Project Title : Face detection based home security system

Project Description :

The security alarm system is to be designed using Arduino . Human face will be given to the designed system. If detected image is a family member , the system will glow the green light and it will allow them whereas others will be prevented by glowing red light.

Part : 1

Generating dataset (Collecting large no.of family members images)

Part : 2

Training an Owner / Not Owner detector using deep learning

Part : 3

Deploying our results to the Arduino UNO .

Project workflow :

- First we classified our image dataset using Convolutional Neural Network(CNN) and Keras.
- Then we trained our CNN image classifier with Keras.
    - Here we are having few step :
        1) Load our image dataset from disk
        2) Pre-process the images
        3) Instantiate our Convolutional Neural Network
        4) Train our image classifier
    - For this training we are having python code . While compiling we have to give path for dataset and trained model.
    - Eg : python train_network.py --dataset images --model owner_not_owner.model
- Evaluating our CNN image classifier.
    - While compiling the test python code , we have to give our trained model we generated in the above step .
    - Eg : python test_network.py --model owner_not_owner.model \ --image examples/image.jpg
    - It will produce an integer value 1 if that detected image is house member otherwise it will produce 0 .

- Deploying our results in the arduino software.
    - For deploying the results , we have used pyserial package . By using this we can communicate between our python code and arduino software through arduino's serial port.
    - Based on the output value we got from the previous step , the arduino will glow green light or red light .

Code parts :

1) Training CNN image classifier (train_network_final.py)

2) Testing CNN image classifier (test_network_final.py)

3) Deploying results in the arduino software (arduino_final.ino)