AI-Based Attendance Monitoring System

K P Naveen Reddy, Alekhya T, Sushma Manjula T, Rashmi K

Abstract: ***Attendance Monitoring System is essential in all organizations for checking the performance of students and it is not easy task to check each and every student is present or not. In all organization attendance are taken manually by calling their register numbers or names and noted in attendance registers issued by the department heads as a proof and in some organizations the students wants to sign in these sheets which are stored for future references. This technique is repetitive, complex work and leads to errors as few students regularly sign for their absent students or telling proxy attendance of the absent students. This method additionally makes it more complex to track all the students attendance and difficult to monitoring the individual student attendance in a big classroom atmosphere. In this article, we use are using the technique of utilization face detection and recognition framework to contunisuly recognize students going to class or not and marking their attendance by comparing their faces with database to match and marking attendance. This facial biometric framework takes a picture of a person using camera and contrast that image and compare the image with the image with is stored at the time of enrolment and if it matches marks the attendance and monitor the student performance contunisuly. We may use the concept of artificial intelligence concept to monitor student attendance like capturing the motion pictures of the student when present in class to analyze the student data how much time the student presents in class.***

Index Terms: Artificial Intelligence, Student Attendance System, Face reorganization, Students attendance monitoring system and applications

I. INTRODUCTION:

The student's attendance system using artificial intelligence concept mainly works using the concept of facial recognization system was discussed by Akshara Jadhav et al.0.Face is considered as a primary key feature to identify and talk with other peoples in the world because face considered as a unique identity for each and every person. The facial features will be unique to the other indusial. The Unique features for every indusial make facial recognition in implementing the real world.

Human distinguish a particular persons face based on several factors like color, nose, eyes, ears, etc but for computers, it's difficult to analyze the data so we may use the concept of Computer vision. The intention of using computer vision technology to recognize the human features in a computer.

Revised Manuscript Received on December 15, 2019.

K. P. Naveen Reddy, GITAM School of technology, Bangalore campus.

T. Alekhya, GITAM School of technology, Bangalore campus.

Sushma Manjula T, GITAM School of technology, Bangalore campus.

Ms. Rashmi K, Assistant Professor, Department of CS&E, GITAM School of Technology, Bangalore

In recent years we observed remarkable changes in face recognition techniques because of available biometric methods, this is the most unnoticeable technique. The installation face recognization systems on a large scale are easy but the actual implementation of face recoginization system is ambitious because it has to take into account for all potential cases variation caused by a modification in face expressions by light-weight, face expressions, different styles, image resolution, sensing element device, viewing distance, etc.[3] Several algorithmic rules are implemented on face recognition and every algorithm has strengths and capabilities by its own. We tend to do face recognition nearly on a daily basis. Most of the time we glance at a face and acknowledge by in a flash with the data present already in the database

This aptitude if potential followed by machines will influence be valuable and should give for a vital role in real-world applications like vary access management, national and international security and defense, etc. At present mainly two approaches rely on Face reorganization methods. The first and very familiar method is native face recognition system that depends on face expressions of a covering for example eyes, nose, color, etc. to identify the face with a someone matching or not. The second approach is world face recognition system which uses the whole face to identify a person. The two described approaches are enforced by a methods by various types of algorithms. The recent implementation using artificial intelligence applications in face recognition attracts many scientists to research on this topic. The elaboration of a face features originates from the changes continuously within the facial expression that changes by time. Apart all these changes, we are ready to acknowledge an individual easily.The idea of developing a self understanding and self-learning intelligent machine may require to give sufficient data to the machine was proposed by Pradeepa .M et al.[5] Facial Recognition System can be defined in simple words as the technology that identifies a person and verifies it with the database by comparing the facial features described by Chaitanya reddy [7].

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 a 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. [10] Practically it has been proven that students attended classes only when there is full control on classroom and attendance monitoring.

II. 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 on previously was implemented by Jireh Robert Jam[3] .Some of the important functional and non functional requirements are outlined below by analyzing the shop keeper story.

- First capturing the facial image by high qualitity camera
- HD Camera especially professional camera
- Facial features should be detected in photo.
- Crop the overall ranges of faces detected.
- Resize all the images until the recognization system takes photo to recognize.
- Calculating the overall attendance percentage based on facial features matched.
- Storing all the detected face images in a folder.
- Loading the images into the database.
- We want to train facial features to computer to recognize.
- Perform recognition for faces stored on database.
- Calculate computer facial recognization speed for effective security.
- Performing face recognition sequentially for the each image cropped.
- Displaying input and output cropped image side by side on a same slot to recognize and compare the features by machine.
- After recognizing the face displays the name of the output image above the image in the given area to identify easily.

B.Non-Functional Specifications:

Non-functional Specifications are the needs based on the specific criteria to evaluate the operation of the system. These requirements are collect and analyzed based on the client needs and exceptions, security and working etc implementation issues by Jireh Robert Jam[3] Specifically:

- The first and important thing is user need to find easy to take pictures.
- The system can be easily installed.
- The operator will give a clear instruction on how to pose the face to train computer.
- The face reconization system is highly secure.
- The response time if the system is very less i.e. 10 seconds.
- The face recoginization system must be fast, reliable and 100% efficient.

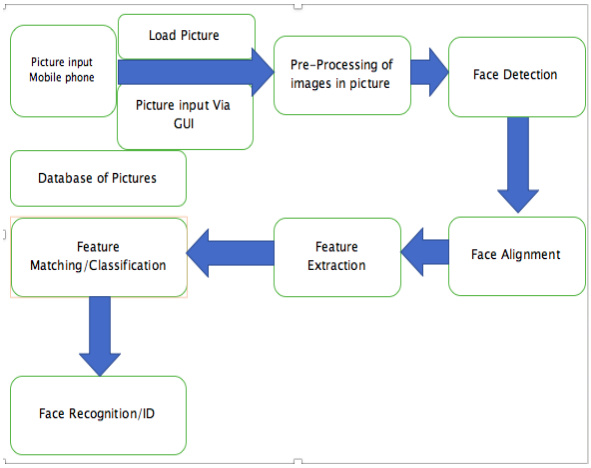

Fig-1: Flow Diagram describing the face detection.

From the above use-case mentioned Face Detector detects the face inputted in the given image or video and loads the image to the system. Face localization can notice wherever face is situated within the inputted image or video marked using the bounding boxes. The landmarks of the face like eyes, color, nose, mouth etc are done for feature extraction from the system using face localization. The key features are extracted using face extraction to undergo tracking effecetively.Facial features are matched and classify with the databases stored. Face detection offers two outputs either a positive output or negative output for the supported image from the set of stored database collection of images.

C. Working of face reconization system

The working of face recoginization system mainly classified into two types of algorithms [3]. They are holistic matching algorithm and feature-based algorithm The entire face is considered as input data to identify a particular person from the database in the holistic matching method and the face is divided based on the facial features like eyes, color, skin tone and eyebrows etc in feature-based method. Apart from the above two, in recent days three dimensions face recoginization technique is used to capture the 3D faces using sensors to identify person in real world very accurately. Real-time face detection using 3D sensor based applications determine a person with various facial images in different angles, on different light conditions, and various poses with different expression makes more efficient in all applications.

III. ARTIFICIAL INTELLIGENCE TO MARK ATTENDENCE:

Artificial Intelligence enabled Face detection based application becoming world famous. This was discussed by Santana Fell [6]. In Washington, American private elementary school in Seattle begins implementing automatic face detection technique called SAFR(Secure accurate Facial Recognition). In this method faces of parents are adding into the database.

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 replaces 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 customizes exercises for the college activities.

Citytech Software firm in Calcutta organized an in-house innovation competition based on trending technology. One group in that contest started working on Artificial Intelligence enabled cameras to require pictures of individuals coming into the workplace notice the person age, feelings ,gender and alerts the concern person about the security thread discussed by Shreyak Sawhney et al.[9] The CCTV cameras which detects the employee face and marks the attendance of that person and calculates their salary based on how many hours they worked in office.

IV. REAL-WORLD APPLICATIONS OF FACIAL RECOGNITION:

- Recent Years, Face Recognition and identfication is being extensively used in security surveillance Real-time system to Identifying individuals on the spot proposed by Shreyak Iyer et al [8].
- In crime detection and forensic analysis it's plays a major role. Using drivers 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 as it is 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.

A. Advertising makes more responsive

Using face identification method we can makes 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 adds 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 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 becoming a part 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 etc are increasing their services in numerous ways in which by utilizing face recognition systems to recognize drivers. The main use of using face recognization system is to begin the car using face recognization 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 boosts 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. Stops 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.

V. ADVANTAGES:

A. Improvement of Security Level

Every organization needs to secure their premises for the unknown entry into that place. They also wish to monitor the employees and indusial 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.[11]

B. Straightforward Integration method

The automatic face detection tools works effectively with the current authentication code that organizations has developed.Bascially the technique is a straightforward to code the system to access organizations automatic data processing which makes the method very clear.

C. 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 addition employee to monitor the working of cameras 24/7. The main objective of Automation means to reduce human effect and reducing the cost of employees too. Then any organization can recognizes the fact that usage of automated face identification is highly secure with accurate data.

D. 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 recoginization 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 indusial 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.

VI. LIMITATIONS:

A. Processing & Storing

Storages plays major role in practical world in avoiding wasting huge amounts of information and needs to store for future use. For storing HD-Videos in a very low resolution also needs a huge amount of .We are wasting large number of resources in processing high-quality image frames every time which is actually not required. We need to process all the data and wants to store all the data creates a huge space. But using face recoginization we can done this job in fraction of seconds using artificial intelligence concept. To reduce the speed of processing photo frames professional agencies will use clusters of computers. But each additional system means that appreciable information transfer via internet creates a problem.

B. Size & Quality

To operate face recognition system correctly and perfectly we required advance software system using high quality digital cameras.identfication 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 and affects the storage.ess the image to reduce the size of the image it will affects the quality of the system in recognizing the face. For example consider CCTV and the person who is far away the camera recognizes the person and takes photo from a long distance if the resolution of the image is decrees then we can't identify the person if we didn't decreases the quality of the image the storage size of the image is very high.

To avoid bad detection of images and speedup the recoginization 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 decreases due to high quality of the image.

C. Surveillance Angle

The police identification method is additionally creates problems in many ways which was answerable for the selected face capturing by the camera to register a face using software recognition system, so many angles are getting used like 45 degree, frontal face etc. To get transparent model for the image, we have to use frontal part. One can fool the face recoginization system by hair on face, spectacles etc but using the high intention image with direct angle goes with the enrolled and compared with the actual image to get accurate results. Even a person can fooli system by appearing suddenly or removing beard or mask on face etc. We can simply avoid the above mentioned problems by updating the databases regular To avoid such failures, the databases must be regularly updated with all the recent changes.

VII. 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 thump 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 students concentration which is of no use for the students and difficult to pass the device without disturbing the class to all students to mark attendance by putting their thumb on the device was discussed by Akshara Jadhav et al [1].

B. Radio Frequency Identification-based Attendance System

The works connected to this identification attendance system still present in the practical society described by the author Akshara Jadhav at el. they proposed an Radio frequency identification system. 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.

C. Iris-Recognition Based Attendance System

It is a biometric system which uses the Iris-Recognition management .this system uses the concept of iris recoginization system in which the iris are scanned and extracted the features and matched with the database. The main problem with this system is placing the transmission lines of the scanner in a good condition of light to scan the entire irises passing through the system. It is based on the real time face detection system which is highly secure, reliable and fast to access but needs a lot of development in different lighting conditions was discussed by Akshara Jadhav et al[1]

VIII. CONCLUSION:

We are automating the attendance system to decrease the errors occurs due to the manual taking attendance. If the cameras monitoring into classrooms to evaluate their interest and to mark attendance, students tends to pay attention if Artificial Intelligence enabled method can monitor and mark their attendance and faculties will at least come to school or college every day because, in early times they are coming and putting sign and they are letting the school or college now it's not possible if the faculty left the college the system automatically marks as absent so everyone will come to school or organization regularly. Using artificial intelligence concept the attendance monitoring system is very secure, accurate and easy to monitor students and faculty's attendance.[8]

REFERENCES:

[1] Akshara Jadhav, Akshay Jadhav Tushar Ladhe, Krishna Yeolekar "Automated Attendance System Using Face Recognition" Irjet Volume: 04 Issue: 01 | Jan -2017
[2] Lerato Masupha,Tranos Zuva,Seleman Ngwira,Omobayo Esan "Face Recognition Techniques, Their Advantages, Disadvantages And Performance Evaluation" 2015 International Conference On Computing, Communication And Security(Icccs),1-5,2015.
[3] Jireh Robert Jam, Face Detection And Recognition Student Attendance System,Kingston University London
[4] Expert Opinion: The Effect Of Artificial Intelligence On Face Recognition Avaliable At Https://Www.Everteam.Com/En/Artificial-Intelligence-Face-Recognition/ Accessed On (08/10/2019)
[5] Pradeepa .M, H P Mohan Kumar" Face Detection And Recognition For Automatic Attendance System Using Artificial Intelligence Concept"Ijesc Volume 8 Issue No.5 May 2018
[6] Santana Fell "Ai To Mark Attendance" The Telegraph Online Edition Published On Wednesday, 25 September 2019
[7] Chaitanya Reddy "Face Recognition Using Artificial Intelligence" Towardsdatascience.Com In April 2017.
[8] Sulakshana Iyer "Facial Recognition Technology Is Too Great To Ignore" On Soft Web Solutions In March 6th, 2019
[9] Shreyak Sawhney ; Karan Kacker ;Samyak Jain ;Shailendra Narayan Singh ;Rakesh Garg "Real-Time Smart Attendance System Using Face Recognition Techniques" Published In Ieee 2019 9th International Conference On Cloud Computing, Data Science & Engineering (Doi: 10.1109/Confluence.2019.8776934)
[10] Jyothi S Bedre,Shubhangi Sapkal "Comparative Study Of Face Recognition:A Review" In Emerging Trends In Computer Science And Information Technology-2012 And Precedings Published In International Journal Of Computer Applications.
[11] Refik Samet,Muhammed Tanriverdi "Face Recognition-Based Mobile Automatic Classroom Attendance Management System" Published In Ieee 2017 International Conference On Cyberworlds (Cw) (Doi: 10.1109/Cw.2017.34)

AUTHORS PROFILES

K P Naveen Reddy- obtained his B. Tech degree (CS&E Branch) in GITAM School of technology, Bangalore campus. He has published the research paper titled "A study of Robotic Process Automation Among Artificial Intelligence" on International Journals of science and research publications, Volume 9, Issue 2, February 2019 ISSN 2250-3153 and two more article with name "Closed Form Solutions Of Funcanality of Windshield Wipers" in IJEE (Volume 10, Issue 1) and "Comparison of Programming Languages: Review" in IJCSE (Volume 9 Issue 2) which are UGC Recommended Journals. The research aims are Artificial intelligence, Robotics, Machine learning and Big data.

T Alekhya- completed her B. Tech degree (CS&E Branch) in GITAM School of technology, Bangalore campus. She has Published the research paper titled "A study of Robotic Process Automation Among Artificial Intelligence" on International Journals of science and research publications, Volume 9, Issue 2, February 2019 ISSN 2250-3153. Her research interests are artificial intelligence robotic process automation and machine Learning.

Sushma Manjula T- Obtained her B.Tech degree (CS&E Branch) in GITAM School of technology, Bangalore campus. The research interests are artificial intelligence, Robotics and Internet of Things.

Ms RASHMI K - Assistant Professor in Department of CS&E, GITAM School of Technology, Bangalore Campus Published a book related to computer science on Computer Networks (ISSBN: 9789386770707) by Aram Book House (P) Ltd in 2018. She has published a research paper on "Healthcare Data Modeling in big data analytics using R" in Journal of Emerging Technologies and Innovative Research, Volume 6, 522-525,2019 and two more Scopus index journals with title "Royalty Processing in Music Industry with Block chain Technology" and "Flexible Deep Learning in Edge Computing for IOT" in International Journal of Pure and Applied Mathematics, Scopus, APR-2018, volume 119.The research interests are Block Chain Technology ,Artificial intelligence and wireless sensors networks.