Software Requirement Specification Document for Attendance Marking System

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Table 1: Document version history

Version	Date	Reason for Change
1.0	11-May-2022	SRS First version's specifications are defined.

GitHub: https://github.com/marioshady/Attendance-Marking-System.git

Contents

Abstract

Face detection became something extremely essential in our daily lives, starting from CCTV cameras down the streets, in universities, malls, and indoors, and definitely the tracking features that became publicly used in China and some other countries like the United Kingdom. Till reaching the facial recognition which became standard in most smartphones and is no longer considered for the premium flagship mobiles.

Therefore, it was time to implement this feature in the educational process, so now we are presenting this project in order to use Facial Recognition techniques, accompanied by image processing image enhancement techniques in order to achieve an automated attendance marking system using only camera and software. After checking students while entering the lecture hall, it will mark whether the student is absent or present, and will keep it recorded for further usage while giving marks for example in Excel Sheet. And it can send the professor students' names who have passed certain absence limits, as well as send the students themselves warning messages in order to take care of their attendance and lectures.

1 Introduction

1.1 Project Definition

The designing of an automated class attendance system will use footage of the lecture hall in order to make some processing and image enhancement on it, to detect faces using the latest facial recognition techniques, then when it detects a face, it will give it a score, and then mark him/her as present.

1.2 Project Objectives

1. Reduce wasted time in attendance by taking manual attendance.
2. Use the latest machine learning techniques in order to remove some headaches from the professors. That will give some more energy and time to utilize it better with the students.
3. Automated environment.
4. Encourage the usage of technology in our lives.

1.3 Project Specifications

1. Use machine learning algorithms for face detection.
2. Use image enhancement techniques to have better resolution photos.
3. Use a scoring system based on footage analysis.
4. Requires a good lighting environment for better footage, meaning higher score, and higher accuracy.
5. The attendance sheet is .xlsx or .csv in order to be easily maintained and shared.

1.4 Life Applications

- On a small scale, attendance in lectures will be automated and manual errors will be eliminated saving tons of time in each lecture.
- On a large scale, attendance may be taken into corporates, saving thousands of dollars that are spent on attendance devices and their maintenance.

2 System Description

2.1 Problem Statement

It is a well-known fact that machine learning is used to solve separate problems, using only one step which is feeding in data and getting the result, such as (estimating the price of a house, generating new data based on existing data, etc. . .).
However, face recognition is actually a collection of problems:

1. First, image acquisition which is capturing the image.
2. Second, focus on each face and recognize
3. Third, be able to distinguish distinctive face features from other people, which will be in this case such as the size of the eyes, the length of the face. Using both boundary method and region method segmentation
4. Finally, compare the distinctive qualities of that face to every individual you have their faces stored in a database, we will be able to compare the given input image by the one which is already stored in the database and determine the name of the attendee and store it on an "Excel type" sheet and keep on updating this sheet each time we do capture a face.

2.2 System Overview

1. A camera (a webcam in our case) will capture the image which is image acquisition process.
2. Inserting input image then, "face-recognition" and "cv2" libraries will be used in our python code, the "face-recognition" is the simplest face recognition library that helps us to recognize faces. The accuracy of the model is around 99.38%. also "cv2" is an open-source "OpenCV" library that can be used to execute tasks like face detection, objection tracking, etc. . . . . .
3. If pattern matches, it will mark the attendance else it will not do so.
4. Update the marked attendance in an "Excel" file.

2.3 System Context

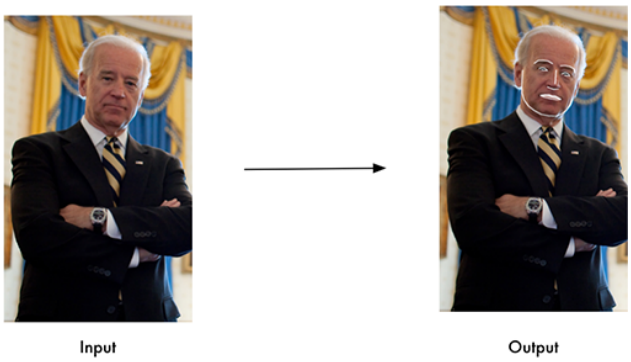


Figure 1: Figure 1: Get the locations and outlines of each person's eyes, nose, mouth and chin.

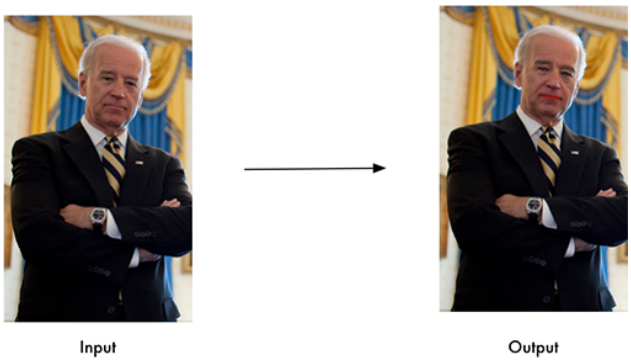


Figure 2: Figure 2: Finding facial features

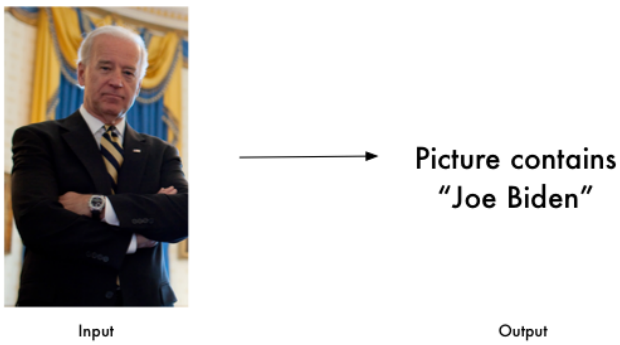


Figure 3: Figure 3: Recognize who appears in each photo.

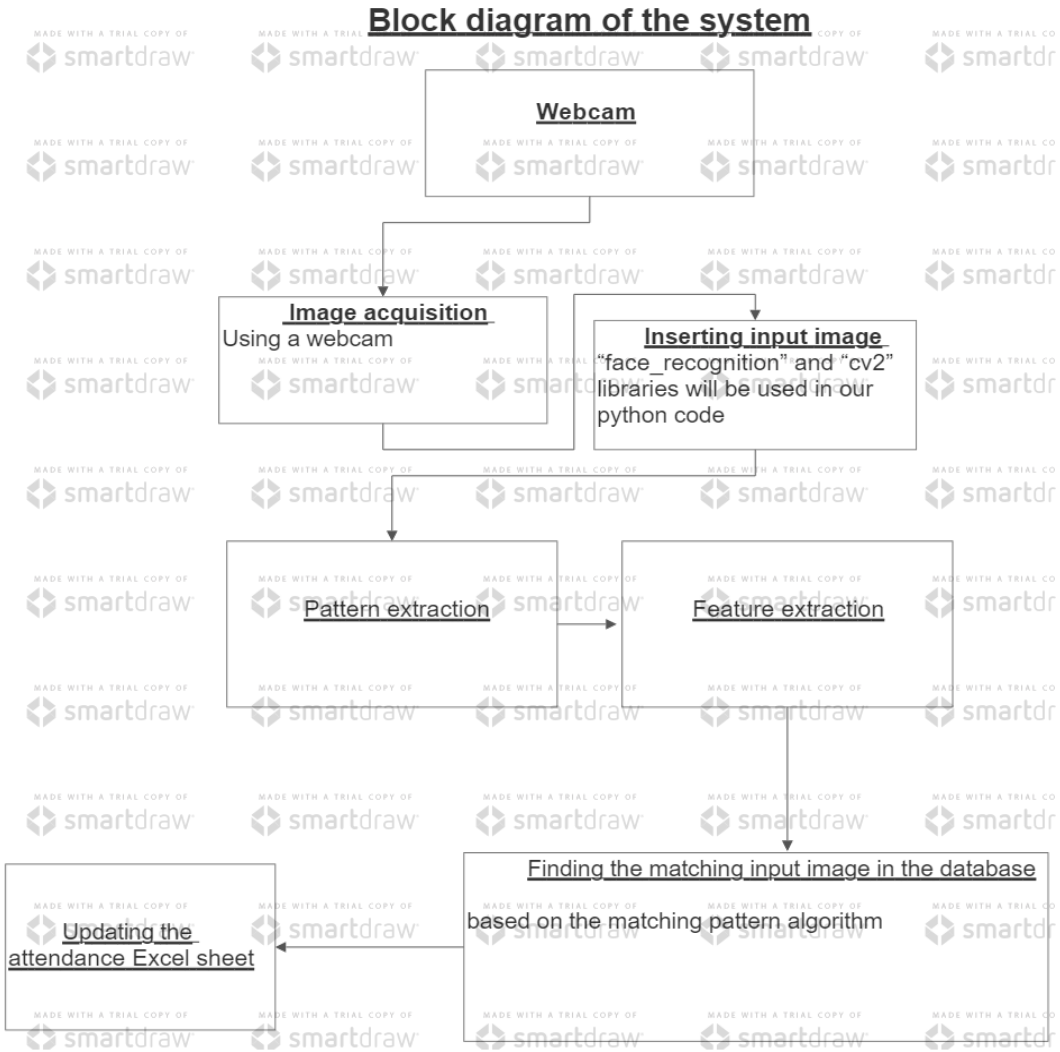
3 Functional Requirements

3.1 System Functions

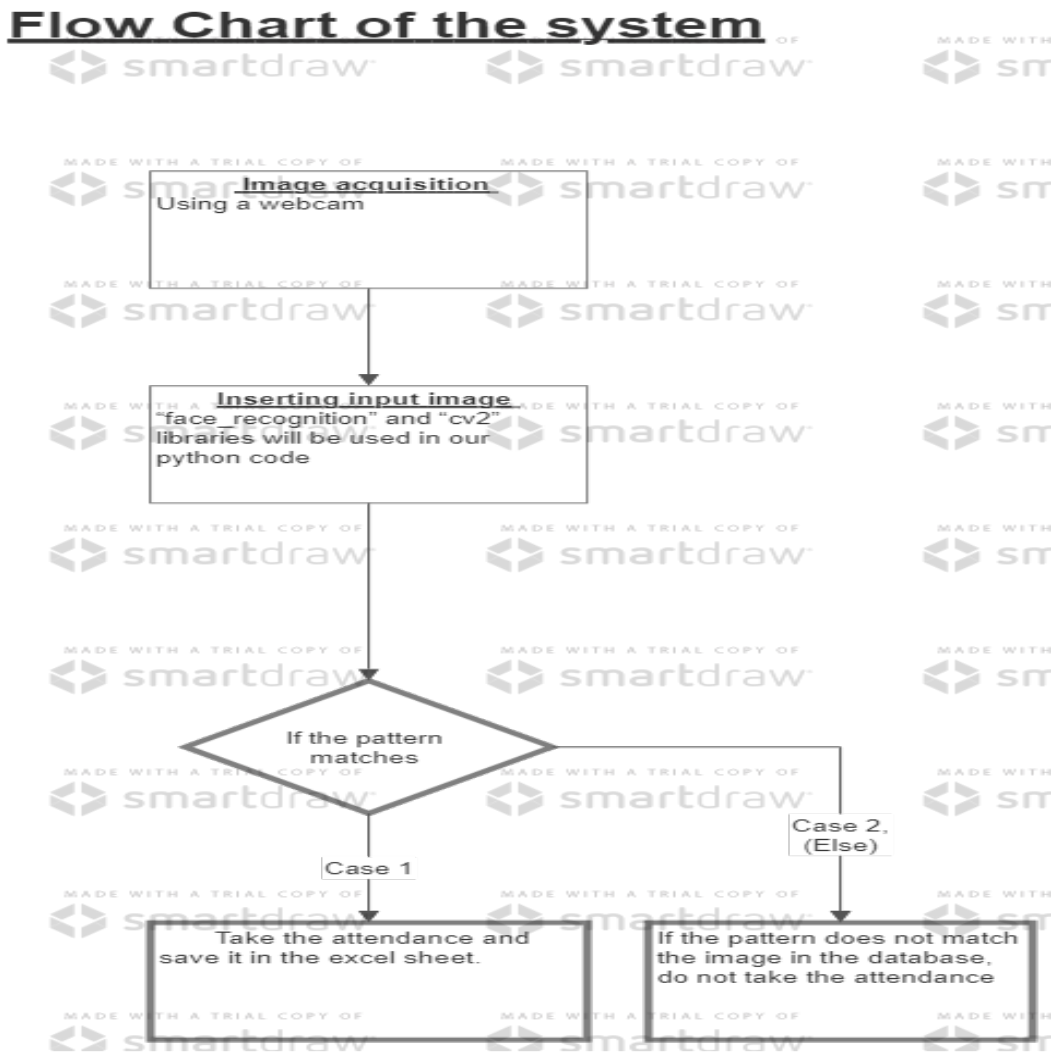
- System will be connected to excel sheet, or .csv file. This will contain the attendance sheet.
- System will contain a camera in order to take multiple snapshots to be used later on.
- System will then use these snapshots in order to do some image enhancement processes and then mark the attendance sheets in front of who's present or not.

4 System

4.1 Block Diagram of the System



4.2 Flowchart of the System



5 Supportive Documents

- https://medium.com/ageitgey/machine-learning-is-fun-part-4-modern-face-recognition-with-deep-learning-c3cffc121d78
- https://pypi.org/project/face-recognition/
- https://www.pmu.edu.sa/attachments/academics/pdf/udp/coe/dept/ee/face_detection_system_report.pdf