendance using some biometric techniques. But in these methods employees need to await while in making a queue at time they enter the office. Many biometric systems are available but the key authentications are same is all the techniques. Every biometric system consists of enrolment process during which unique features of an individual is stored within the database then there are processes of identification and verification.

These two processes compare the biometric feature of an individual with previously stored template captured at the time of enrolment. Biometric templates are often of the many types like Fingerprints, Eye Iris, Face, Hand Geometry, Signature, Gait and voice. Our system uses the face recognition approach for the automated attendance of employees within the office room environment without employees' intervention. Face recognition consists of two steps, in initiative faces are detected within the image then these detected faces are compared with the database for verification.

II. RELATED WORK

1. **Functional Requirements:-**Functional requirement are the function or features that must be included in any system to satisfy the business needs and be acceptable to the users. Based on the functional

requirement that the system must work-In proposed system, the system should be able to perform Tracking and marking student attendance by facial recognition in specific time.

2. **Non- Functional Requirements:-** Non-functional requirement is a description of feature, characteristics and attributes of the system as well as any constraint that may limit the boundaries of the proposed system.
The non-functional requirements are essentially based on the performance, information, economy, control and security efficiency and services. Based on these non-functional requirement are as follows:-
   • User-Friendly.
   • System should provide better accuracy.
   • To perform with efficient throughout and response time.

3. **User Classes &Characteristic's :-** Basic knowledge of using computers is adequate to use this application. Knowledge of how to use a mouse or keyboard and internet browser is necessary. The user interface will be friendly enough to guide the user.

4. **Feasibility Study :-** A feasibility study tests the viability of an idea, a project. The goal of a feasibility study is to emphasize potential problems that could occur if one pursues a project and determine if, after considering all significant factors, the project is a good idea. Feasibility studies also allow a project to address where and how it will operate, potential obstacles, competition and the funding needed to get the process up and running.

5. **Technical Feasibility:-**Technical feasibility study is the complete study of the project in terms of input, processes, output, fields, programs and procedures. It is a very effective tool for long term planning and trouble shooting. The technical feasibility study should most essentially support the financial information of an project. It includes following aspects.

   • Project description in brief
   • Examination of the part of the project.
   • The human and economic factor. • Solutions to the problems.

6. **Economic Feasibility :-** Economic feasibility analysis is the most commonly used method for determining the efficiency of a new project. It is also known as cost analysis. It helps in identifying profit against investment expected from a project. Cost and time are the most essential factors involved in this field of study.

7. **Performance Feasibility :-** When measuring performance, the actual rate of return of an investment or a pool of investments over a given evaluation period. Total return includes interest, capital gains, dividends and distributions realized over a given period of time. Total return accounts for two categories of return: income and capital appreciation. Income includes interest paid by fixed-income investments, distributions or dividends. Capital appreciation represents the change in the market price of an asset.

8. **Assumptions :-**

   A. All the software such as python,etc are installed and running on the computers.
   B. The cluster of nodes is formed and running.

III. PROPOSED ALGORITHM

1. **Convolutional Neural Network (CNN) :-**

   • Step 1(A): Convolution Operation The first building block in our plan of attack is convolution operation. In this step, we will touch on feature detectors, which basically serve as the neural network's filters. We will also discuss feature maps, learning the parameters of such maps, how patterns are detected, the layers of detection, and how the findings are mapped out.
   • Step 1(B): ReLU Layer The second part of this step will involve the Rectified Linear Unit or ReLU. We will cover ReLU layers and explore how linearity functions in the context of Convolutional

Neural Networks. Not necessary for understanding CNN's, but there's no harm in a quick lesson to improve your skills.

- Step 2: Pooling In this part, we'll cover pooling and will get to understand exactly how it generally works. Our nexus here, however, will be a specific type of pooling; max pooling. We'll cover various approaches, though, including mean (or sum) pooling. This part will end with a demonstration made using a visual interactive tool that will definitely sort the whole concept out for you.
- Step 3: Flattening This will be a brief breakdown of the flattening process and how we move from pooled to flattened layers when working with Convolutional Neural Networks.
- Step 4: Full Connection In this part, everything that we covered throughout the section will be merged together. By learning this, you'll get to envision a fuller picture of how Convolutional Neural Networks operate and how the "neurons" that are finally produced learn the classification of images.

IV. PROJECT ARCHITECTURE
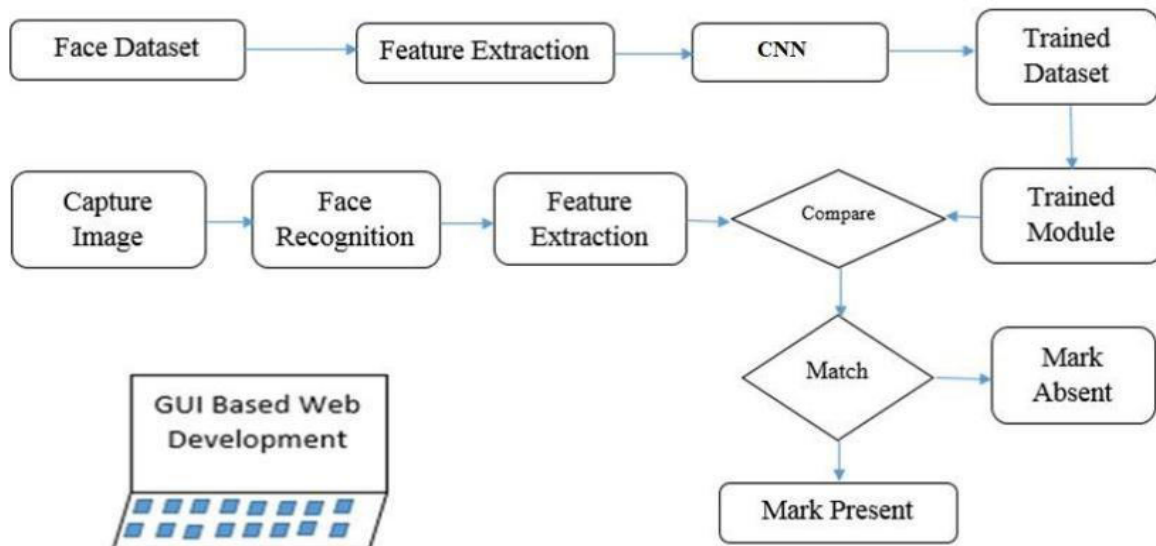
V. CONCLUSION AND FUTURE WORK

Automated attendance system has been envisioned for the purpose of reducing the errors that occur in the traditional (manual) attendance taking system. The aim is to automate and make a system that is useful to the organization such as an institute. The efficient and accurate method of attendance in the school/college/office environment that can replace the old manual methods.

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