
SURVEY ON REAL-TIME IMAGE-BASED ATTENDANCE SYSTEM

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ABSTRACT

This research paper contains information on Real-time Image-Based Attendance System. The "Face Recognition-Based Smart Attendance System using Machine Learning" not only streamlines attendance tracking but also enhances security, reduces the risk of proxy attendance, and saves time for both administrators and attendees. This innovative solution represents a significant advancement in attendance management and is poised to revolutionize the way organizations and institutions handle this essential administrative task.

Keywords: Accuracy, Real-Time Tracking, Security, Transparency, Time Saving Management, Reduces The Risk Of Proxy Attendance.

I. INTRODUCTION

The "Face Recognition-Based Smart Attendance System using Machine Learning" is an innovative application that leverages the power of machine learning and computer vision to automate and enhance the traditional process of attendance tracking. This system offers a modern and efficient approach to record and manage attendance by recognizing and verifying individuals' faces in real-time.

Traditional attendance systems, often reliant on manual record-keeping or card-swiping methods, are susceptible to inaccuracies, time wastage, and even fraud. The Face Recognition-Based Smart Attendance System addresses these issues by providing a seamless, contactless, and secure means of tracking attendance.

The core technology behind this system involves training machine learning models to recognize individuals' unique facial features. These models can accurately identify and verify users by comparing their facial data with a database of registered faces. The system operates in real-time, capturing faces through cameras or other image-capturing devices, and automatically marking attendance once a match is confirmed.

Key components of this system include facial detection, feature extraction, and recognition algorithms that make it possible to identify individuals accurately, even under varying lighting conditions and angles. Additionally, the system can provide detailed attendance reports and analytics, making it valuable for educational institutions, businesses, and organizations seeking a more efficient and data-driven approach to attendance management.

It is also enhances security, reduces the risk of proxy attendance, and saves time for both administrators and attendees.

II. ATTENDANCE TECHNOLOGY BASICS

A. Explanation of Real- Time Image-Based Attendance System:-

This research mainly focuses on the implementation of real time attendance system as well as sending the attendance report to the respected guardians/teachers.(in the case in employee any company for attendance or punching.) to help them track the number of classes attended by their children, which will further be implemented in institutions, organizations as well as schools to reduce the time invested while taking the attendance by ordinary procedures.

Extract features from facial images and learn to map these features to a unique embedding vector for each individual.

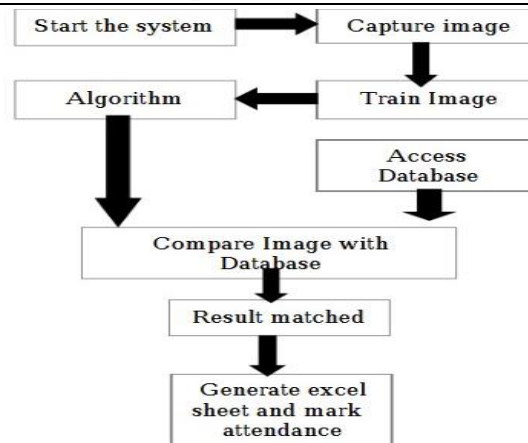


Fig. 1. Proposed System Block Diagram

III. KEY COMPONENTS

Generate roll numbers of present students and return that, when data is returned, the system generates attendance table which includes the name, roll number, date, day and time with corresponding subject id. automatically identifies and confirms a person and records attendance based on their face detection.

IV. SMART CONTRACTS AND THEIR ROLE IN REAL-TIME IMAGE-BASED ATTENDANCE SYSTEM ON SOCIAL MEDIA

- **Accuracy:** ML algorithms can achieve high accuracy in recognizing and verifying individuals' faces, reducing the likelihood of attendance errors.
- **Contactless:** It offers a contactless and hygienic attendance tracking method, crucial in situations like pandemic outbreaks.
- **Efficiency:** Automates attendance recording, saving time for both students/employees and administrators.
- **Security:** Enhances security by ensuring that only authorized individuals can mark their attendance, reducing the risk of proxy attendance.
- **Real-time Tracking:** Provides real-time attendance tracking, enabling immediate response to attendance anomalies or emergencies.

V. SYSTEM STRATEGY

We are completely user driven. Gray image conversion technique and Haar Cascade classifiers have been used to extract the features from the captured image.

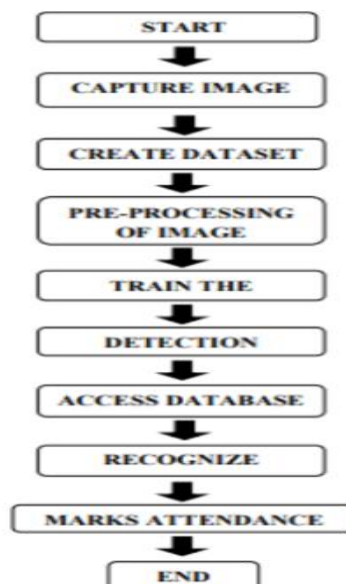


Fig. 2. Block Diagram of System Strategy.

- 1. CREATE DATASET:** The dataset includes many number of images of the indicated person, for the process of recognition. It is stored in a folder named 'DATASET'.
- 2. PRE-PROCESSING OF IMAGE:** We have used gray image conversion technique which converts input image converts into grey scale image, for preprocessing the image for better quality.
- 3. TRAIN THE DATASET:** When algorithm is asked to recognize some unknown face, it uses training set to make the recognition. It will use the same id which was used for capturing faces, for the successful training. And the trained sheet will be successfully saved in a folder named trainer, with the extension trainer.yml.
- 4. FACE DETECTION:** Here, the human face is detected in digital form using the function, detector=cv2.CascadeClassifier("haarcascade_frontalface_default.xml"); 'frontalface' is used since we are using the front face of the students for automated attendance system, and haarcascade classifier is required in OpenCV for extracting the facial features of the image captured.
- 5. ACCESS DATABASE:** Database will be required to compare the face images. Previously made dataset will be accessed now.
- 6. RECOGNIZE:** When algorithm is asked to recognize some unknown face, it uses training set to make the recognition. Here, LBPH method is used. In our proposed system face is recognized using the following function: recognizer = cv2.face.LBPHFaceRecognizer_create (); Recognizer.Read('trainer/trainer.yml'); This will recognize the face using LBPH algorithm and by using the trainer.yml file, to find the exact match of faces.
- 7. MARKS THE ATTENDANCE:** If the face which was trained is matched with the face being recognized, then the system on clicking the button 'ATTENDANCE SHEET' will automatically create the attendance sheet with the current date and the name of the candidate.
- 8. MAIL THE ATTENDANCE:** After marking the attendance, the attendance sheet can be mailed to the guardians, while selecting the mail ids and the attendance sheet manually

VI. EXPERIMENTAL RESULTS

c	EXPECTED RESULTS	OBSERVED RESULTS	EXECUTED (TRUE/FALSE)
cv2.VideoCapture (0)	Connects with the installed camera and starts playing.	Camera started.	True
cv2.Cascade Classifier	Loads the haarcascade classifier.	Gets ready for extraction.	True
ExtractFace()	Loads the LBPH face extracting framework.	Face extracted.	True
Learn()	Starts the LBPH algorithm	Updates the trainer.xml file.	True
Recognize()	It compares the input face with the saved images.	Recognizes	True

VII. CONCLUSION

1. This system aims to build an effective class attendance system. using face recognition techniques.
2. The proposed system will be able to mark the attendance via face Id.
3. It will detect faces via webcam and then recognize the faces.
4. After recognition, it will mark the attendance of the recognized student and update the attendance record.

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VIII. REFERENCES

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