

**CP-**

K. K. Wagh Education Society’s

K. K. WAGH POLYTECHNIC

HirabaiHaridasVidyanagari,Amrutdham, Panchavati, Nashik – 422003

**Department of Computer Technology**

**(Academic Year 2023-24)**

CAPSTONE PROJECT PROPOSAL (SYNOPSIS)

* **PROJECT TITLE :** Attendance Monitoring System using facial recognition
* **PROJECT GROUP MEMBERS:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr.**  **No.** | **Name of Student** | **Class &**  **Roll No.** | **E-mail ID** | **Mobile No.** |
| 1. | **Group Leader:**  Aditya Suryawanshi | TY-WIN  47 | adityasuryawanshi4040@gmail.com | 8975523983 |
| 2. | Sejal Pathak | TY-WIN 35 | sejalpathak2005@gmail.com | 7558564078 |
| 3. | Sakina Modi | TY-WIN  30 | sakinamodi05@gmail.com | 8237882652 |

* **NAME OF INTERNAL GUIDE:** Mr S.H.Sangale
* **SPONSOR DETAILS:**

|  |  |
| --- | --- |
| **Company/Industry/Organization Details** | **Contact Persons Details at Sponsor** |
| Name: | Name: |
| Address: | Designation:  Department: |
| Office Phone Nos.: | Mobile No: |
| e-mail ID: | e-mail ID: |
| Website: |  |

**Place: Nashik**

**Date: / /2023**

**Abstract**

Nowadays Educational institutions are concerned about regularity of student attendance. Even in pandemic situation attendance was still a major issue in schools and colleges. Mainly there are two conventional methods of marking attendance which are calling out the roll call or by taking student sign on paper. They both are more time consuming and difficult. Hence, there is a requirement of computer-based student attendance management system which will assist the faculty for maintaining attendance record automatically. In this project we will implement the automated attendance system using Android Studio and TensorFlow. We have projected our ideas to implement an “Automated Attendance System Based on Face Recognition”. The application includes face identification, which saves time as well as being purely software based it can be flagged as eco-friendly as it reduces the use of paper. This system also eliminates the chances of fake attendance because of the face being used as a biometric for authentication. Hence, this system can be implemented in a field where attendance plays an important role. The proposed system is designed in Android platform supported with TensorFlow ML library .The algorithm used in the system will be based on image comparison on the basis of the encoded values of the face from the image from database with the image recorded by the system in run time.

**Keywords:**

1. *Tensorflow lite*
2. *Python 3.9*
3. *MySQL*

**Project Title:** Attendance Monitoring System using Facial Recognition

**Rationale:**

The two methods of calling out the roll call or by taking the student signature on the paper were time consuming and difficult. This problem is solved by the attendance monitoring system, i.e. as facial recognition is included teachers can directly mark attendance of students in a group. Also there are less chances of fake attendance. The proposed system has a much simpler and efficient algorithm. The system is simpler because of use easy and user-friendly Framework. It has a more efficient algorithm along with much less complex database configurations. The system is more efficient because of being platform independent.

**Introduction:**

The Attendance System using Face – Recognition is a replacement way method for the traditional way of marking attendance. The proposed system is Android, Machine Learning based system.. This system can be implemented on a single faculty system of a particular institute. This system is proposed to be based on biometrics .i.e. Face Authentication. Since there is presence of biometrics, this system completely eliminates the chances of fake attendance which is a problem with the traditional methods of attendance.

The Attendance management is the significant process that were carry out in every institute to monitor the performance of the student. Every institute does this in its own way. Some of there institute use the old paper or file-based system and some have adopted strategies of automated attendance system using some biometric technique. A facial recognition system is a computerized software which is suited for determining or validating a person by performing comparisons on patterns based on their facial appearances.

Here, the teacher will be the super user (Administrator). Teacher will be able to manage the data of the students stored in the database. Data includes attendance, performance in practicals, rating of student,etc. After the completion of theory sessions the teacher would just scan multiple students and assign the attendance of present students in just one tap! Administrator would also be able to scan the face of a particular student and read its data.

**Literature Survey:**

Using real time computer vision algorithms in automatic attendance management systems This system introduces a new approach in automatic attendance management systems, extended with computer vision algorithms. The Proposed system uses real time face detection algorithms.

Automatic Control of students’ attendance in Classrooms Using RFID Radio frequency identification (RFID) is one of the automatic identification technologies more in vogue nowadays. There is a wide research and development in this area trying to take maximum advantage of this technology, and in coming years many new applications and research areas will continue to appear.

Face Recognition based Attendance Management System using Machine Learning is the most arduous task in any organization is attendance marking. We proposed an automated attendance management system which tackles the predicament of recognition of faces in biometric systems subject to different real time scenarios such as illumination, rotation and scaling.

Face Recognition-based Lecture Attendance System proposed a system that takes the attendance of students for classroom lecture. The system takes attendance automatically using face recognition. However, it is difficult to estimate the attendance precisely using each result of face recognition independently because the face detection rate is not sufficiently high.

**Project Concept and Proposed Working:**

The Proposed system uses real time face detection algorithms. Since there is presence of biometrics, this system completely eliminates the chances of fake attendance which is a problem with the traditional methods of attendance. The two methods of calling out the roll call or by taking the student signature on the paper were time consuming and difficult. This problem is solved by the attendance monitoring system, i.e. as facial recognition is included teachers can directly mark attendance of students in a group. A facial recognition system is a computerized software which is suited for determining or validating a person by performing comparisons on patterns based on their facial appearances. The images of the students will be stored in a database. The system camera will open and it will detect faces. Then the system will encode the all the images present in the database as well as the faces detected in the frame. The measurements of the face that were detected in frame will get compared with the measurements of the faces present in the database. Using algorithms system will find the person in database of known people who has closest measurements to the image that were detected by the camera. After finding the perfect match, system will retrieve the name, attendance, performance and rating of the detected student.

**Area of Project:**

The project would be accessible in areas like System Software Applications. It uses Machine Learning Library therefore it can also be used in real time systems. Typically this system is build as an android application so its use real time system is quite debatable, though the algorithms can be used elsewhere to perform facial extraction or encodings.

**Features:**

1. **Image acquisition:**

Image is acquire using a high definition camera which is placed in the classroom or lab. This image is given as an input to the system.

1. **Face Detection and Extraction:**

Face detection is important as the image taken through the camera given to the system, face detection algorithm applies to identify the human faces in that image.

1. **Face Encoding:**

Once the faces are detected in the given image, the next step is to extract the unique identifying facial feature for each image.

1. **Face matching:**

The encodings of the faces is compared and respective data is retrieved.

1. **Attendance Marking:**

The attendance of detected faces is marked.

**Design Concept:**

An application specifically made for teachers to mark the attendance of students in one tap using face recognition. Teacher (admin) will be able to register students with following data: Name of student, Roll No. and Face data. Teacher can edit the database later according to the need. There will be an interface provided to manipulate the database at runtime. Multiple as well as individual face detection will be possible for the teacher to assign attendance or read data (respectively).

In between these processes, various Machine Learning algorithms as well as libraries exists which need to implemented.

**Activity Diagram:**

****

**Data Flow Diagram:**

****

**Use Case Diagram:**

****

**Hardware Requirements for Development of Project: (minimum)**

* Minimum 8GB of RAM required,
* 512GB Secondary Storage,
* INTEL i3 or higher level processor.

**Software Requirements for Development of Project: (minimum)**

* Windows 10/11,
* Android Studio,
* TensorFlow for Machine Learning and a Database.

**Limitations/Constraints/Scopeof Project:**

The user cannot read its own data as the application is only made for teachers. Teacher cannot notify users in any way about the marking of attendance, rating and their performance. Multiple registration of faces in the database may affect the accuracy of facial recognition and increase the time delay in results. It is difficult to estimate the attendance precisely using each result of face recognition independently because the face detection rate is not sufficiently high. The algorithms will be implemented in android studio.

**Applications:**

1. **Security and Access Control:**
   1. Access Control: Facial recognition is used to grant or deny access to secure facilities, buildings, or computer systems. It is often used in place of traditional access methods like keycards or PINs.
2. **Identity Verification and Authentication:**
   1. Mobile Phones: Many smartphones now incorporate facial recognition for unlocking the device and verifying the user's identity.
3. **Automotive Industry:**
   1. Driver Monitoring: In vehicles equipped with advanced driver assistance systems (ADAS), facial recognition can monitor the driver's attention and alertness, helping to prevent accidents.
4. **Education:**
   1. Campus Security: Educational institutions may use facial recognition to enhance security on campus and control access to certain areas.
   2. Attendance Tracking: Some schools and universities use facial recognition to automate attendance tracking in classrooms.

**Action Plan**

.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sr. No. | Description of Activity to be performed | Start date of Activity | Completion date of Activity | Major Lead from the Group |
| 1. | Searching for a problem definition with help of guide and other resources. | 20/09/23 | 28/009/23 | All members |
| 2. | Researching the project topic from all the possible sources (references, websites, etc). | 20/09/23 | 28/09/23 | All members |
| 3. | Preparing a synopsis. | 20/09/23 | 28/09/23 | All members |
| 4. | Defining a methodology for solving the problem statement. | 06/10/23 | 08/10/23 | All members |
| 5. | Analysis of problem definition and system design. | 14/10/23 | 19/10/23 | All members |
| 6. | Finalizing the workflow module of the proposed system. | 23/10/23 | 28/20/23 | All members |
| 7. | Preparing a presentation on work done in 5th Semester. | 06/11/23 | 10/11/23 | All members |

**Conclusion**

The system that is being developed fills the gaps in conventional methods used for marking attendance at institutions and universities. This system has demonstrated its effectiveness in accurately and efficiently tracking and recording attendance.

The implications of this research are significant in several ways:

The system's high accuracy in identifying and verifying individuals ensures that attendance records are more reliable and less susceptible to errors or fraudulent activities.

The integration of facial recognition enhances security by ensuring that only authorized individuals gain access to specific areas or services. This has applications in both educational and corporate environments.

The system generates valuable data and insights related to attendance patterns and trends. This data can be leveraged for better decision-making, resource allocation, and optimization of processes.

***References:***

[1]. Dipti Kumbhar , Prof. Dr. Y. S. Angal Department of Electronics and Telecommunication, Smart Attendance System using Computer Vision and Machine Learning yogeshangal@yahoo.co.in IRJET 1/4/2022]

[2]. P. Visalakshi, Sushant Ashish Assistant Professor ,Department of Computer Science and Engineering SRM Institute of Science and Technology, Chennai, Tamil Nadu, ATTENDANCE SYSTEM USING MULTI-FACE RECOGNITION , IEEE 27/5/2023]

[3]. CH. VINOD KUMAR , DR. K. RAJA KUMAR PG Scholar, Dept of CS& SE, Andhra University, Vishakhapatnam, AP, India. Assistant Professor, Dept of CS& SE, Andhra University, Vishakhapatnam, AP, India. Face Recognition Based Student Attendance System with OpenCV 15/12/2022]

[4]. Face Recognition based Attendance Management System using Machine Learning. IRJET 06, June 2022 ]

[5]. Ashish Choudhary,Abhishek Tripathi,Abhishek Bajaj,Mudit Rathi and B.M Nandini Information Science and Engineering, The National Institute of Engineering, Automatic Attendance System Using Face Recognition. IRJET 12/5/2021]

[6]. Anushka Waingankar1, Akash Upadhyay, Ruchi Shah, Nevil Pooniwala, Prashant Kasambe. Face Recognition based Attendance Management System using Machine Learning IEEE 8/6/2023]

***Web Reference:***

1. [www.kaspersky.com](http://www.kaspersky.com)
2. en.wikipedia.org
3. pyimagesearch.com
4. shotkit.com
5. hyperverge.com
6. www.itpro.com

**Name: Mr. S.H. Sangale**  **Mr. S. H. Sangale Prof. G. B. Katkade**

**(Name & Sign of Guide) (Project Coordinator) (HOD-CM.)**