LaTeX Proposal for Computer Vision

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Abstract

Sam This Computer Vision project proposal will contain problem statement and importance, plan for data sources, and the computer vision algorithm to be used in this project.

1. Introduction

Attendance is a vital part of a students success in any course, especially in graduate level education, however enforcing and keeping records of a student's attendance is not always possible because of time and resource. In this project proposal will will lay out a system that will allow students to check in and out of a classroom using facial recognition.

2. Problem Statement

Attendance enforcement and record keeping in the class room is often overlooked because of added time and resources. Additionally, the COVID-19 pandemic has made it difficult to enforce attendance in the classroom. In this project, we will develop a system that will allow students to check in and out of a classroom using face recognition.

3. Data

1. The data for this project will be collected from the University of North Carolina's Canvas API (Will use Murtadha's Account) to fetch the number of students in the Computer Vision course. This information will be stored to be references to give a percentage of students attending.
2. The dataset that will be used to train our model is the Faces in the Wild (LFW) dataset. This dataset contains more than 13,000 images of faces collected from the web. Each face has been labeled with the name of the person pictured. 1680 of the people pictured have two or more distinct photos in the dataset. The only constraint on these faces is that they were detected by the Viola-Jones face detector.
3. Images of the students in the class will be collected using a webcam. The images will be taken in the classroom and will be used to train the model to recognize the students in the class.

The dataset used to test the model consists of photographs taken by group members during each class session. These photos were captured with the consent of the participants to record attendance for the day. Additionally, a small amount subset of a wild dataset will be incorporated as supplementary learning material.

Our approach involves training the model on a portion of the wild dataset to help it recognize and understand human faces. Subsequently, we will use our own images as test data to assess whether the model has been trained effectively. The primary objective is to determine the number of human faces in these images by performing face detection.

The dataset will be split into two parts: training and testing. The training dataset will be used to train the model to recognize the faces of the students in the class. The testing dataset will be used to test the model's accuracy.

The training dataset will consist of 80% of the images in the dataset. The testing dataset will consist of the remaining 20% of the images in the dataset.

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4. Methodology & Computer Vision Algorithm

4.1. Methodology

1. Train a model to recognize faces using the LFW dataset
2. Use the trained model to recognize the students in the class.
3. Use the Canvas API to fetch the number of students in

the class.
4. Compare the number of students in the class to the number of students recognized by the model to get a percentage of students in the class.
5. Log the percentages and present them in a graph to provide a visual representation of the attendance in the class.

The model will be trained using the LFW dataset (Partially). The model will be used to recognize the students in the class. The model will be able to recognize the students in the class and log the time they entered and exited the classroom. The model will also be able to identify the number of students in an image and cross-reference it with Canvas's people table (number of students) to provide a percentage of students in the classroom. The percentages will be logged and presented in a graph to provide a visual representation of the attendance in the class.

4.2. Computer Vision Algorithm

Using YOLO [1], a neural network for object detection, we will train a model to recognize faces. The model will be trained using the LFW dataset. The model will be used to recognize the students in the class. The model will be able to recognize the students in the class and log the time they entered and exited the classroom. The model will also be able to identify the number of students in an image and cross-reference it with Canvas's people table (number of students) to provide a percentage of students in the classroom. The percentages will be logged and presented in a graph to provide a visual representation of the attendance in the class.

5. Team

Murtadha Marzouq
Resume Link

Param Patel
Resume Link

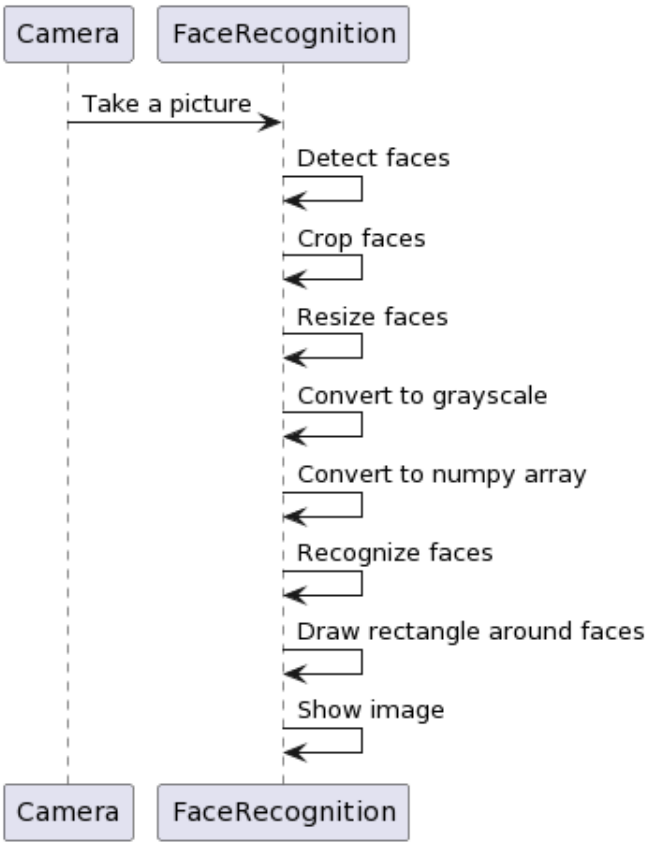
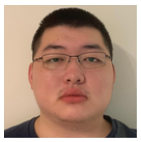
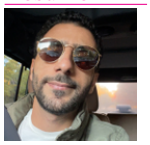


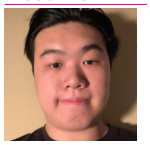
Figure 1. Flowchart of the system



Haochen Ye
Resume Link



Sam Aldehayyat
Resume Link



Yuepei Yu
Resume Link

This team had been build with the following fellowship in minds:
1. Liberté, Egalité, Fraternité
2. Diversity and Inclusion

3. Teamwork
4. Respect
5. Integrity

6. Results

Figure 2. Before

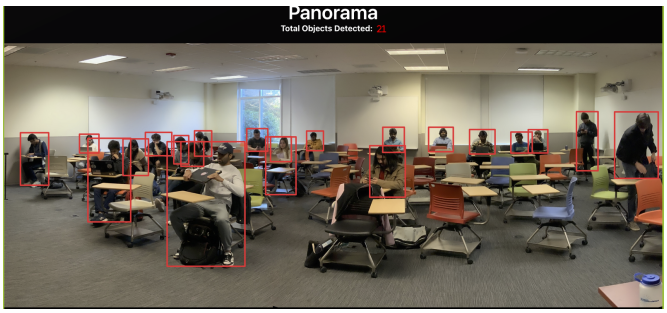


Figure 3. After

7. Conclusion

References

[1] Awais Adnan Misbah Ahmad, Imran Ahmed. Overhead view person detection using yolo. *IEEE*, pages 0627–33, 2019. 2