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## SMART ATTENDANCE SYSTEM USING FACE RECOGNITION

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### ABSTRACT

The use of technology has revolutionized almost every sector of society. In this competitive world, the education sector also needs modernization to keep pace with the changing situations. The attendance management system has seen critical change over a brief period from manual registers to hi-tech smart attendance tracking mechanisms. Generally the traditional methods of attendance are by calling roll numbers or by taking the sign of students on the paper. But both these methods are time consuming and difficult to maintain the records. So the system we have developed takes attendance by recognizing faces. This project is based on python and Local Binary Patterns Histogram algorithm. The faces of students are captured and stored, the recognizer is trained by using that training dataset and then marks attendance by recognizing the faces. The system displays the details of students who are present, absentee details and the cumulative attendance till day. And this project also organizes the attendance information in excel files

**Keywords:** Smart Attendance System, LBPH, Face Recognition, Cumulative Attendance, Excel Sheets.

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### I. INTRODUCTION

The Attendance tracking is fundamental to all associations. Studies have shown that the attendance greatly affects the retention and academic performance of students. The attendance can be taken in different ways. The conventional ways include calling the roll calls, or students signing in the paper. In these methods there are problems like proxy attendance, difficulty in organizing the records and above all its time consuming. So there is a need to automate the attendance using smart attendance system. The paper is based on the smart attendance system developed using openCv, python, Local Binary Patterns Histogram. Even though there are other methods like Iris scan, fingerprint, the face recognition is more accurate and comparatively faster technique than its counterparts as there is no need for external interference. Face recognition is a real-time and contact-less attendance tracking software exceptionally relevant in the current pandemic situation. The system registers the student, take their images and stores them. The algorithm is used to train the system. The trained dataset is stored in the form of histograms. When the student takes the attendance, the input image is again converted into histogram and compared to mark attendance.

### II. SYSTEM REQUIREMENTS

#### 1. Hardware Requirements

The minimum hardware requirements to execute the system are as follows:

- ✓ Processor - Intel I3
- ✓ RAM - 4 GB
- ✓ Storage - 1GB
- ✓ Web camera

#### 2. Software Requirements

- ✓ Operating system - Windows 10
- ✓ Programming Language - Python -3.10 64bit
- ✓ Front-End - Python Tkinter

#### 3. Functional Requirements

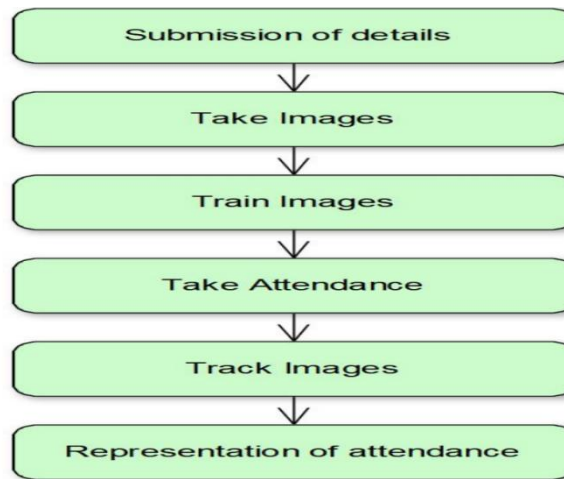
- ✓ Enrolling the students
- ✓ Taking and tracking student attendance by facial recognition in specific time.

- ✓ Mark Attendance and update the same in excel sheets
- ✓ Calculate the absentees and cumulative attendance of month

**4. Non- Functional Requirements**

- ✓ Reliability requirements
- ✓ Scalability requirements
- ✓ Security requirements
- ✓ Maintainability requirements
- ✓ Usability requirements
- ✓ Interoperability requirements
- ✓ Availability requirements
- ✓ Data Integrity requirements

**III. METHODOLOGY**

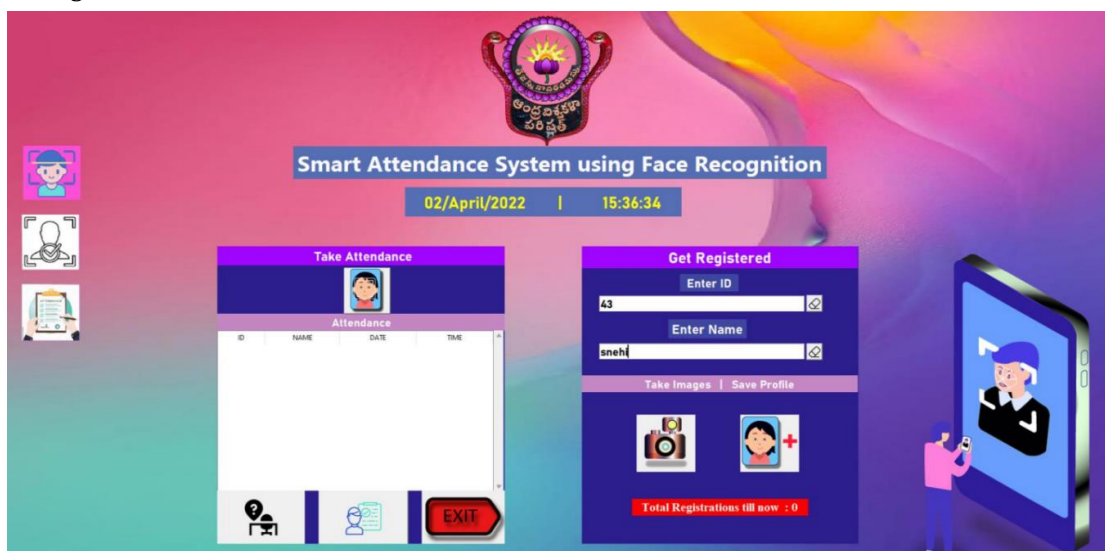


**Figure 1:** Steps in the project

The various steps in the system are as shown above in the flowchart .

**1. Submission of details**

The students of the class have to first register themselves in the system. For this the system asks for the name and Id of the student. And the system also has a secret password which must be used by the students for successful registration. The information is added to student details excel sheet



**Figure 2:** Registration portal



**4. Track Images**

When the student takes the attendance by clicking the attendance button ,then the video capture is switched on and it capture the images, crops it and changes it to grayscale. Now for the input image the algorithm creates a histogram. The histogram which is obtained from the input image is compared with the trained images histogram. If there occurs any similarity between the histograms, the corresponding name and ID will be retrieved to mark the attendance of the student

**5. Representation of Attendance**

The marked attendance is displayed on the screen as well as stored in the excel sheets which are created day-wise. The students details excel sheet is compared with that day’s attendance sheet and the absentees are calculated. The absentees names and ID are shown on the screen and also stored in the excel sheet.

The cumulative attendance is also calculated by :

$$\text{Attendance Percentage} = \frac{\text{Total Number of days a student was present in the month}}{\text{Total Number of days till today from the start of the month}} * 100$$

**IV. TESTING**

Software testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation.

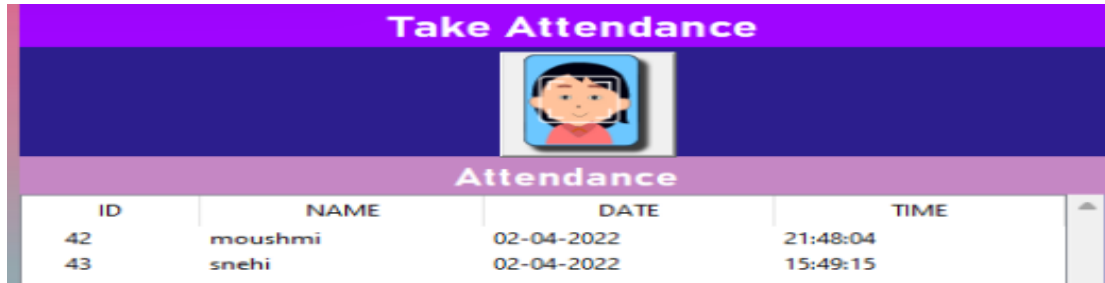
The sample test cases we designed for our system are as follows:

**Table 1:** Sample Test Cases

Step	Step Details	Expected Results	Actual Results	Pass/Fail/Not Executed/Suspended
1	Saving Profile	It asks for ID , Name, Password	The student must submit his name ,Id and secret Password to register .The password is for security	Pass
2	User enters wrong password while saving profile	A pop up box notifying that it is wrong password	Pop up box showing that wrong password has been entered	Pass
3	Enrolling by taking images without filling the student name and Id details	Displays that students details should be entered first	Notified that correct student name should be given	Pass
4	The lecturer clicks the Show Absentee button	The message box shows the absentee	For error-less recording of absentees the message box shows the absentee name and ID	Pass
5	The student clicks the take attendance button	Video capture is switched on	The front camera takes the picture of the student and compares the input image with the trained dataset images and if matches ,marks attendance	Pass
6	The student clicks the Show cumulative attendance button	The message box pops up with % of attendance	It allows the students to check their cumulative attendance till date since the starting of the month	Pass

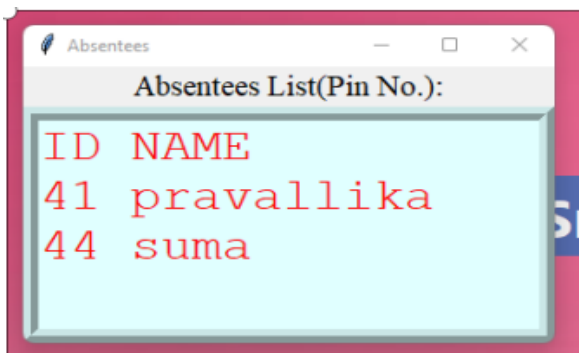
### V. RESULTS AND DISCUSSION

The outputs of the system we have created is as follows:



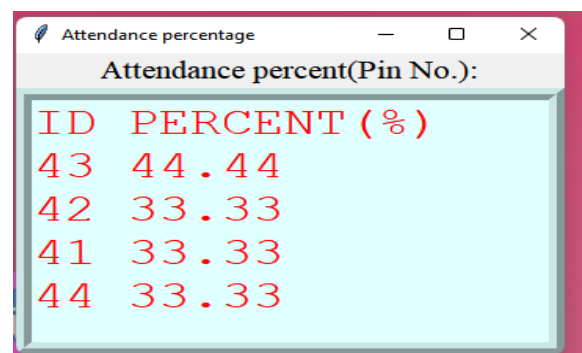
ID	NAME	DATE	TIME
42	moushmi	02-04-2022	21:48:04
43	snehi	02-04-2022	15:49:15

Figure 6: Displaying the marked attendance



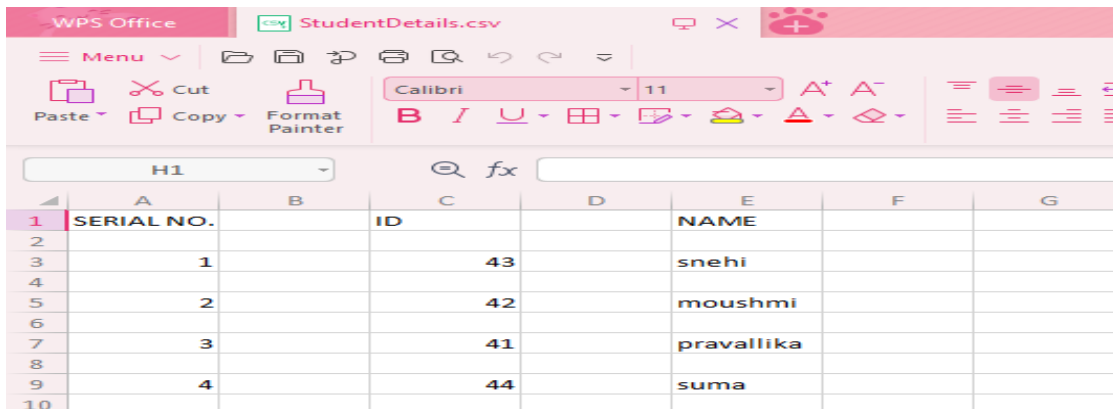
ID	NAME
41	pravallika
44	suma

Figure 7: Absentee list



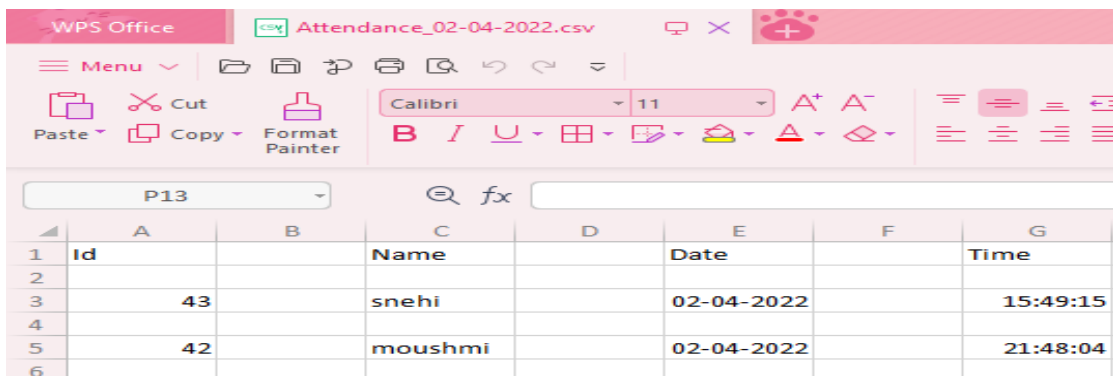
ID	PERCENT (%)
43	44.44
42	33.33
41	33.33
44	33.33

Figure 8: Cumulative Attendance



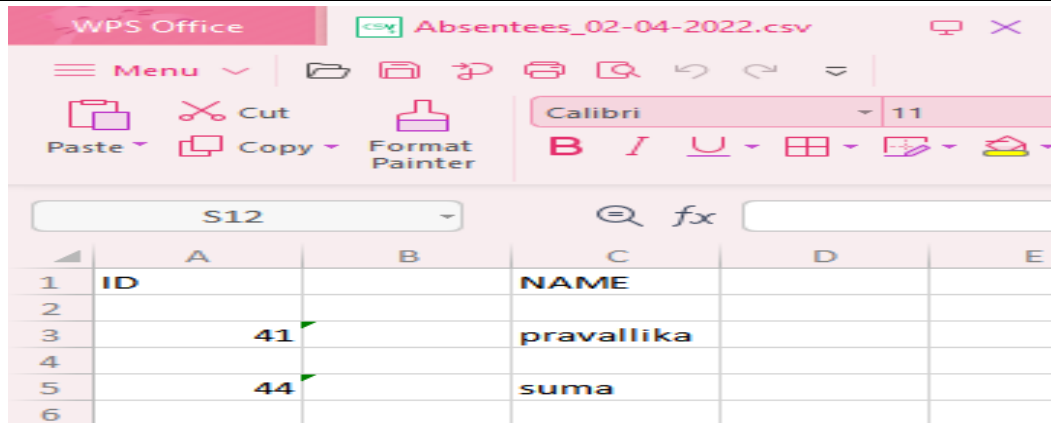
SERIAL NO.	ID	NAME
1	43	snehi
2	42	moushmi
3	41	pravallika
4	44	suma

Figure 9: Student Details excel-sheet



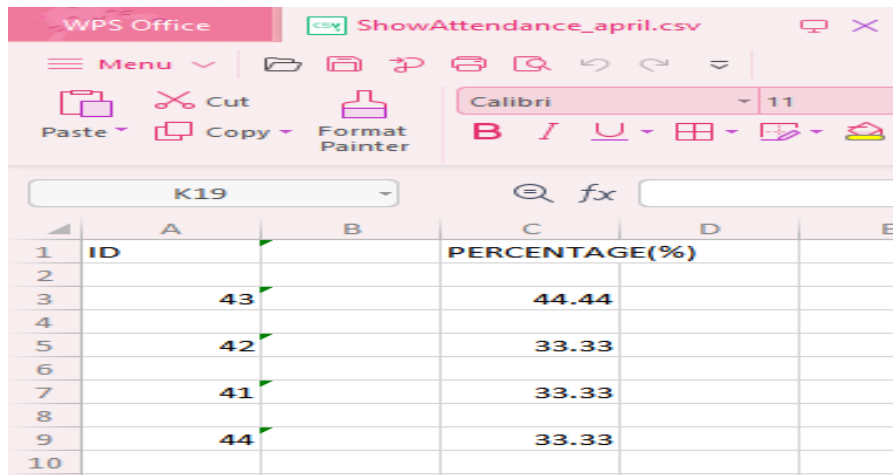
Id	Name	Date	Time
43	snehi	02-04-2022	15:49:15
42	moushmi	02-04-2022	21:48:04

Figure 10: Attendance excel-sheet



	A	B	C	D	E
1	ID		NAME		
2					
3	41		pravallika		
4	44		suma		
5					
6					

Figure 11: Absentees excel-sheet



	A	B	C	D	E
1	ID		PERCENTAGE(%)		
2					
3	43		44.44		
4					
5	42		33.33		
6					
7	41		33.33		
8					
9	44		33.33		
10					

Figure 12: Cumulative Attendance excel-sheet

## VI. CONCLUSION

In this system we have implemented an attendance system by using the LBPH algorithm which is one of the efficient and robust algorithm for face recognition. This system can be used at various places like in classroom teaching, laboratory attendance, examination attendance etc. This attendance system demonstrates the use of image processing techniques in classroom. Automated Attendance System has been envisioned for the purpose of reducing the drawbacks in the traditional (manual) system. It saves time and effort, especially if it is a lecture with huge number of students. This system can also be used for employee management and pay-scale can be added as an extra feature. This attendance system can play a major role in the organizations and can help them to improve the productivity.

## VII. REFERENCES

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