Attendance System using Face Detection and Recognition

UNIVERSITY PARTNER

UNIVERSITY OF WOLVERHAMPTON

HERALD COLLEGE KATHMANDU

Name: Samir Husen

University ID: 2039211

Supervisor: Mr. Biraj Dulal

Introduction

- Face detection and recognition systems are biometric software applications that are designed to detect and recognize the human face through a camera and identify their identity. (Li & Jain, 2004)
- Detection can detect human face by analyzing their facial curves and recognition can match the detected face with the existing one inside the system or database.

Aims and Objectives

Aims Develop a functional web-based application that will help the teachers and will manage the classroom control by taking attendance of students within a few seconds via live detecting and recognizing their faces.

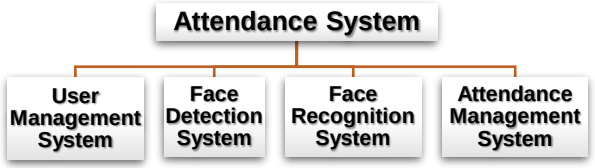
Objectives

- System should detect and recognize one or more faces at the same time with 80% of accuracy rate.
- System should be able to recognize the detected face within a few seconds and match them with the existing one from the database or system.
- System should be able to record the attendance of the recognized student.
- System should record the attendance in csv/xlsx format file.

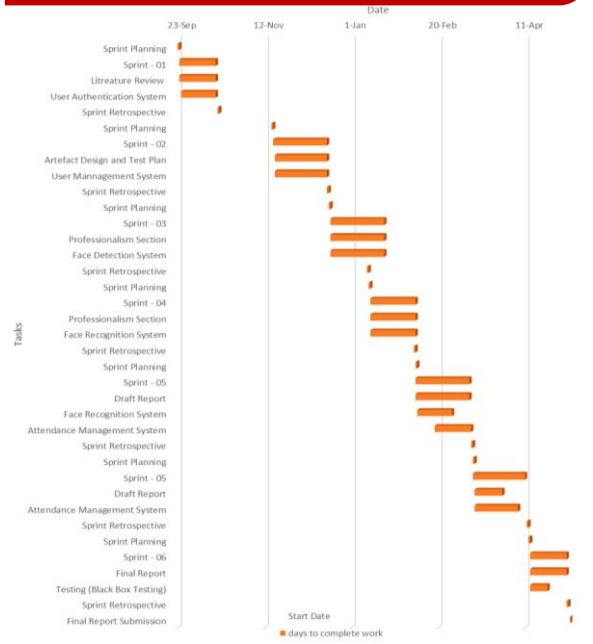
Academic Questions

- Which programming languages are you going to use for this project?
- Which library are you going to use for the implementation of the algorithms?
- What are the tools and techniques that you will use throughout this project?

Artefact



Gantt Chart



Testing Approach

"**Black Box Testing** just focuses on the inputs and output of the software system without bothering about internal knowledge of the software program".

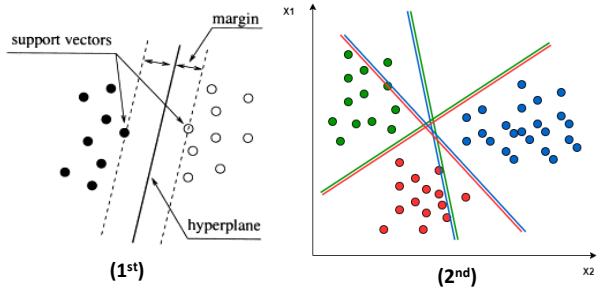
Literature Review

Comparison of diverse face detection and recognition algorithms on different basis:

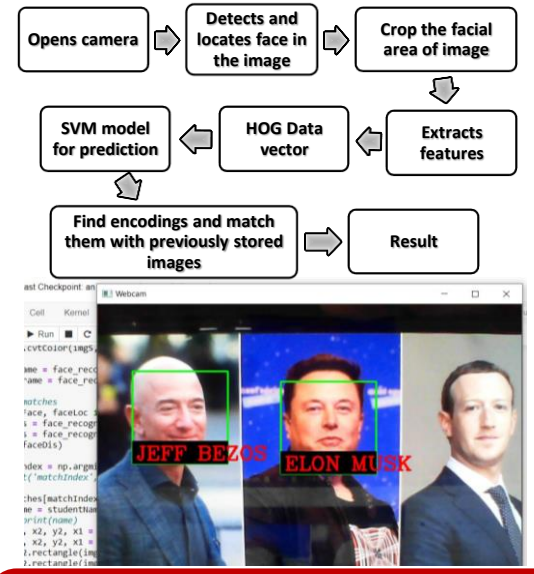
Algorithms	Accuracy	Time & Speed	Comments
Viola - Jones Algorithm	92% accuracy	Faster	15 fasters than any previous approach but low accuracy
Convolutional Neural Network(CNN)	97.5% accuracy	Time consuming and Slower	Fast with the use of GPU (Nvidia) and highest accuracy among all
Histogram of Oriented Gradients	95.865 % accuracy	Faster	High accuracy, works faster and, no use of GPU

Algorithms	Accuracy	Techniques	Memory usage
Fisher face	97% accuracy	Principal Component Analysis (PCA) and, (FDL) or (LDA)	Most Efficient
Eigenfaces	96% accuracy	Principal Component Analysis (PCA)	High
Support Vector Machine (SVM)	98 % accuracy	Kernel Trick and LSVM (Linear Support Vector Machine)	High and depends upon the size dataset

Support Vector Machine (SVM)



System Process and Reflection



Conclusion

- Python programming language which uses MVT (Model, View, and Template Pattern) provides an easy and well-developed environment for web development.
- Libraries such as OpenCV, face recognition and Dlib perform a high level of face recognition with the implementation of different algorithms.
- There are different tools such as MySQL, GitHub, and Anaconda which helped during the system development.
- The system can detect and recognize one or more faces at same time with help of HOG & SVM model.