Smart attendance system

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Outline

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Introduction

- Traditional Approch(pen-paper based attendance) which is tadious and time consuming.

- This system uses the face recognition approach for the automatic attendance of students in the classroom without student's intervention.

System Model

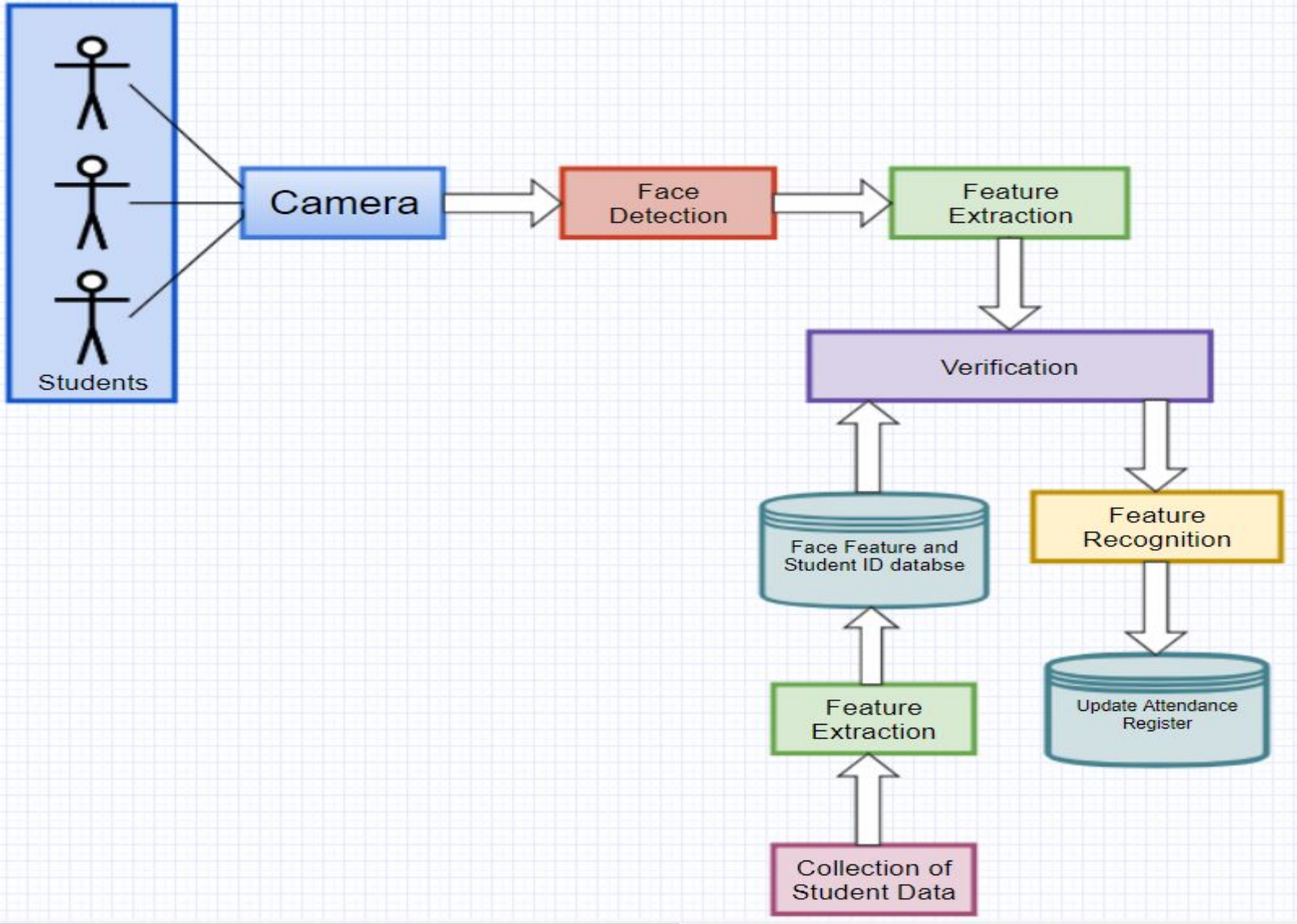

Figure 1. System Model

Motivation

- **Problems:**
  - Long process and takes lot of effort and time, if it involves huge number of students.
  - Attendance sheet is subjected to damage and loss.
  - chance to human error.

- We propose a system that provides a solution to the above mentioned problems by **automating the process of attendance management** that can be used during exams or a lecture which will save effort and time.

Objective

- To develop an automated class attendance management system comprising of a desktop GUI application to perform the following tasks:

  - **To detect faces real time.**
  - **To recognize the detected faces by the use of a suitable algorithm for verification.**
  - **To create the class attendance register after a successful match for that day.**

Scope

- The scope of the project is for a particular institutes & Organization.
- project can be modified to operate it online.
- To find a specific person.

Applications

- criminal identification
- security systems
- image and film processing

Modules

- Gathering user’s data
- Training user’s data
- Maintain attendance sheet
- Alert

Technologies

- Front end : Python GUI(Tkinter)
- Back end : python
- Hardware : Camera

Platform

- OpenCV Library
  - LBPH Face Recognition Algorithm

- Convolution Neural Network(CNN)

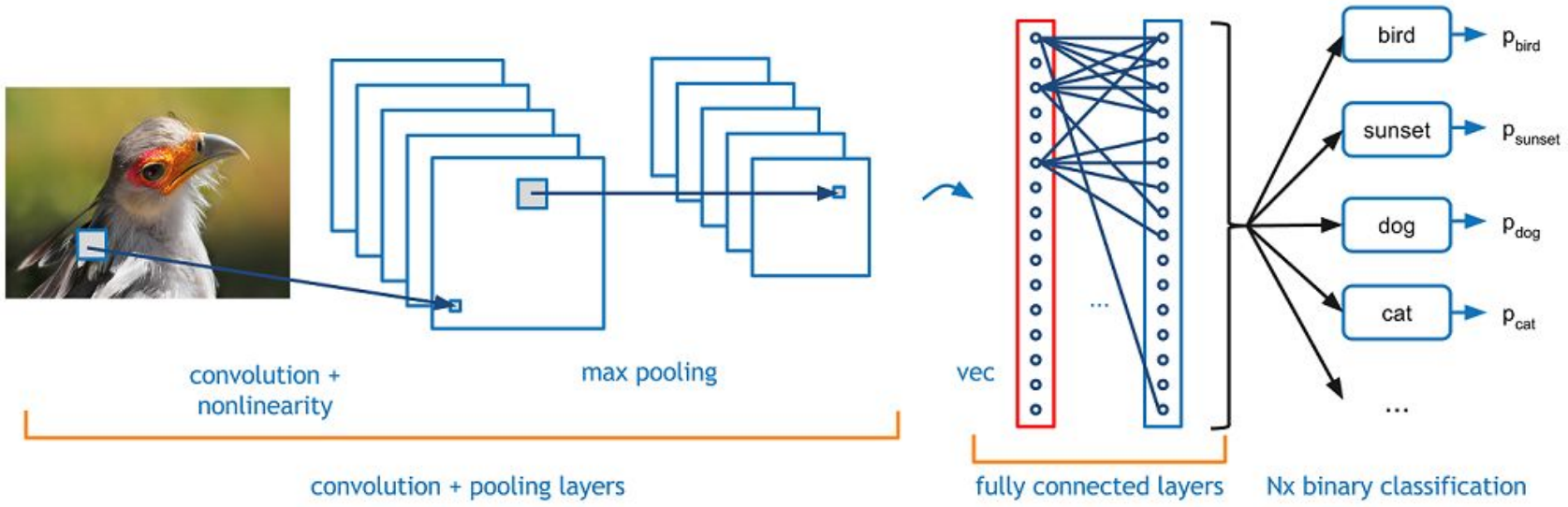

Figure 2. CNN Architechture

Database Schema

Table 1: Person

Column Name	Data Type	Size	Description
Id	INT	5	ID No.
User_name	VARCHAR	50	Label

Table 2: Attendance register

Column Name	Data Type	Size	Description
Id	INT	5	ID No.
name	VARCHAR	50	Label
date&time	DATE	50	date & time of presents

Image Dataset

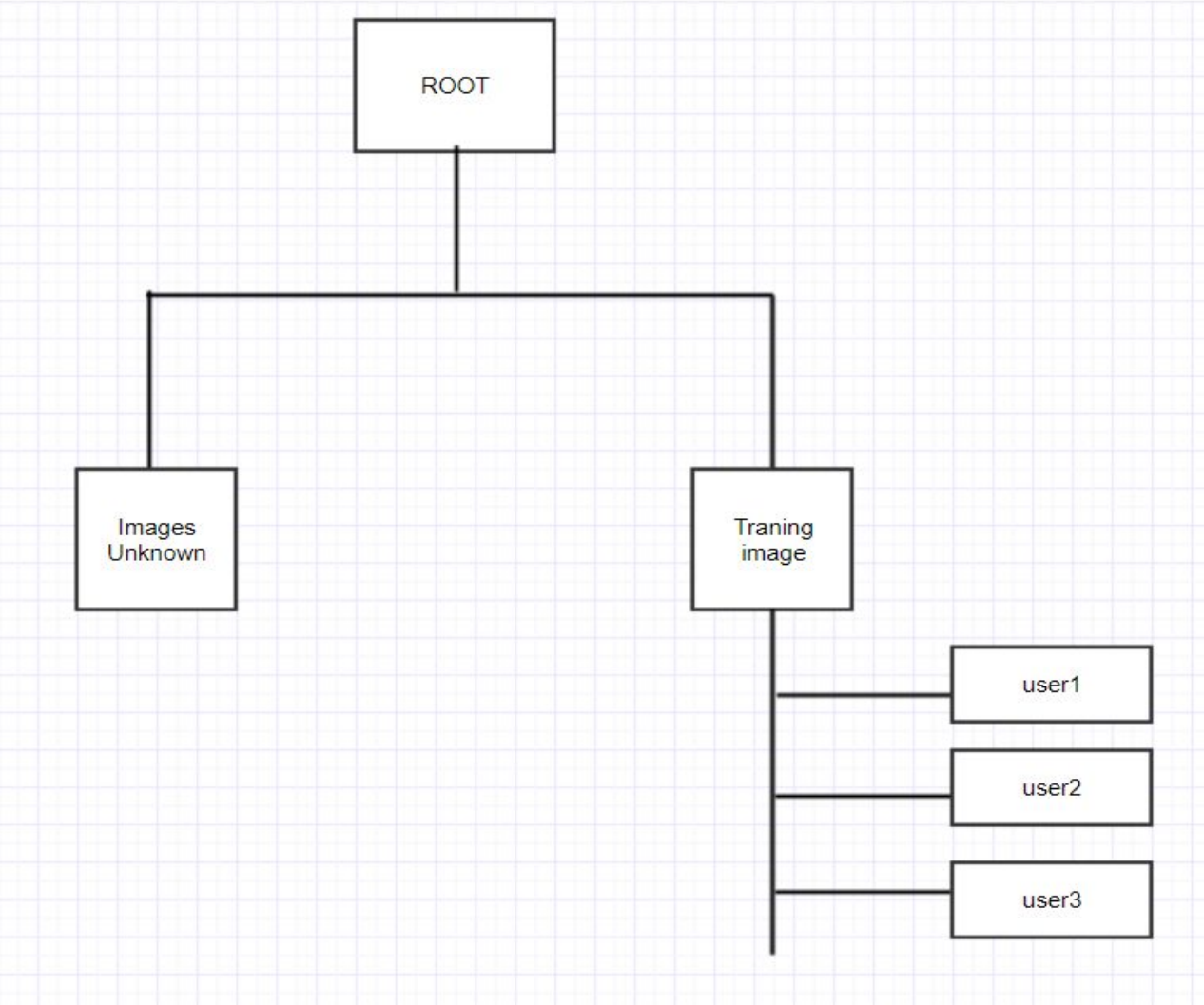

Figure 3. Directory System

Diagrams

- Use-case diagram

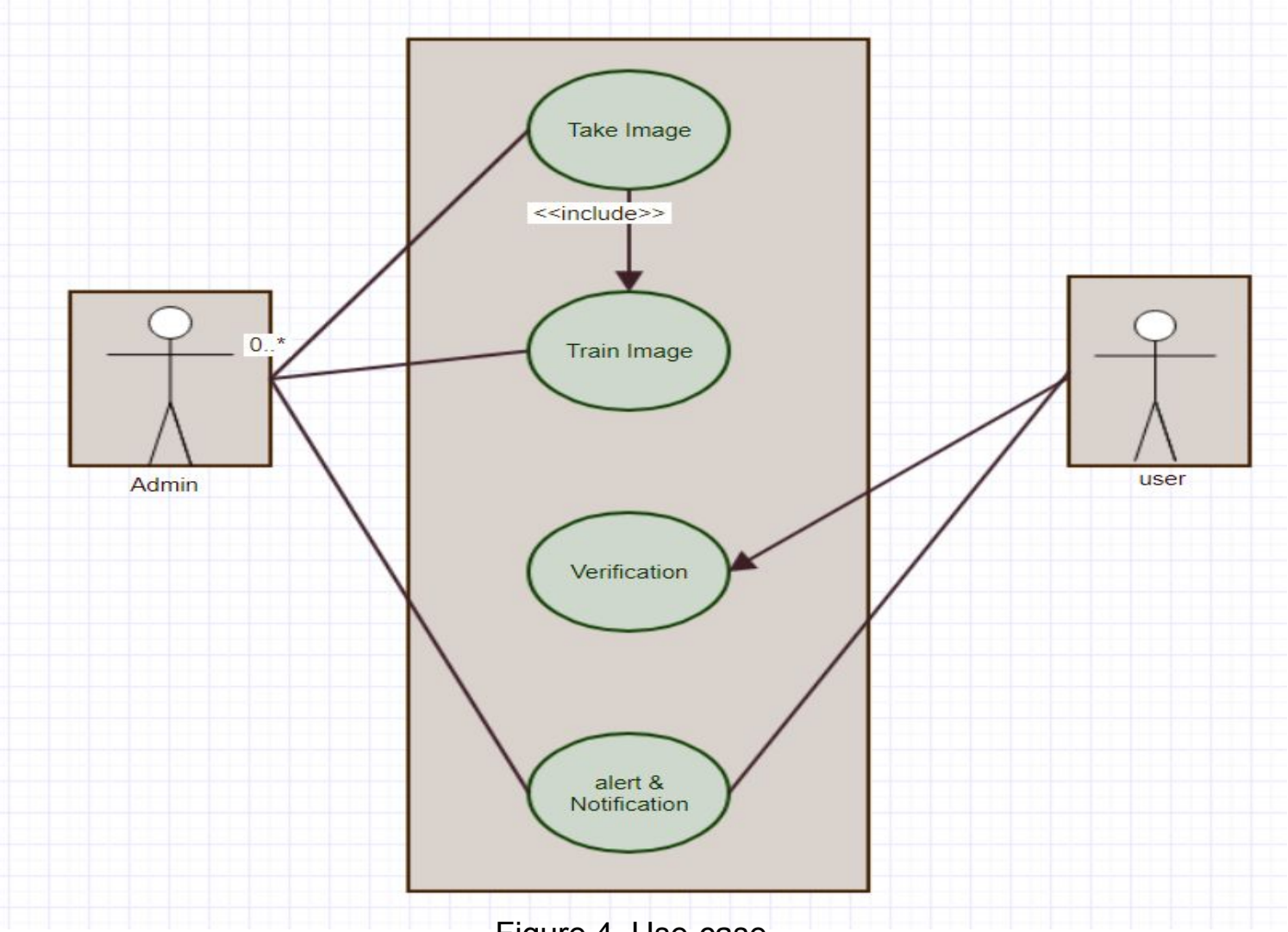

Figure 4. Use-case

Data Flow Diagram

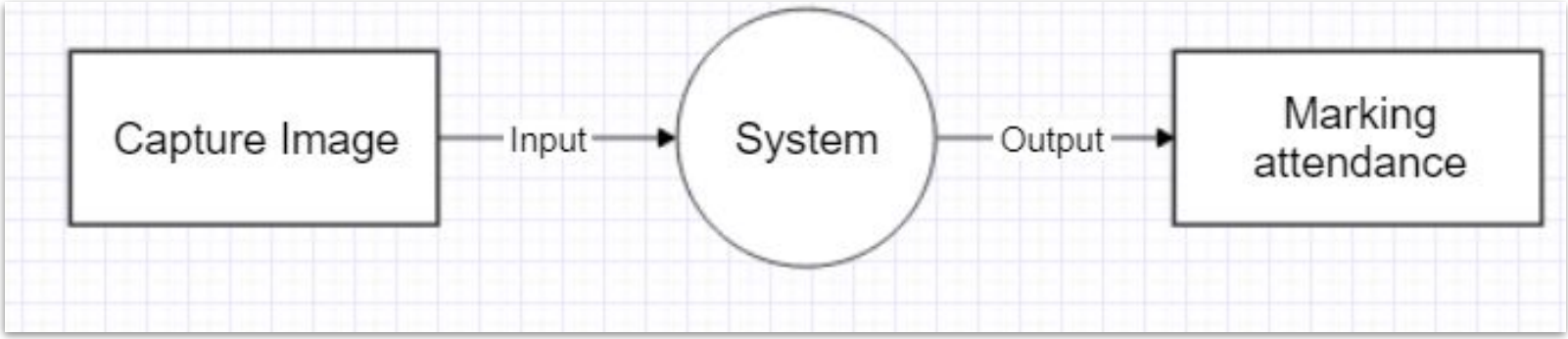

Figure 5.Leve-0 DFD Diagram

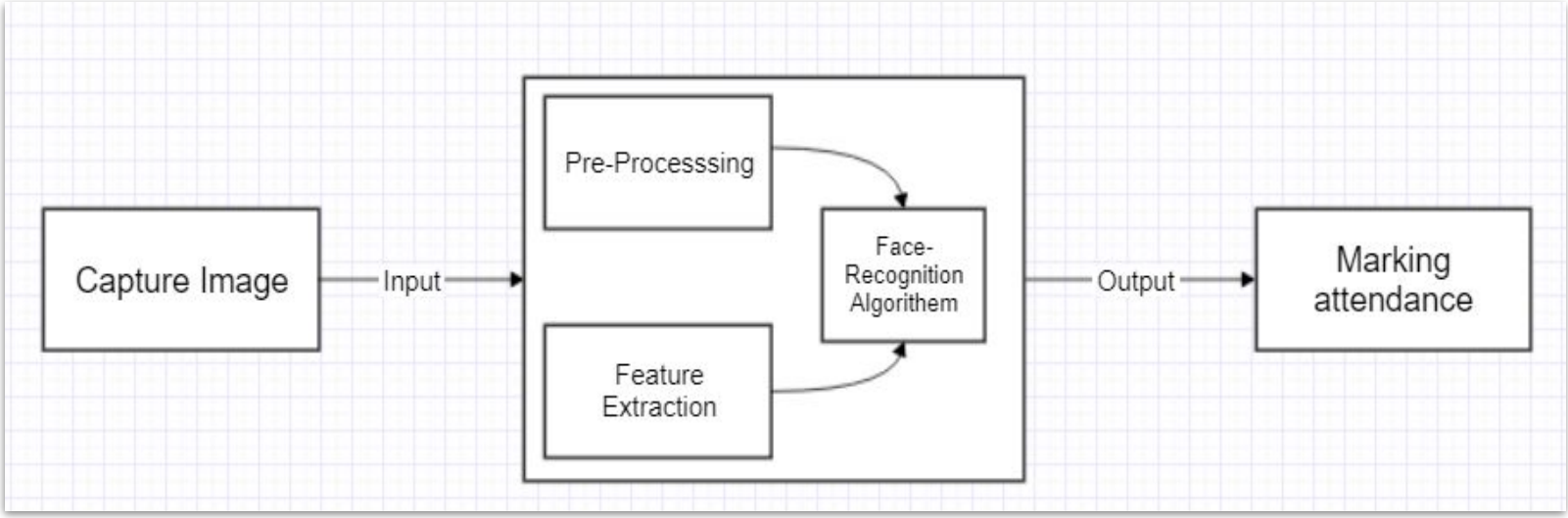

Figure 6.Leve-1 DFD Diagram

Activity Diagram

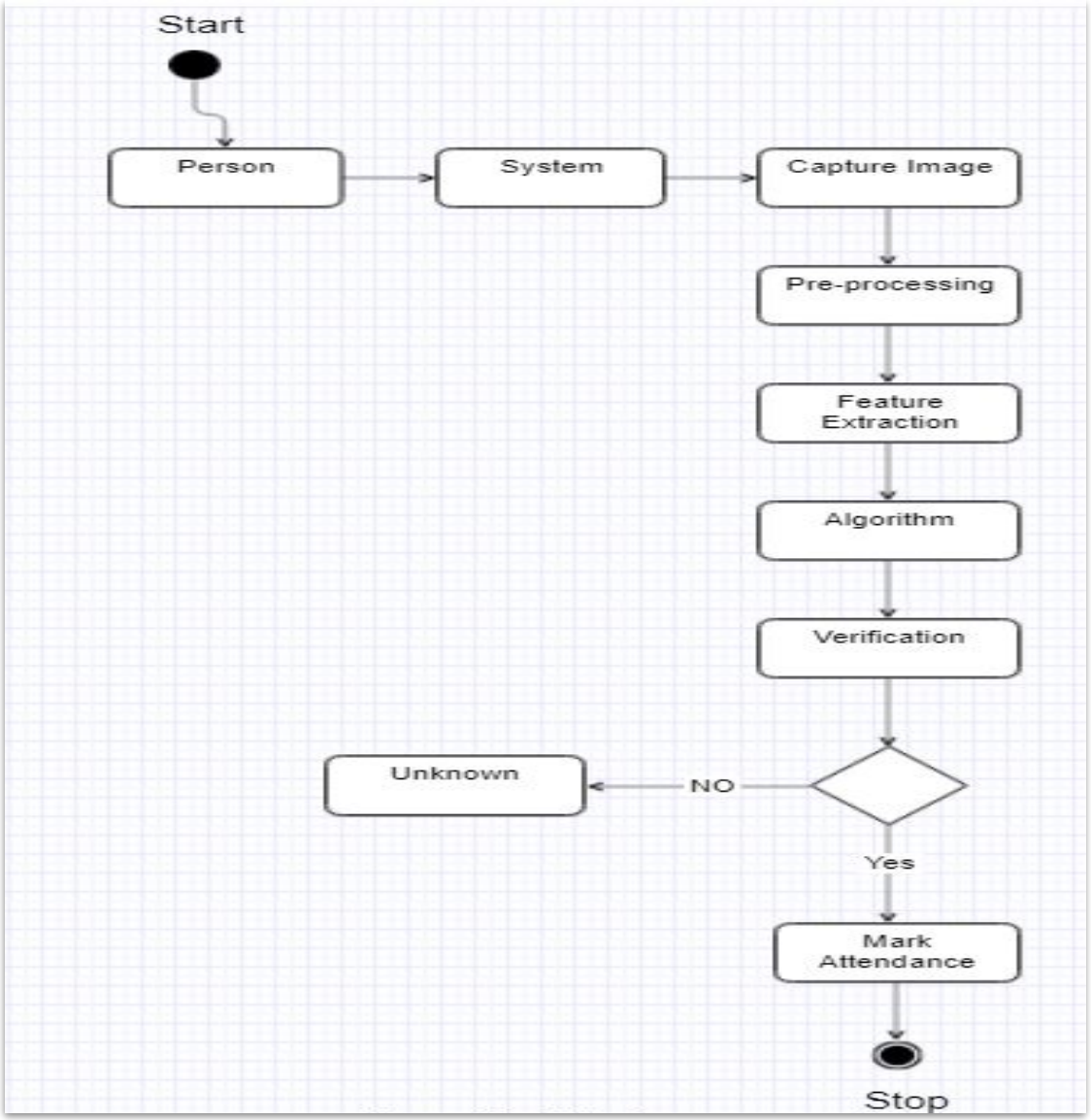

Figure 7.Activity Diagram

Implementation

	A	B	C	D
1	ID	Name		
2	1	gaurav		
3	2	hiren		
4	3	aarjav		
5	4	hinket		
6	5	harshil		
7				
8				

Figure 8.Attendance Register

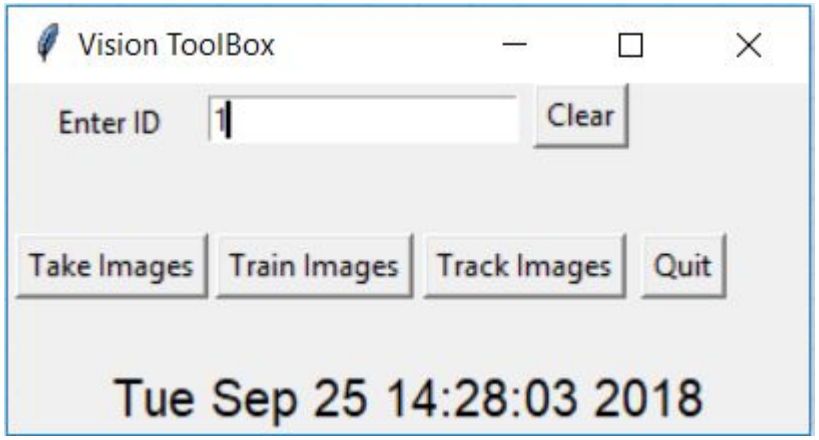

Figure 9.Home Window

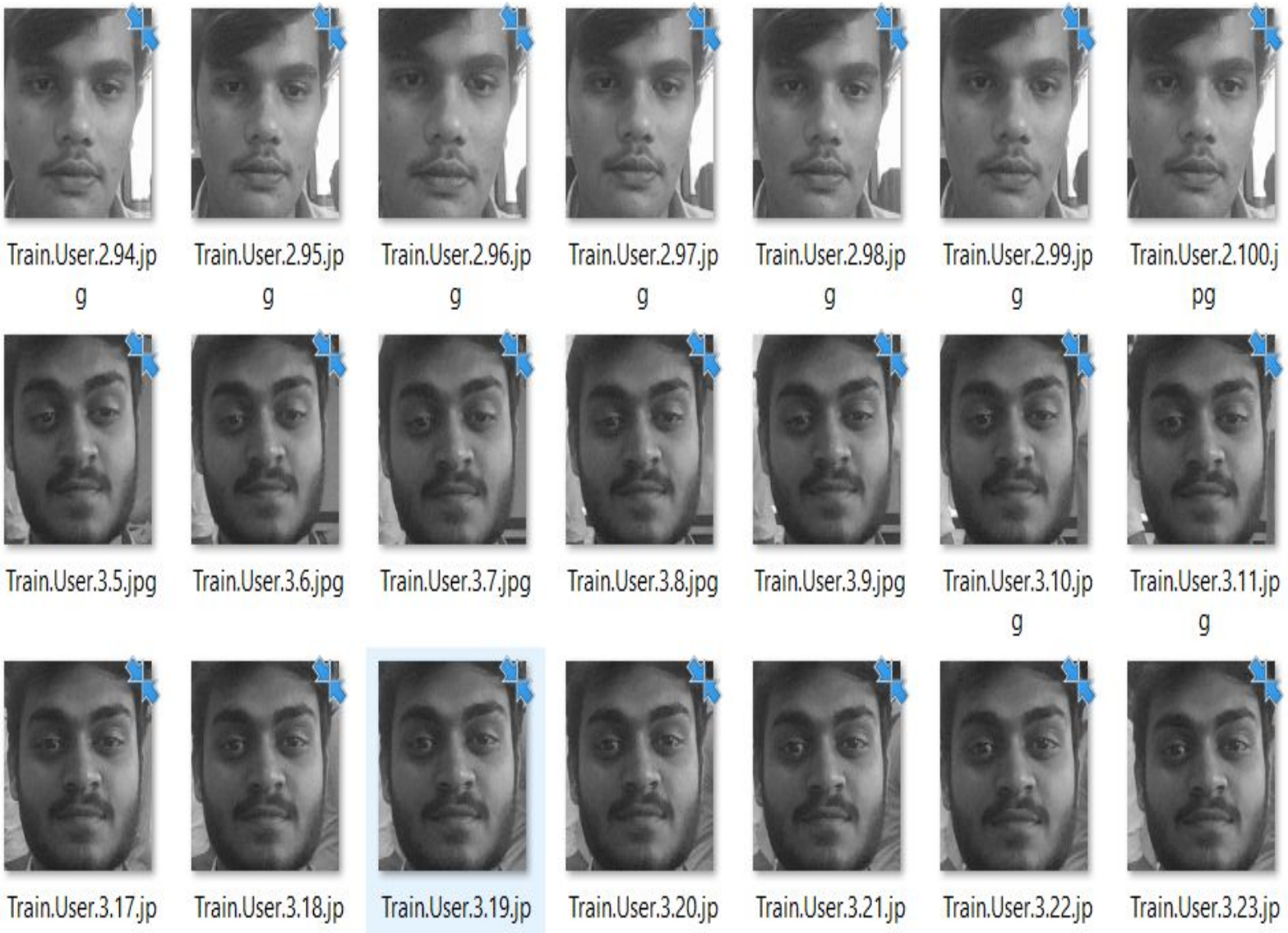

Figure 10.Pre-processed Photo

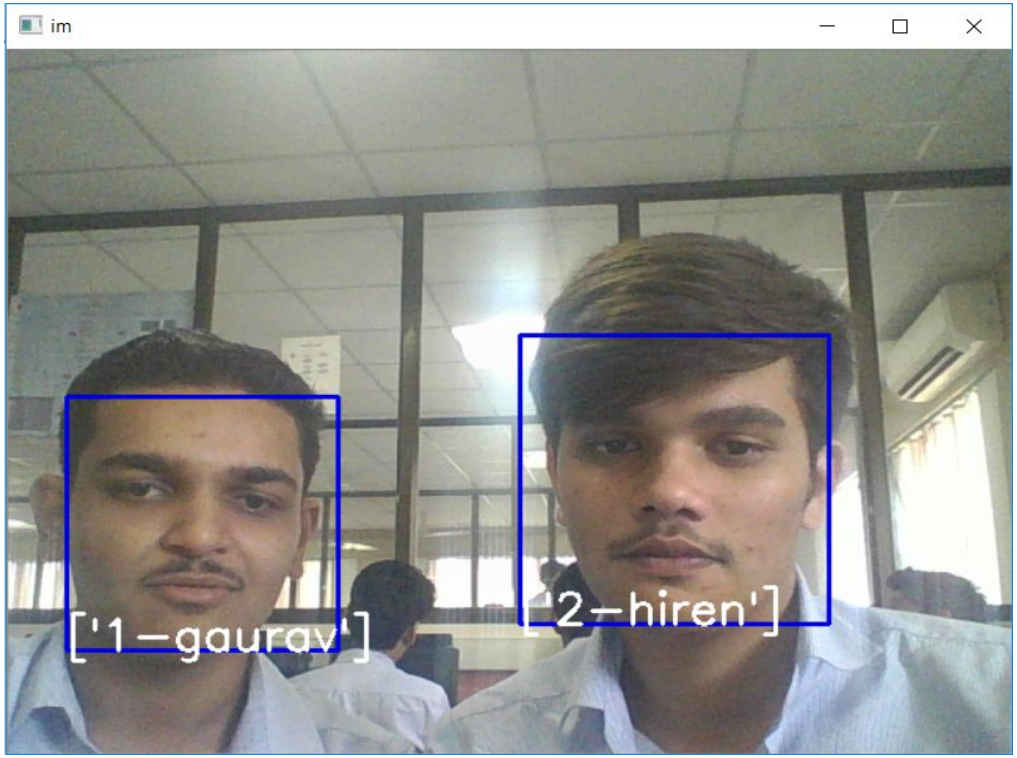

Figure 11. Face Recognition

	A	B	C	D
1	ID	Date	Time	
2	3	9/25/2018	14:43:50	
3	1	9/25/2018	14:43:50	
4	2	9/25/2018	14:44:05	
5	4	9/25/2018	14:46:01	
6				

Figure 12. Present Entry

Testing

	5 subjects								
	Training: 10 pics per subj.			Training: 20 pics per subj.			Training: 40 pics per subj.		
	Correct	Error	Result	Correct	Error	Result	Correct	Error	Result
Eigenfaces	6 pics	4 pics	60 %	6 pics	4 pics	60 %	6 pics	4 pics	60 %
Fisherfaces	7 pics	3 pics	70 %	5 pics	5 pics	50 %	5 pics	5 pics	50 %
LBPH	3 pics	7 pics	30 %	4 pics	6 pics	40 %	4 pics	6 pics	40 %
OpenFace	10 pics	0 pics	100 %	10 pics	0 pics	100 %	10 pics	0 pics	100 %

	10 subjects								
	Training: 10 pics per subj.			Training: 20 pics per subj.			Training: 40 pics per subj.		
	Correct	Error	Result	Correct	Error	Result	Correct	Error	Result
Eigenfaces	4 pics	6 pics	40 %	4 pics	6 pics	40 %	4 pics	6 pics	40 %
Fisherfaces	2 pics	8 pics	20 %	5 pics	5 pics	50 %	3 pics	7 pics	30 %
LBPH	0 pics	10 pics	0 %	1 pics	9 pics	10 %	2 pics	8 pics	20 %
OpenFace	10 pics	0 pics	100 %	10 pics	0 pics	100 %	10 pics	0 pics	100 %

	15 subjects								
	Training: 10 pics per subj.			Training: 20 pics per subj.			Training: 40 pics per subj.		
	Correct	Error	Result	Correct	Error	Result	Correct	Error	Result
Eigenfaces	2 pics	8 pics	20 %	2 pics	8 pics	20 %	2 pics	8 pics	20 %
Fisherfaces	2 pics	8 pics	20 %	1 pics	9 pics	10 %	1 pics	9 pics	10 %
LBPH	1 pics	9 pics	10 %	3 pics	7 pics	30 %	3 pics	7 pics	30 %
OpenFace	8 pics	2 pics	80 %	8 pics	2 pics	80 %	9 pics	1 pics	90 %

Figure 12. Tests results with subjects and a different environment of the training data and test data.

Accuracy Testing

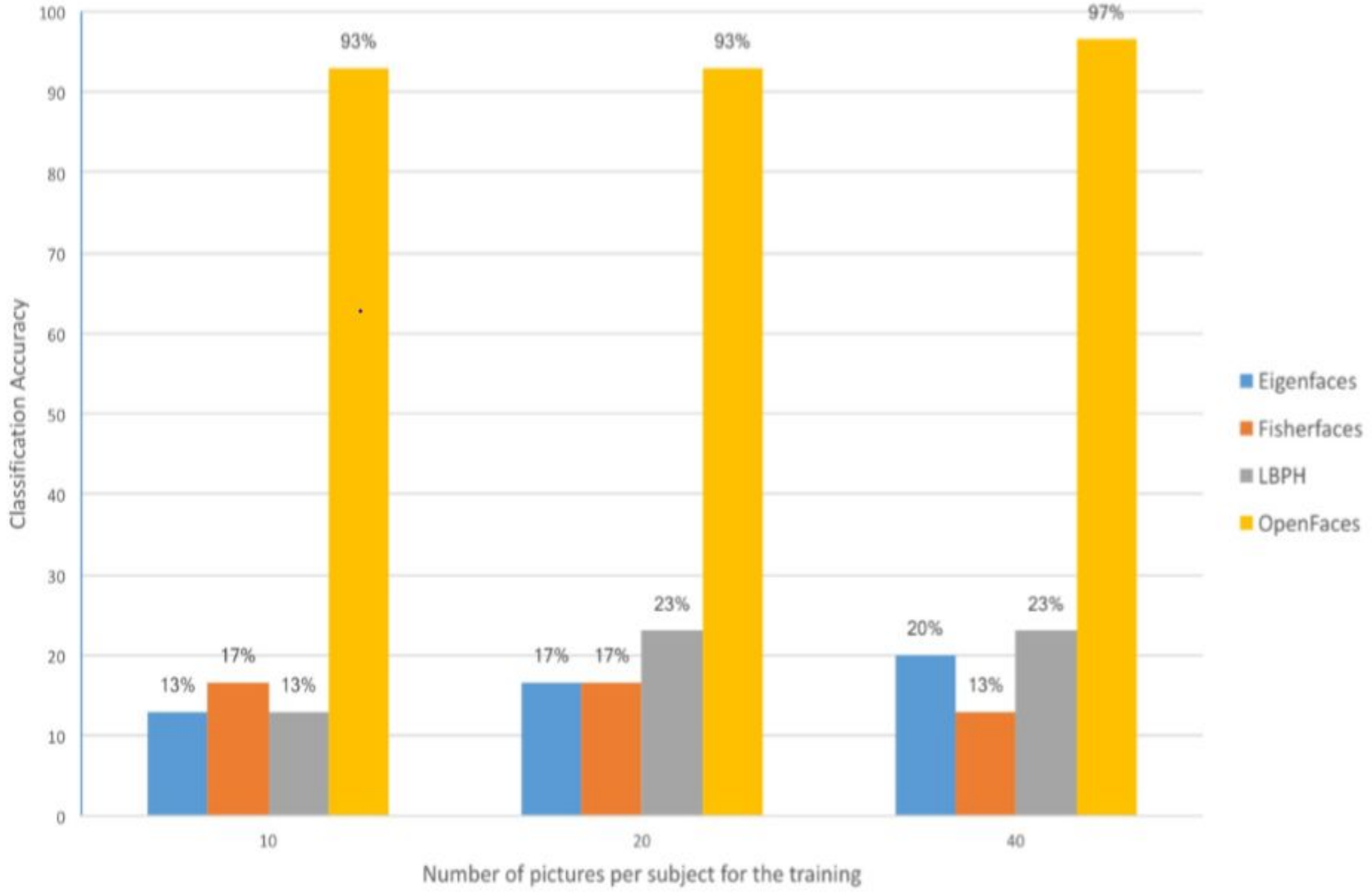

Figure 12. Tests results with subjects and a different environment of the training data and test data.

Conclusion

- It can be concluded that a reliable, secure, fast and an efficient class attendance management system has been developed replacing a manual and unreliable system.

- This face detection and recognition system will save time, reduce the amount of work done by the administration and replace the stationery material currently in use with already existent electronic equipment.

Future Work

- Future work could also include adding several well-structured attendance registers for each class and the capability to generate monthly attendance reports and automatically email them to the appropriate staff for review.

References

- Web references

  www.opencv.org/face-recognition/

- Reserch paper Paper references
  - V. Shehu and A. Dika, “Using Real Time Computer Algorithms in Automatic Attendance Management Systems.” IEEE, pp. 397 – 402, Jun. 2010.
  - FaceNet: A Unified Embedding for Face Recognition and Clustering. Florian Schrof, Dmitry Kalenichenko, James Philbin. s.l. : IEEE Xplore, 2015. pp. 815-823.

Thank You