Selfie Drone
Final Report

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OpenCV Benchmarking

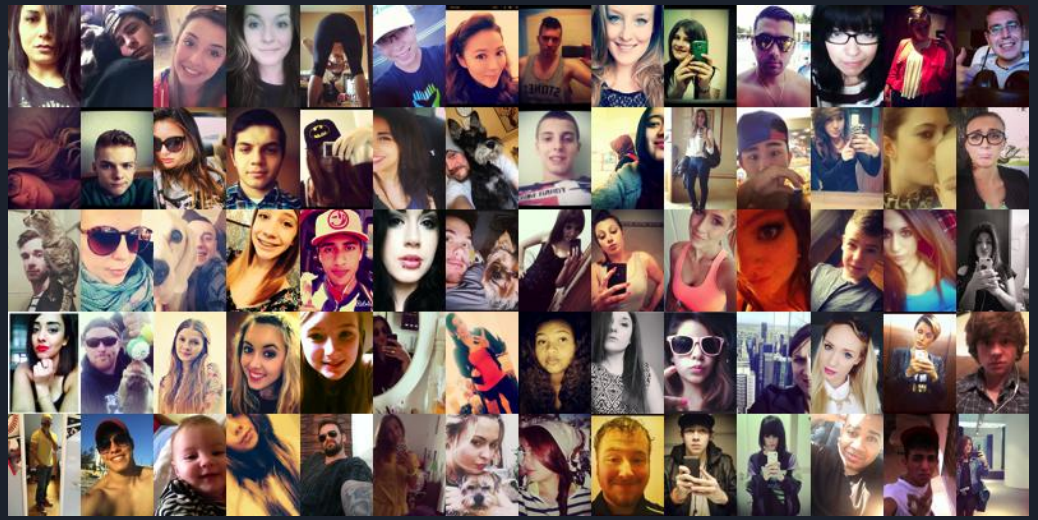
- For Face Detection, there are two pre-trained classifiers
  - Haar Cascade Classifier
  - LBP Cascade Classifier
- OpenCV provides the following models
  - haarcascade_frontalface_default.xml
  - Haarcascade_frontalface_alt.xml
  - Haarcascade_frontalface_alt2.xml
  - Lbpcascade_frontalface.xml
  - lbpcascade_frontalface_improved.xml

How We Did It?

- Modified the Selfie routine to look through data set, time the picture detection, and sort the pictures.
- Executed in Simulation mode

```
                byte[] pic;
                int picNum = 1;
                System.out.println("Querying PicTrace for image data for image: "+picNum);
                //read next picture from picTrace database
                Date date = new Date();
                System.out.println(date.toString());
                while (picNum <= 100) {
                        pic = readNextPic(picNum);
                        //read image into openCV and classify

                        if(classify(pic)){

                                                                System.out.println("Selfie: Found " + picNum);
                if (getSim().equals("AUAVsim")) {
                        writeImage(pic, "/home/indrajeet/git/reroutlab.cstewart.code.auav/trace.data/PicTraceDriver/PicTrace/Selfies/"
+ picNum + ".jpg");
                }
                else {
                        writeImage(pic, Environment.getExternalStorageDirectory().getPath() +  "/home/indrajeet/git/
reroutlab.cstewart.code.auav/trace.data/PicTraceDriver/PicTrace/Selfies/"+ picNum + ".jpg");
                }

                        }

                        else {
                                writeImage(pic, "/home/indrajeet/git/reroutlab.cstewart.code.auav/trace.data/PicTraceDriver/PicTrace/
Not Selfies/" + picNum + ".jpg");
                        }
                        picNum++;
                }

                date = new Date();
                System.out.println(date.toString());
                System.out.println("Selfie: Exiting"  );

        }
```

What we used ?

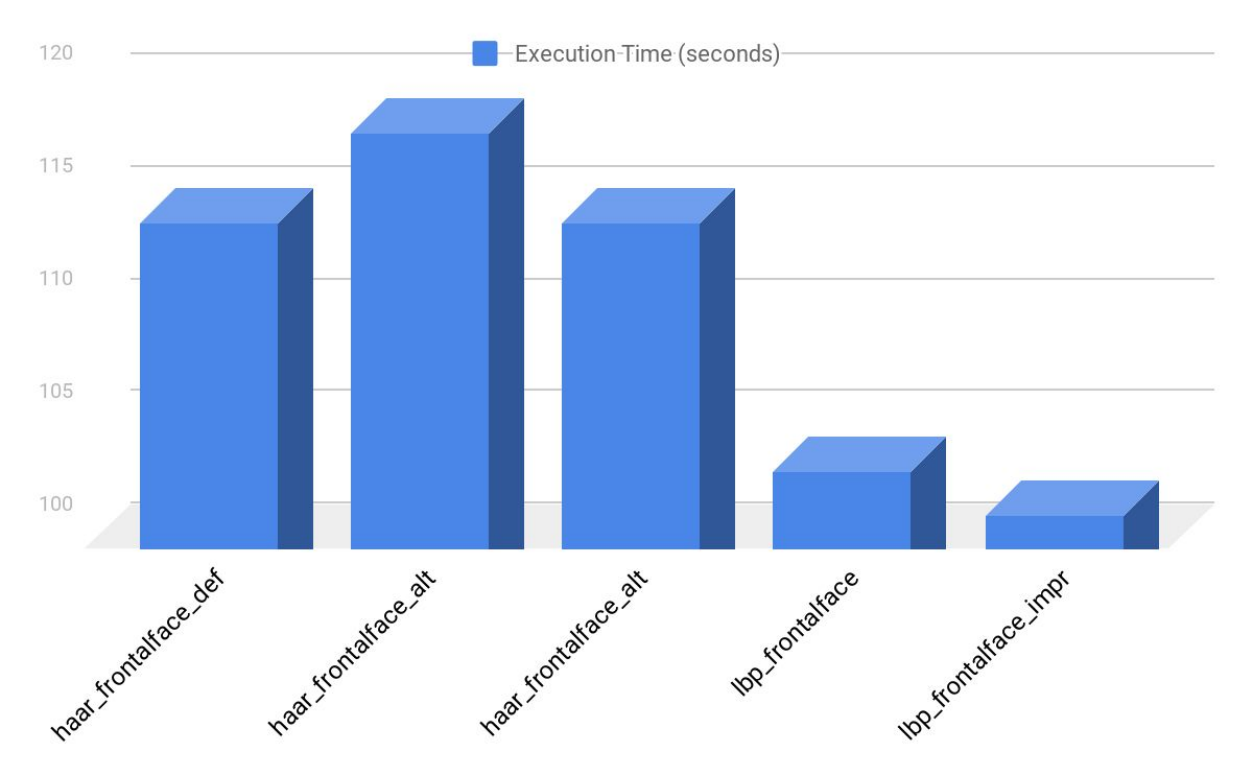


Selfie Data Set from UCF Center for Research in Computer Vision

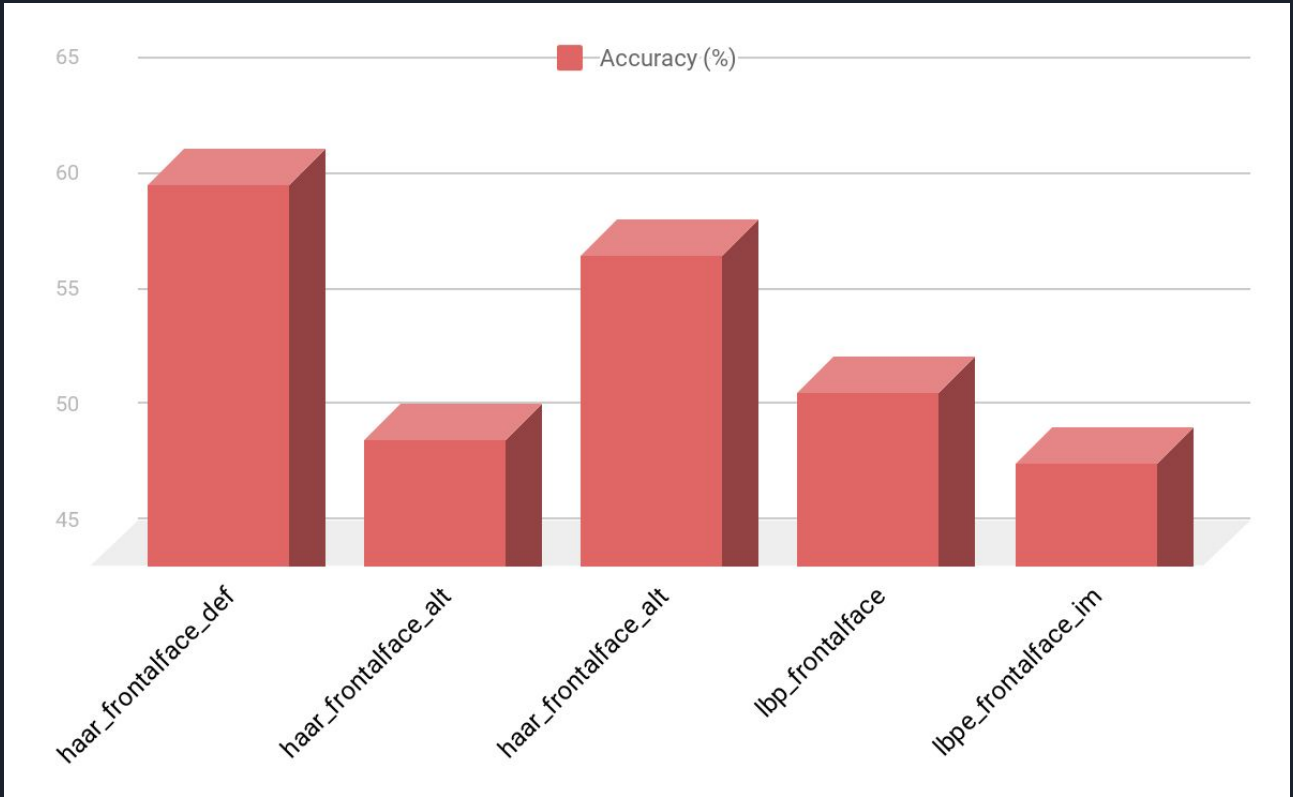
http://crcv.ucf.edu/data/Selfie/

100 images

Complexity of Face Detection Models



Accuracy of Face Detection Models



Inferences

- Haar is computationally complex but more accurate
- LBP is computationally simple and fast but less accurate
- Avg. size of LBP is 52.95 KB vs 715.8 KB for Haar
- Choosing the right model is a tradeoff between time complexity, size of classifier, and accuracy

Future Work

- Increase the size of the dataset and compare results
- Face detect should run on a forward facing picture, we wanted to see how many degrees your face could pan before not being recognized.

Future Work (more possibilities)

- Deploy selfie on Android device
- Extend flight plan
- Expand camera control
- Add additional AI
  - Additional image processing
  - Automatic flight plan planning