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Liveliness Based Attendance System

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Abstract: ***The paper describes the development and implementation of a liveliness-based attendance system. The proposed system uses computer vision algorithms to detect the liveliness of a person's face and compare it with the stored images to verify their identity. The system can accurately identify and mark the attendance of individuals in real-time, by eliminating the need for manual processes. The results show that the proposed system is reliable and efficient, making it suitable for use in various settings, such as educational institutions and workplaces. Overall, the system provides a convenient and secure way to manage attendance, saving time and improving accuracy.***

Keywords: liveliness-based attendance system, facial recognition, real-time attendance, facial expressions, database

Problem Statement: According to the previous attendance management system, the accuracy of the data collected is the biggest issue. This is because the attendance might not be recorded personally by the original person, in another word, the attendance of a particular person can be taken by a third party without the realization of the institution which violates the accuracy of the data. Hence create a system that can capture the live details of a particular person & be able to store it in a database for future reference.

I. INTRODUCTION

Liveliness-based attendance system is a technology that uses various methods to verify the identity of a person and ensure that they are physically present during attendance marking. The system is designed to eliminate attendance frauds that are prevalent in many organizations and educational institutions. The system uses behavioral characteristics to authenticate the identity of the person and ensure that the person is actually present. The goal of the project is to develop an accurate, reliable, and secure system that can help organizations manage attendance effectively and efficiently.

Automated Attendance System (AAS) is a process to automatically estimate the presence or the absence of the student in the classroom by using face recognition technology. It is also possible to recognize whether the student is sleeping or awake during the lecture and it can also be implemented in the exam sessions to ensure the presence of the student. The presence of the students can be determined by capturing their faces on a high definition monitor video streaming service, so it becomes highly reliable for the machine to understand the presence of all the students in the classroom.

II. PROPOSED SYSTEM

The task of the proposed system is to capture the face of each student and to store it in the database for their attendance. The face of the student needs to be captured in such a manner that all the features of the students' face needs to be detected. There is no need for the teacher to manually take attendance in the class because the system records a video and through further processing steps the face is being recognized and the attendance database is updated. This system is developed using python opencv. OpenCV: OpenCV (Open Source Computer Vision Library) 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 Itseez (which was later acquired by Intel). The library is cross platform and free for use under the open-source BSD license. Python is dynamically typed and garbage collected. It supports multiple programming paradigms, including structured (particularly, procedural), object-oriented, and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

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Image Capture: We need some HD camera in order to get results. We can capture the images from the video stream or by capturing each and every image from the webcam manually. Doing the frame capture from the stream of video will give us results in less © 2020 JETIR October 2020, Volume 7, Issue 10 www.jetir.org (ISSN-2349-5162) JETIR2010064 Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org 549 time but we won't be able to capture the face properly in case we lose light or something and if the face is not captured properly.

Image Processing: Digital image processing is the use of a digital computer to process digital images through an algorithm. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build- up of noise and distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems. The generation and development of digital image processing are mainly affected by three factors: first, the development of computers; second, the development of mathematics (especially the creation and improvement of discrete mathematics theory); third, the demand for a wide range of applications in environment, agriculture, military, industry and medical science has increased.

III. ARCHITECTURE DIAGRAM

Architecture diagram is define for proposed system in figure 1.Data collection: taking data of person [ID(which is auto incremented) , Name, creating username , email, number , age, gender, password, visit reason, Position (student/faculty/visitor) and storing it to database. Then data mapping is done it takes face data (30 images) and storing it to folder with name same as primary key. After taking 30 face data the Camera input taking video input frame by frame and do processing on it.

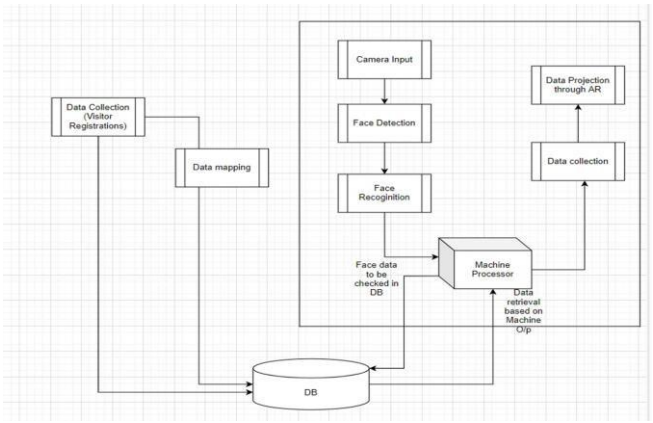

Fig 1. Proposed System Architecture Diagram

Face detection is done by using opencv library LBPHF ace Recognizer is used which is build in python library ,for detecting faces in that image. After detecting next and main step comes Liveliness Checking, using liveliness module it check if person is there or its just showing photograph or image. After sucessfully face detection next is Face Recognition if liveliness test is passed then it forward these frames from camera to face_recognize module to match that face with face data taken at time of registration If face is matched then we retrieve data of that person from database which is called data collection. Data projection is done through AR which prints all the data taken from the database on image.

IV. WORKING OF PROPOSED SYSTEM

Firstly we call liveliness function, check if a person is live or it's just an image by asking to do certain movements. If liveliness is passed then pass controls to face recognition module. Face_recognisze module takes image as input.

Step 1: Convert the image from "RGB" profile to "BGR" profile

Step 2: Convert the image to Gray image

Step 3: Use detect MultiScale function to detect faces in image

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Step 4: Use cv2.rectangle() to draw a rectangle around the face
Step 5: Using gray[y:y + h, x:x + w] crop the image
Step 6: Use cv2.resize() to resize it to match its size with our face data
Step 7: Pass cropped face to model.predict() to match face with our dataset
'**Step 8:** % s - %.0f' % this function will return the folder label (folder name) if face matches with our face data but for that we will have to provide numpy array of folders
Step 9: This is how it would look like '% s - %.0f' % (names[prediction[0]], prediction[1])
Step 10: By taking folder name where face match has been found we will fire query into database to get that particular person's data, Here folder name and primary key of that person is same
Step 11: Using cv2.putText we put all the data on image to present it into the form of augmented reality
Step 12: Call the records function to mark attendance of that person

V. RESULT

We have done more than six test cases, with different users. The proposed system gives accurate results of all the test cases. The users data is successfully store in database, and accuratly give the same match after recoginzation. For example shown in Fig 2.

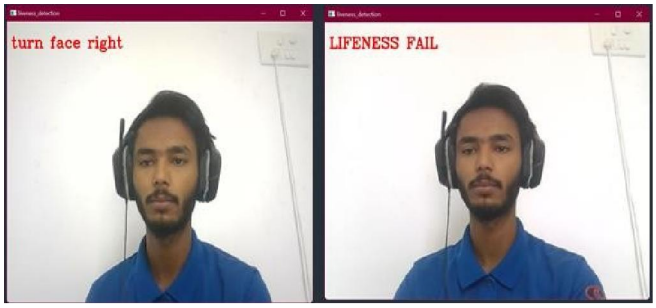

Fig 2. Result

In the above image Fig 2, the camera will capture the person's image, the instruction will prompt you to do certain movements like turn face right or turn face left.After this it will match the user with database image if not match it will declare lifeness fail.

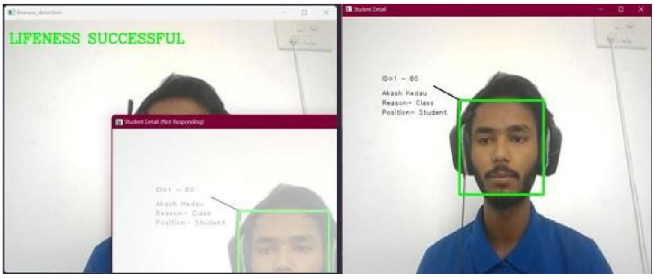

Fig 3.Result Successful.

In the above image Fig 3,after successfully detecting a face ,it will give details of the user who is marking his/her attendance in the system on screen like his/her id,name ,reason ,position and also percentage of matching user face with database stored images

VI. CONCLUSION

A liveliness-based attendance system is a valuable solution for organizations and educational institutions seeking to manage attendance with greater efficiency and accuracy. By leveraging behavioral characteristics to verify a person's identity and physical presence, the system can eliminate fraudulent attendance and improve attendance record-keeping. This advanced system can also provide real-time attendance tracking, support multiple locations, and generate analytical reports to support data-driven decision-making.

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This project has the potential to benefit a broad range of organizations and institutions by improving compliance, streamlining administrative processes, and increasing overall efficiency. Furthermore, the liveliness-based attendance system can reduce the risk of human error, save time and resources, and improve the experience for both students and employees. Ultimately, the implementation of this technology can help organizations focus on higher-level strategic objectives by automating routine attendance management tasks.

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