IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

International Conference on Muti-Disciplinary Application & Research Technologies (ICMART-2023)

Geetanjali Institute of Technical Studies

Vol. 10, Special Issue 2, May 2023

Student Attendance System Using Face Detection

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Abstract: When done using conventional techniques like calling out roll calls or obtaining a student's signature, managing attendance may be a tiresome task. A clever and validated attendance system must be put in place to address this problem. Smart attendance systems often employ biometrics like facial recognition, fingerprints, DNA, retina, iris recognition, hand geometry, etc. Humans may be recognized by their faces alone because of their distinctive facial traits. Systems for face recognition are be handy for a variety of real- world uses. The suggested system will first enroll all pupils by saving their face photos along with a special ID. Real time photographs will be taken during the event, and the faces in those images will be compared to the faces in the pre-trained dataset. For face detection, the Haar cascade technique is employed. The Local Binary Patterns Histogram (LBPH) technique, which creates histograms for both saved photos and real-time images, is used for face recognition and training on stored datasets. Calculating the difference between the histograms of the real-time picture and the dataset photos allows for the recognition of faces. The student's name and roll number are displayed when the lower difference yields the best match. The excel spreadsheet automatically updates with the student's attendance. The four steps of this system are database building, face detection, face recognition, and attendance updating. Images of the pupils in class are used to develop databases. The Haar-Cascade classifier and the Local Binary Pattern Histogram technique are used, respectively, for face detection and recognition. From the classroom's live streaming video, faces may be found and identified. At the closing of the session, attendance will be forwarded to the relevant professors.

Keywords*:* face Recoginition , Attendances system ,student attendance system ,open cv, face detection, Haar cascade algorithm.

I. INTRODUCTION

Systems that recognize faces can identify the individual in still images and moving movies. It is a biometric security level. Voice, fingerprint, and eye recognition are further forms of biometric security. Real-time applications include helping the blind, aiding forensic investigations, finding missing people, and securing phones. The primary goal of this project is to create a facial recognition-based attendance system. Face identification may be done using a variety of methods, including location-based attendance systems, RFID tags and readers, attendance systems with fingerprint sensors, and facial recognition. The problem of proxy attendance is reduced by the attendance system with a fingerprint scanner. When compared to other systems, attendance systems that use facial recognition offer validated data as well as much reduced chances of proxy data entry. The suggested technique records video at the moment of ailment and uses face recognition and storage to record student photos in a database. Real-time video of a student entering a classroom will be recorded, their face will be recognised and compared to photographs in the dataset, their name and roll number will be presented, and the attendance will be updated.

The everyday tasks of attendance tracking and analysis are carried out by an automated attendance management system with little assistance from humans. Issues including scale, position, lighting, variations, rotation, and occlusions cannot be resolved by the commonly used approaches and methodologies for face detection and recognition. The suggested system offers functions including face identification, feature extraction, detection of extracted characteristics, and analysis of student attendance in an effort to avoid the drawbacks of the current methods. For feature identification, the system incorporates methods including image contrasts, integral images, colour features, and cascade classifiers. Due to the system's extensive usage of facial traits, accuracy has grown. Various use cases are tested for the system. It uses a particular area, such student attendance in class, to assess the system's accuracy. The proportion of recognised faces out of the total tested faces of the same individual is the parameter taken into account. The system is tested in a variety of lighting situations, with diverse facial expressions, partial faces (in classes with a high student population), and with and without beards and eyeglasses.

II. OVERVIEW

As a biometric approach, face recognition involves determining if a specific person's face image matches any of the face images that are kept in a database. Because of the alterations that many elements, like facial expression, ageing, and even lighting, might effect the image, this problem is difficult to automatically fix. Although it may not be the most accurate biometric method, facial

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recognition offers a number of benefits over the others. Face recognition is effortless, practical, and self-sufficient. The anticipated system uses face recognition technology to automatically track students' or workers' attendance without their participation. Images of pupils or staff are taken using a webcam. The faces in the captured images are detected and compared with the images in database and the attendance is marked.[3]

III. METHODS OF IMAGE PROCESSING

The facial recognition process may be divided into two main stages: processing, which takes place before detection and involves processes like face identification and detection, and recognition, which happens afterwards and involves actions like feature extraction and matching.

A. FACE DETECTION

This step's main purpose is to determine whether or not human faces can be seen in a particular image and where they may be found. The intended outputs of this phase are patches which contain each face in the input image. In order to obtain a facial recognition system that is more reliable and simple to construct.

B. FACE EXTRACTION

The extraction of human face patches from photos is done after the face detection process. Following this stage, the face patch is converted into a vector with fixed coordinates or a collection of reference points.

C. FACE RECOGNITION

The identification of faces comes after their portrayal. We need to create a face database in order to enable automated recognition. Each individual has many photos taken of them, from which their traits are extracted and entered into the database. The face detection and feature extraction process is then carried out on an input image, and the features of each face class are compared and saved in the database.

IV. TYPES OF ALGORITHMS

There are various types of algorithms are used in this system follows:
1.Eigen Values
2.Fisher Faces
3. Local binary pattern histograms

A. EIGEN VALUES

This approach is a statistical strategy. This method derivesthe feature that affects the photos. The training database that will be offered will be a factor in the entire recognition process. Images from two distinct classes are not handled separately.

B. FISHER FACES

Like the Eigen faces, the Fisher faces algorithm also employs a progressive strategy. As a modification of Eigen faces, this technique also incorporates principal components analysis. The fisherman's consideration of the classes is the primary conversion. As was previously established, during training, the Eigen faces cannot distinguish between the two images from the two separate classes. Each image is affected by the overall average. To discriminate between images of a distinct class, a Fisher face uses linear discriminant analysis.

C. LOCAL BINARY PATTERN HISTOGRAM

For the purposes of handling the training component this approach requires the grayscale images. In contrast to previous algorithms, this method does not take a comprehensive approach.

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V. BLOCK DIAGRAM

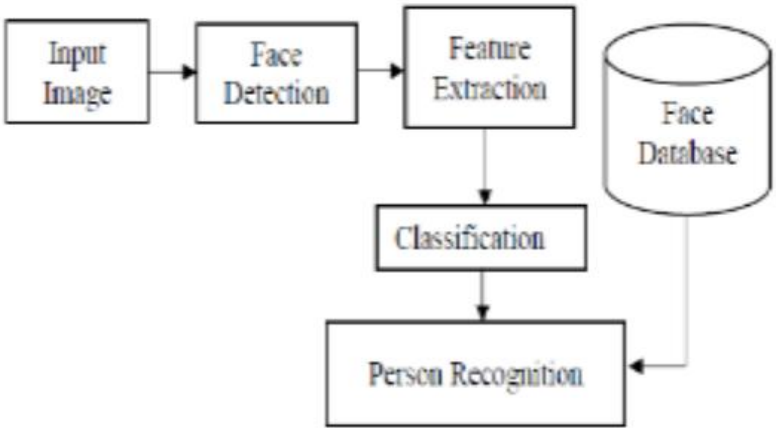

Fig 1: Block Diagram

VI. FLOW CHART

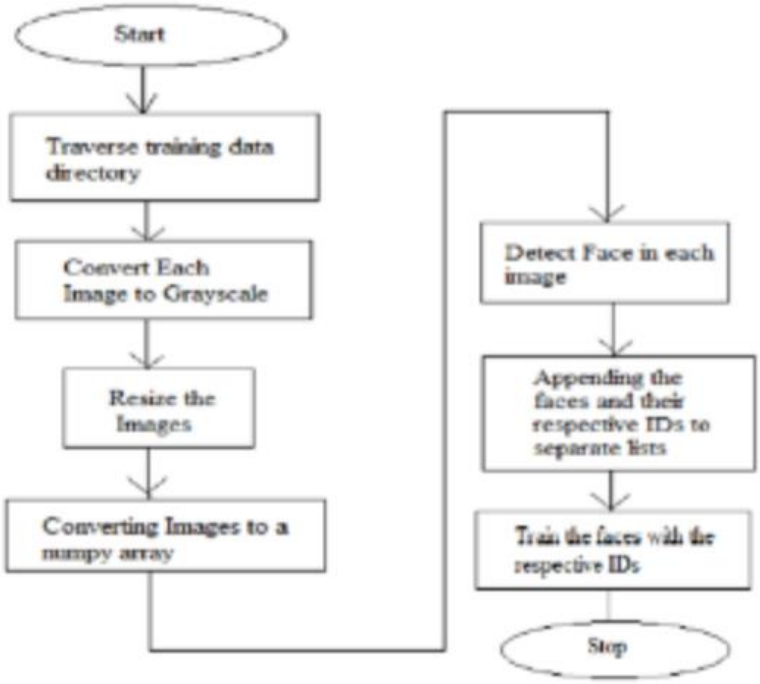

FIG 2: FLOW-CHART OF THE METHODOLOGY USED FOR TRAINING PROCESS

The exploration of the training data directory is the first step in the training process. The training data's images are all transformed to grey scale. The image's centre is chosen, and its surrounding areas are thresholded against it. If the centre portion's intensity is more than or equal to that of its neighbour, indicate it with 1; otherwise, designate it with 0. The photos are then resized after that.

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The photos are then transformed into a numpy array, the main data structure of the numpy library. Every face in the photograph is recognised. The faces are created in distinct lists for each face, and their corresponding IDs are attached to each list. After that, the faces are trained with the appropriate Ids. We have to describe the process using another flow chart .that is the my system working as follows: Grayscale is created when the picture is read. The Haar Cascade frontal face module is used to identify the faces in the picture. The faces in the image are predicted using the LBPH algorithm. Following the prediction of the photos, the identified faces are displayed in a green box with their names.

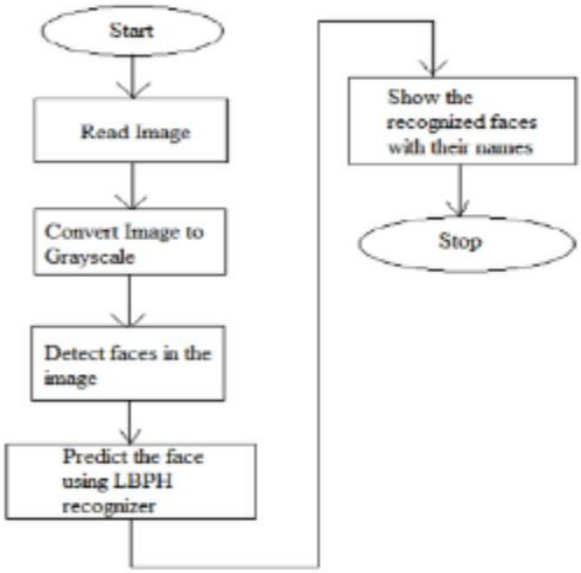

FIG 3: FLOW-CHART OF THE METHODOLOGY USED FOR FACE DETECTION AND RECOGNITION

VII. SOFTWARE USED

A. OPEN CV

The phone's camera processes the input image. Grayscale is created once the picture has been read. The Haar Cascade frontal face module is used to identify the faces in the picture. The faces in the image are predicted using the LBPH algorithm. Following the prediction of the photos, the identified faces are displayed in a green box with their names. 1. OpenCV VII. SOFTWARE DESCRIPTION Open CV (Open Source Computer Vision Library) is a machine learning-focused open source computer vision software library. the sharpened realism, etc. It supports Windows, Linux, Android, and Mac OS and has C++, Python, Java, and MATLAB interfaces. Real-time vision applications that use SSE and MMX instructions when they are available make up the majority of Open CV. The development of fully functional CUDA and Open CL interfaces is ongoing. Over 500 algorithms exist, and there are roughly ten times as many functions that support or create those algorithms. Open CV is written inherently in C++ and has a template interface that works harmoniously with STL containers.[3]

B. PANDAS

Pandas is a Python open source library that provides a variety of tools for data analysis. The package includes a number of different data structures that may be applied to a wide range of data manipulation applications. It also contains a variety of data analysis algorithms that may be used, making it possible to solve data science and machine learning challenges with Python.

C. IDLE

Python's Integrated Development and Learning Environment is known as IDLE. IDLE is entirely written in Python and makes use of the tkinter GUI toolkit. It functions almost consistently on Windows, Unix, and macOS. It contains an interactive Python interpreter with a shell window that can colourize error messages, code input, and code output. Multiple undo, Python colourizing, smart indent, call hints, auto completion, and other capabilities are available in a multi-window text editor. It is able to search across numerous files, replace text within editor windows, and search within any window. Additionally, it contains browsers, setup, and other dialogues.

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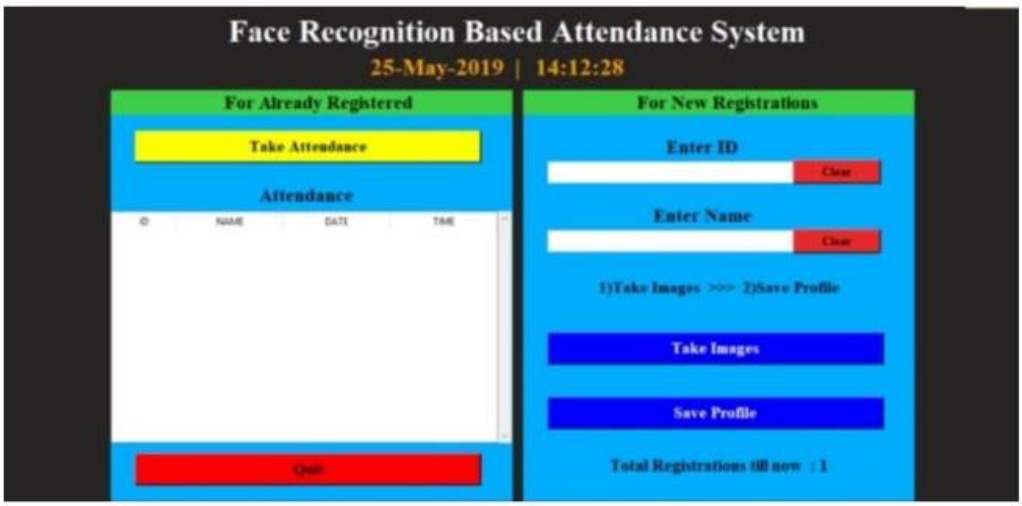
D. MICROSOFT EXCEL

The Microsoft Office software package includes the spreadsheet tool Microsoft Excel. Spreadsheets allow users to create tables of values that are organised in rows and columns and can be mathematically modified using both simple and advanced arithmetic operations. In addition to its usual spreadsheet functions, Microsoft Excel also has significant graphing and charting capabilities, programming support through Visual Basic for Applications (VBA), and the ability to retrieve data from other sources through Dynamic Data Exchange (DDE). Excel, an application for creating electronic spreadsheets, may be used to organise, modify, and store data. Paper spreadsheets used for accounting purposes served as the foundation for early electronic spreadsheet systems. Computerized spreadsheets have a similar fundamental design to paper spreadsheets. Related data can be stored in tables - which are a group of small rectangular boxes or cells that are standardized into rows and columns.[4]

VIII. RESULT ANALYSIS

A. Main Screen

B. Taking Attendance



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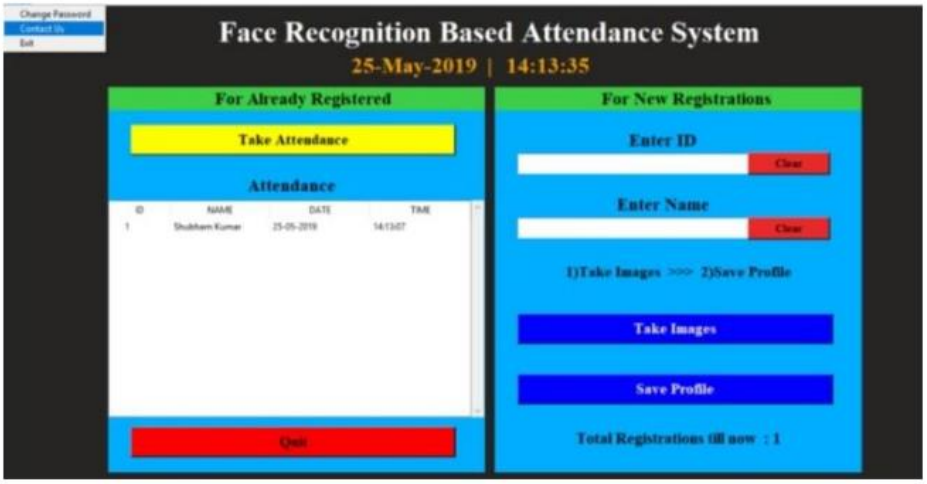
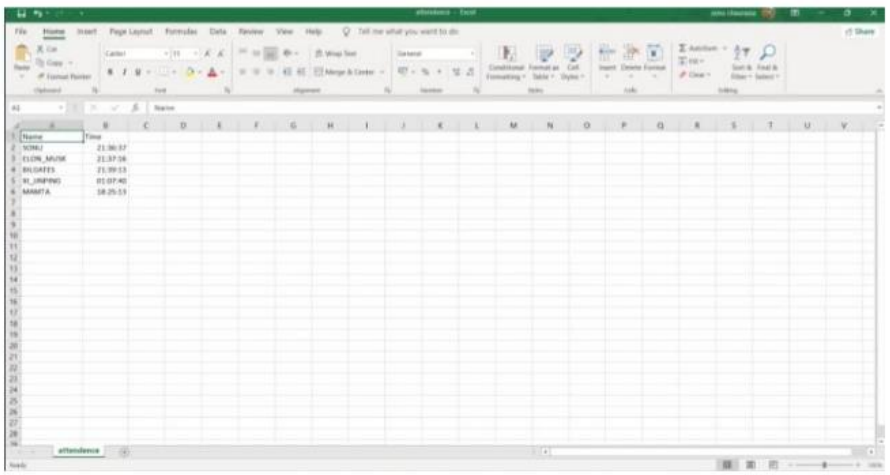
C. Showing Attendance Taken



D. Attendance in Tabular Form



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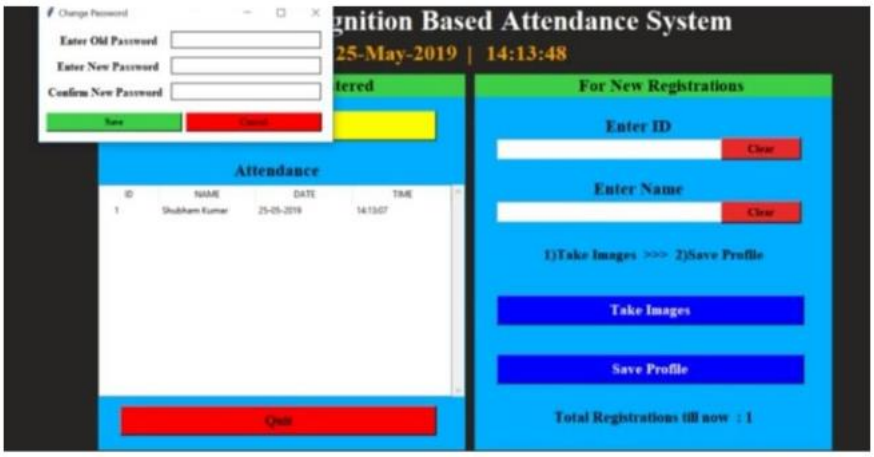
E. Change Password



IX. CONCLUSION

This facial recognition-based attendance management system gives students quick access to precise information about their attendance and uploads that information to a server.[5] Ethernet cable use. This technology offers improved security and is user-friendly and convenient. This system provides information on the student, and if there are any absences, information is exchanged with the appropriate proctors and parents.[6]

REFERENCES

[1] Sandhya Potadar , Riya Fale , Prajakta Kothawade , Arati Padale, 2021, Attendance Management system using Face Recognition, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT) Volume 10, Issue 08 (August 2021).

[2] Amrutha H. B, Anitha C, Channanjamurthy K. N, Raghu R, 2018, Attendance Monitoring System Using Face Recognition, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT) NCESC – 2018 (Volume 6 – Issue 13).

[3] TY - JOUR ,AU - Bussa, Sudhir ,AU - Mani, Ananya ,T1 – Smart Attendance System using OPENCV based on Facial Recognition.

[4] Rathod, Hemantkumar, et al. "Automated attendance system using machine learning approach." 2017 International Conference on Nascent Technologies in Engineering (ICNTE). IEEE, 2017.

[5] Sen, S., Patel, M., Sharma, A.K. (2021). Software Development Life Cycle Performance Analysis. In: Mathur, R., Gupta, C.P., Katewa, V., Jat, D.S., Yadav, N. (eds) Emerging Trends in Data Driven Computing and Communications. Studies in Autonomic, Data-driven and Industrial Computing. Springer, Singapore. https://doi.org/10.1007/978-981-16-3915-9_27

[6] Siswanto, Adrian Rhesa Septian, Anto Satriyo Nugroho, and Maulahikmah Galinium. "Implementation of face recognition algorithm for biometrics based time attendance system." 2014 International Conference on ICT For Smart Society (ICISS). IEEE, 2014.

[7] Patel, Mayank, and Ruksar Sheikh. (2019). "Handwritten Digit Recognition Using Different Dimensionality Reduction Techniques." International Journal of Recent Technology and Engineering 8(2) pp. 999-1002.

[8] F. Khan, R. Kothari, M. Patel and N. Banoth, "Enhancing Non-Fungible Tokens for the Evolution of Blockchain Technology," 2022 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS), Erode, India, 2022, pp. 1148-1153, doi: https://doi.org/10.1109/ICSCDS53736.2022.9760849

[9] Salim, Omar Abdul Rhman, Rashidah Funke Olanrewaju, and Wasiu Adebayo Balogun. "Class attendance management system using face recognition." 2018 7th International Conference on Computer and Communication Engineering (ICCCE). IEEE, 2018.