FaceOn

Elizabeth Carney and Josephine Nyoike
CSC 270, Spring 2019
Project Goals

Why we picked it:
- We were both really intrigued by Computer Vision and wanted to learn more about it.

What it does:
- Recognizes faces in real time using a PiCam.
- Sends data to the Arduino for processing.
- If the face is recognized, we hope to open a box.
The Pi/Ardueino Setup
Sensor

- Detects how many photons hit the sensor
- Has a rolling shutter, meaning it reads out all of the pixels from the sensor row-by-row
- Constantly streams pixels to the Raspberry Pi through the ribbon cable
- Can post-process videos and images with filters, transformations, etc.
```python
facial_recognition.py

if (no faces detected):
    new_data = 0
else:
    if (face not recognized):
        new_data = 0
    else (if face recognized):
        new_data = 1

if (new_data != old_data):
    ser.write(new_data)
```

```python
ArduinoReceiver.ino

if (data == 1):
    onLED()
    openBox()
else if (data == 0):
    offLED()
    closeBox()
```
Software

Facial Detection
Software

Facial Recognition

- Original Image
- LBP Result
- Regions/Grids (Grid X - Grid Y)
- Histogram of each region
- Concatenated Histogram
Challenges

- No display when Arduino is connected to the Pi
- Serial communication
  - Problem: Overloading the communication channel
  - Solution: Reduce the amount of data sent
Demo!