

## COE 379L Project 4 Proposal

### Introduction

The goal of this project is to properly identify who is entering a household by using image recognition software on a Ring camera. The idea is to identify who is coming by a household and to classify between a set of “qualified” persons such as family members and others such as neighbors. If the person identified does belong to the given set, then a text message will be sent to that respective person welcoming them home. If someone does not belong to that set, then a message will be sent to the household owner saying that an unidentified person is at the front door.

### Data Sources

For data sources, we plan on using detection frames from the Ring camera. When the Ring camera is activated, it creates a 30-second video of who/what was interacting with the door that caused the sensor to go off. It also detects when different people are at the door. We plan on using these clips and separating them into individual frames. We will go manually into these frames and create bounding boxes around the faces of people to create the training data.

### Methods/Techniques/Technologies

For methods, we are planning on using either LeNet-5, Alternative LeNet-5, or VGG16. Because both of these methods apply a decent-to-deep neural network layer, they are both suitable for the data processing we are expecting. Because the data set will be a class of 5 people, to resemble a household, the amount of different objects it will have to identify is significantly easier because the model will only be looking for 5 potential people, with the rest being classified as “other”. The LeNet-5 models fit this specification well, however, they’re significantly “weaker” when it comes to complex image classification in contrast to VGG16. However, even so, these cases of complexity would come in cases such as when the person is at a far distance and at night, however, the Ring camera does a good job of visually showing the person in different scenarios that we don’t think that will be a problem. There is a high-quality camera on the Ring camera, which helps reduce the need for many filters that need to be applied.

After identifying a person correctly, IE. within a high enough confidence interval with low error, a text message will need to be sent to that person. A webAPI will need to be developed that will take the confidence interval as a signal to message that specific person. Similarly, if none of those “qualified” persons are identified and instead it is “other”, a message will need to be sent to the homeowner.

**Products to be Delivered**

For deliverables, you should expect a working model that properly identifies household members. The model should be interfaced with a Ring camera system. Similarly, the model, when properly identifying a person in a household, should message them welcoming them home. On that same note, if a person is not of that household and is detected by the model, a message should be sent to the homeowner saying that someone is at the front door.