Lab 4 Final Report   Aayush Suri (aayushs2), Rishov Dutta (rsdutta2)

We chose to make an track 1: IoT System for our project. We used a Raspberry Pi and 2 cameras to essentially create a home security system. In this project we were trying to tackle the problem of creating an affordable home security system that is relatively simple, but gives the user what he/she would need out of a security system. Our main challenge in this was finding out which software we should use, since we had already decided on using the Raspberry Pi and the 2 camera as our hardware, and using OpenCV. OpenCV especially was a challenge since the install took multiple hours and there were many instance of the Pi just freezing during the install. Also many of the instructions online for downloading OpenCV just didn't work for us, so we ran into many dead ends.

The design and flow for our project is as follows: We have a Raspberry Pi setup with OpenCV and connected to 2 cameras. Each webcam has 2 different modes, either it will focus on motion detection or face detection. The user can choose which one he/she wants for either camera. When the cameras detect either motion or a face (based on the setting), they will send an email to the user and upload frames to dropbox where the user can access the frames as JPEGs. We have folders set up in the dropbox to tell which cameras sent the frames and the email also tell the user which camera detected what. We used Mailgun and Dropbox APIs to create a script that would allow us to email and upload files and then we integrated it to our flow. An issue that we faced was email spamming and too many uploads to dropbox so we kept a timer to bottleneck the frame uploads and emails. We thought of scalability for our project as well, and an addition to our project to make it more large scale would be to add more pis with 2 cameras attached.

Our design, overall, is more modular and allows the user to control a lot of the features and aspects. The user can control which form of detection is in use along with the number of pis he/she wants to use. This allows the user to modify and set up the security in a way that works for his/her home. Existing home security systems are much more complicated and require downloading additional apps or syncing the cameras to a laptop or something along those lines. For our system all that is required it an email and a dropbox and everything is done for the user from there.

References

1) https://stackoverflow.com/questions/23894221/upload-file-to-my-dropbox-from-python-script

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3) https://documentation.mailgun.com/en/latest/

4) https://www.pyimagesearch.com/2015/05/25/basic-motion-detection-and-tracking-with-python-and-opencv/

5) http://flask.pocoo.org/