
AI-Powered Attendance System

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Abstract: In this project, face of an individual is used for the purpose of marking the process of attendance automatic by using face detection and face recognition algorithms in the field of AI. Face detection and recognition algorithms are utilized to recognize students going to an address in a classroom and stamp their attendance by perceiving their faces. This process consists of an enrollment procedure in which the remarkable features of a people's face will be put away in labeled folders in a database. For marking the attendance, the student face is captured and is compared with the stored features in the database for respective students. When the face is identified by the system, the student is then marked present for the respective class and the details are stored as a CSV file. The analytics of students is displayed for each student in a day. At the end of each month or semester, the number of days that the student present or absent is calculated and stored for further proceedings.

KEYWORDS: Face Recognition, Attendance System, Webcam, Artificial Intelligence.



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INTRODUCTION

The need of contactless systems is increasing day-by-day. Uniqueness of an individual is their face. In this project, face of an individual is used for the purpose of making the attendance automatic by using face detection and face recognition algorithms in the field of AI. Here, we propose a plan of utilizing those algorithms to recognize students going to an address in a classroom and stamp their attendance automatically by perceiving their faces.

A. Face Recognition:

Scientists started working on computers to recognize human faces from mid-1900s because of its enormous applications on face recognition has received continuous attention from researchers. Face recognition may be outlined because of the technique of characteristic by someone based on biometrics by the approach of matching capturing image or video with the data present in the database. The data flow process in face Recognition systems starts by having the ability to find face and recognize frontal faces from data input devices like mobile phones, cameras, etc. Practically it has been proved that students attended classes only when there is full control on classroom and attendance monitoring.

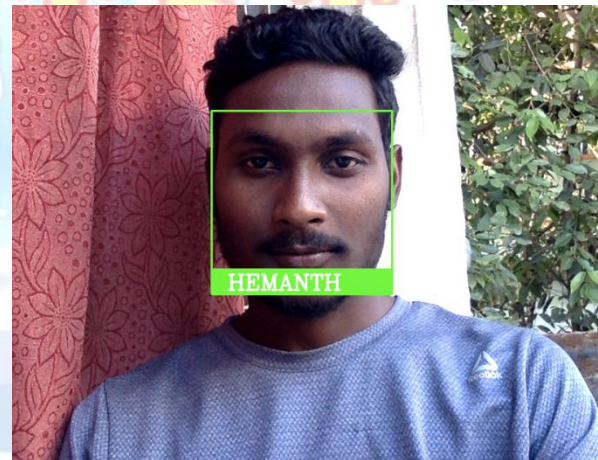
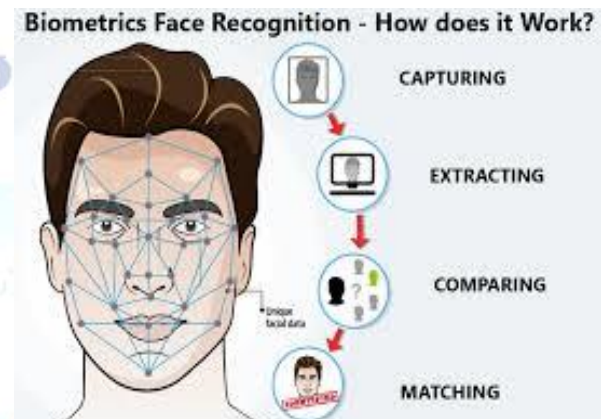
METHODOLOGY

A. Functional Specifications:

Functional specifications are the requirements in which requires to operate a system. These requirements are necessary to assemble a system which will be required to attain the objectives embarked. Some of the important functional and non-functional requirements are outlined below by analyzing the shop keeper story.

- First capturing the image of face by high quality camera.
- HD Camera or a laptop webcam
- Facial features should be detected in photo by using opencv in python.
- Crop all the faces detected.
- Resize all the images captured.
- Storing all the detected face images in a separate folder.
- Store the captured images into the database.

- Train the images using opencv attendance library.
 - Perform recognition for faces stored on database.
 - Performing face recognition sequentially for the each image cropped.
 - Displaying input and output cropped image.
 - Store the details of a student in a separate folder.
 - Marking the attendance in a csv file.
- Storing the data for future use.
- Displaying the analytics using a bar graph.



The face recognition attendance system consists of various phases throughout the completion of the process and is accessed by the administrator. For the student to be recognized they need to be registered. For registration, a form must be filled up with the basic details of a student along with their images. Once the form is filled up student are captured automatically after face being

As a part of the registration process and are stored within the particular student folder. Encoding of the register images that are encoded along with their labels. Detecting facial landmarks is a subset of the shape prediction problem. Facial landmarks such as

eyes, eyebrows, nose, mouth, jaw line were used to localize and represent salient regions of the face. Given an input image, a shape predictor attempts to localize key points of interest along the shape.

In the context of facial landmarks, our goal was to detect important facial structures on the face using shape prediction methods. For detecting key facial structures in the face region we have used a pre-trained facial landmark detector which estimates the location of 68 (x, y)-coordinates of facial structures on the face. The indexes of the 68 coordinates can be visualized on the image. dlib and opencv are used to detect facial landmarks in an image. Python is a powerful tool and loaded with powerful libraries for AI. During attendance, webcam is connected, and as students enter the class their faces are detected and recognized after which, an entry is marked in Excel sheet as a present and other as absent. Reports are generated on the basis of attendance sheet. Those reports are stored for further processes.

B. Non-Functional Specifications:

Non-functional Specifications are the requirements based on the specific use case to evaluate the operation of the system. These requirements are collected and analyzed.

- Important thing is the ease to take pictures.
- Easily installable system.
- The operator will give a clear instruction on how to pose the face to train computer.
- The system need to be highly secure.
- Very fast response of the system.
- Fast, reliable and 100% efficient face recognition algorithm.
- Portability is another key feature of this system.
- Easily maintainable system.

ARTIFICIAL INTELLIGENCE TO MARK ATTENDANCE:

The security gates of the school opened only secure accurate Facial Recognition recognizes the right person. The working of this method is based on scanning. These method works by the method of

scanning the persons face and check with the data base and the person need not to show their face to scanner it will automatically detects face and check with database if both matches the doors will open. Advanced Artificial intelligence enabled techniques are started implemented in class rooms. As books are replaced by tablets and smart board's blackboards. Smart mobiles will replace attendance registers place. A girls government high school in Chennai, Tamil Nadu, started implementing attendance system based on artificial intelligence enabled and



This is a India first school implemented and got popular in Japan and Us. The working of that method is based on the mobile application in which contains all the relevant basic details of the student with the student photo. The faculty needs to just click the photo which automatically marks the attendance those who present and stores the attendance in database. A Company in china has programmed the world's 1st Artificial Intelligence teaching assistant designed to control through whiteboard along with a commanding person. Artificial Intelligence assistant, reacting to the user through voice recognition. The main feature of automatic face recognition is to find that all students attending or not. It is also used to mark grades and use to prepare customized exercises for the college activities.

REAL-WORLD APPLICATIONS OF FACIAL RECOGNITION:

- Recent Years, Face Recognition and identification is being extensively used in security surveillance Real-time system to Identifying individuals on the spot
- In crime detection and forensic analysis it plays a major role. Uses driving license to identify the criminals using facial recognition system is used in US Federal

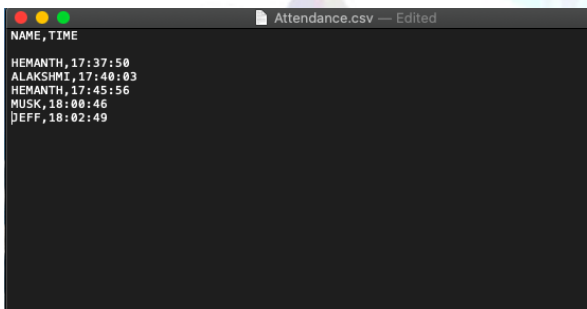
Bureau of Investigation. Artificial Intelligence enabled cameras has been checked to identify those smuggling persons in UK.

➤ Face identification method plays a key role in making secure payments using online payment. online payments is a more trusted feature in which only the Account holder can access account.

➤ The personal information in mobiles can be protected in smart phones to check no one can access the personal data even the smart phone is stolen. It is being used in mobile phones for unlocking. This method is very high secure. Advertising makes more responsive.

A. Advertising makes more responsive

Using face identification method we can make advertisements a lot of participating and makes more personalized for various types of users. To customize the audience interests some branded companies has already implemented automatic face identification method in digital world to customize their campaigns by scanning a face, based on his age and gender ads are played. Apart that this system identifies expressions of people to understand their emotions like sad, happy, disgusted, etc. based on that displays ads for a particular product in which the user likes by understanding the facial emotional features.



B. Airport security increases

Airports are the most busy place in which high chances of criminal and terrorists activates because of this reason several airlines started implementing face identification systems to check baggage's and flight boarding makes the process quicker. Moreover, the Artificial Intelligence face authentication application implemented with surveillance cameras which helps in identifying a terrorist who might be involved in some disastrous activity by understand the unusual behavior of the person and the facial expressions of the person to

recognize the criminals to make the airport place safe.

C. Diagnose rare genetic diseases

Artificial Intelligence enabled automatic face identification application will facilitate the medical business to diagnose sickness that leads to an amendment in appearances like spreading eyes or drooping ears. A face recognition scanning will become apart of standard medical check-up that will identify genetic disorders such as Disgorge syndrome, Angelman syndrome, Cornelia de Lange syndrome etc. which bring gradual changes in facial expressions. Now clinical diagnoses for various genetic diseases and its treatment will become faster than before with face recognition in this way facial technology also implemented in medical field also.

D. Provide driver safety and personalization

Automobile companies like Tesla, Subaru are increasing their services in numerous ways in which by utilizing face recognition systems to recognize drivers. The main use of using face recognition system is to begin the car using face recognition rather than using key to start the car. Face recognition can scan the facial features of the driver and monitors the focus of the driver and alerts the concern person if they are losing the concentration.

The face identification identifies the preference of the driver like favorite stations, calendar and the position of the seat with detailed report which increases the customer and driver safety.

E. Helpful in VIP identification

A face recognition system will establish prestigious guests whereas getting into a building or attending any event automatically identifies the person which boost their loyalty greatly. In hospitals, the face recognition method helps in identifying a returning guest at the entrance and displays the preference of food; room etc. once the face is scanned. In event the organizer can easily identifies the VIP guest among all the fans early and skips the queue and provide all VIP benefits to them.

F. Stop retail crime

In retail business, a face recognition and identification system could be a future decider because it identifies the person instantly once the person enters it searches

for a thief, criminal or person with fraudulent history. The security officer of the particular retail shop informed immediately when the criminal enters. When a criminal enters into store and the image of criminal is matching with the huge database of criminals for any criminal records pending. With the help of face recognition technology the retail crimes are gradually decreasing and there is no case of retail crimes and shop robberies etc.

ADVANTAGES:

A. Security

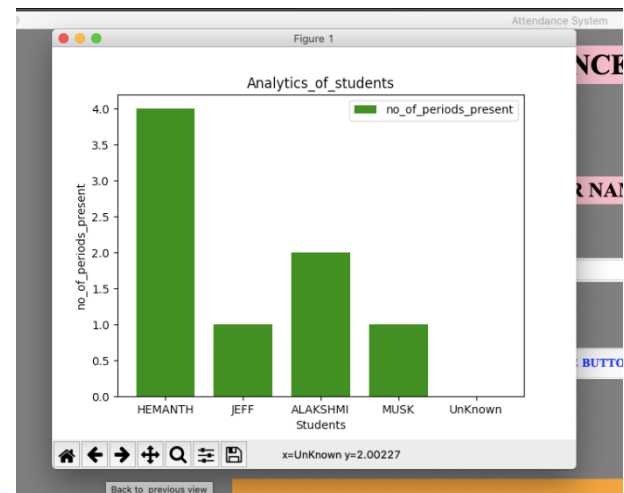
Every organization needs to secure their premises for the unknown entry into that place. They also wish to monitor the employees and industrial entry into that place. Those who are entering the organization premises without proper access they are capturing in the security surveillance system and notice to the respective person and alerts instantly concerning the person who doesn't have permission.

B. High Accuracy Rates

The main advantage is its Accuracy. The system checks and gives the output without any misunderstanding and bad face detection system. The authorized person will be detected at the right time due to the high accuracy levels. The manual recognition, which is done by securities outside of the organization's premises we may use the face recognition technology to automate the process of identification and assures its perfection without changes. We don't want additional employee to monitor the working of cameras 24/7. The main objective of Automation means to reduce human effort and reducing the cost of employees too. Then any organization can recognize the fact that usage of automated face identification is highly secure with accurate data.

C. Displaying Analytics

Attendance of each student in that day is displayed as bar graph to analyze the presence of each student in that particular day.



Forget the Time Fraud

The massive advantage using automatic face recognition method is to provide the time tracking attendance system to enable avoid time fraudness between employees. It is not possible to any colleagues to favor their friends because everyone need to pass the entrance gate where the face recognition camera catches their photo and matches with the database and avoids time fraud among workers. This is very beneficial for the employees who works based on hourly starts check in the time starts counting from that moment until a similar check-out done which is benefit to the organization they need not to monitor their workers and the method is quick because of the actual fact that staff doesn't have to prove industrial identities by scanning their smart cards on the scanner. It is very difficult for the business heads to monitor all the employees are attending or not. The main problem is time fraud among the employees can be avoided using artificial intelligence enabled face detection system.

LIMITATIONS:

A. Processing & Storing

Processing and storing of acquired data is involved with many tasks which needs extra maintenance costs.

B. Size & Quality

To operate face recognition system correctly and perfectly we required advance software system using good quality digital cameras or high quality web cam laptops. This system takes a photo of a person or takes a screen shot from the video and starts comparing with the actual image hence here the storage really matters. The image to reduce the size of the image it will

affects the quality of the system in recognizing the face. To avoid bad detection of images and speed up the recognition process we need to permit the identification in face-size range. The main problem with the system is initial investment in such a huge software system is very expensive and the processing speed will decrease due to high quality of the image.

RELATED WORKS:

A. Fingerprint-based attendance System

This attendance system works on the moveable fingerprint device developed and can pass the device to all students to scan their thumb impression on the device during the class time to mark attendance without faculty involvement. This method assures the never failure method for taking the attendance. The main issue with this method is passing the fingerprint device to all the students in class time that may distrust the student's concentration.

2. Based on RFID

The working is this type system every student needs to carry a ID card called radio frequency tag and wants to put the ID card on card reader to read and to store the attendance of the student in database. The main problem with this techniques is unauthorized access. The person using other person id card can enter into organization which the process is less secure and even they mark attendance of their friends by approved ID card scanning on the scanner.

CONCLUSION:

The system that have been developed is successfully able to accomplish the task of marking attendance automatically and output is obtained is updated as programmed. Factors such as environmental changes and mild changes in appearance impact the technology to a greater degree than many expect. For implementations where the biometric system must verify and identify users reliably over time facial scan can be a very difficult but not impossible technology to implement successfully.

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