



Automatic Drone Tracking

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Problem

- Benefits for tracking, surveillance, and the film industry
- Location and tracking of criminals can be done through automatic control rather than manual
- Ability to automatically track actors and actresses in drone shots of film production
- Can track a moving presenter in a classroom setting



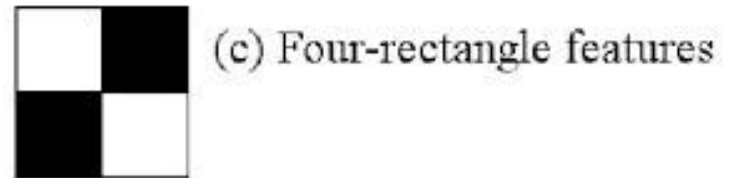
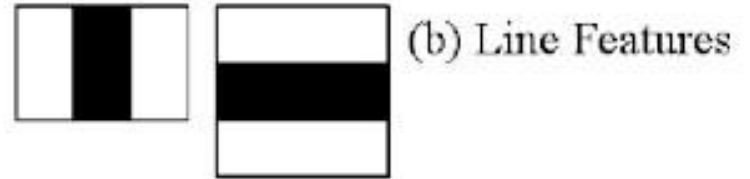
Objective

- Use computer vision to implement facial recognition.
- Report facial recognition data to expert system in order to issue correct drone movement (API calls).
- The drone should be able to track and follow a person based on facial data.

Related Work

Haar Cascade Classifiers

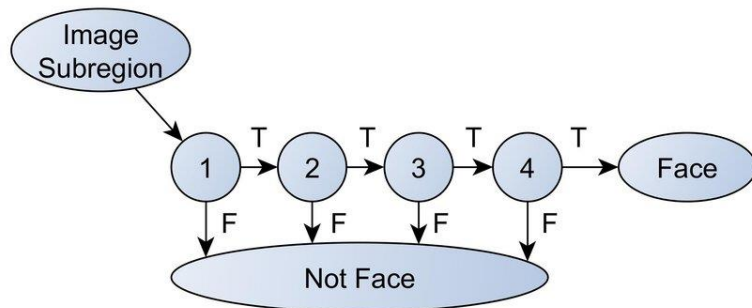
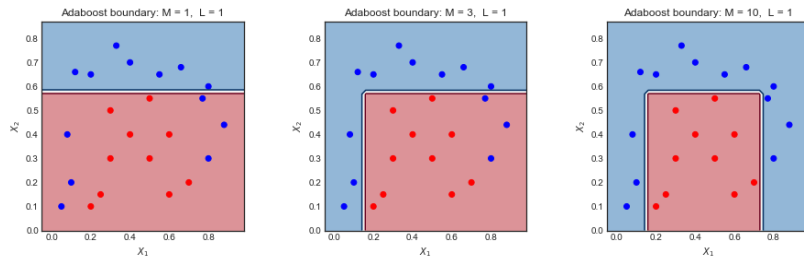
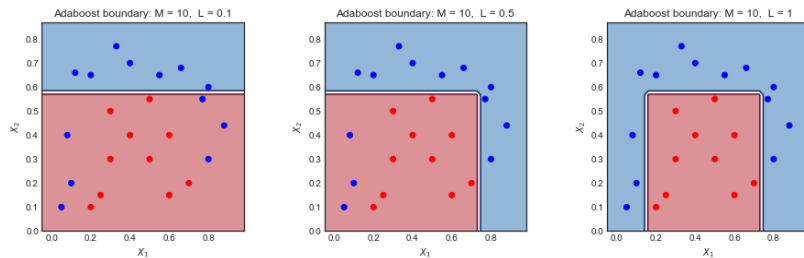
- Haar function is trained
- Haar features determine features of object
- Calculated Haar feature value



Related Work

Haar Cascade Classifiers

- Adaboost to improve efficiency
- Cascade of Classifiers



Design Requirements

- High Quality Camera
- Drone Control System
- Drone Stability
- Facial Recognition Software
- Environment Adaptability
- Enough Processing Power

Design

- System parts: drone and AI backend
- Drone:
 - Tello (Brand), Tello API
 - Mounted camera
 - UDP communication
- AI Backend:
 - Desktop Computer
 - Facial recognition (Haar Cascade + Expert System)
 - Provides movement directions for drone (API + Socket Connection)

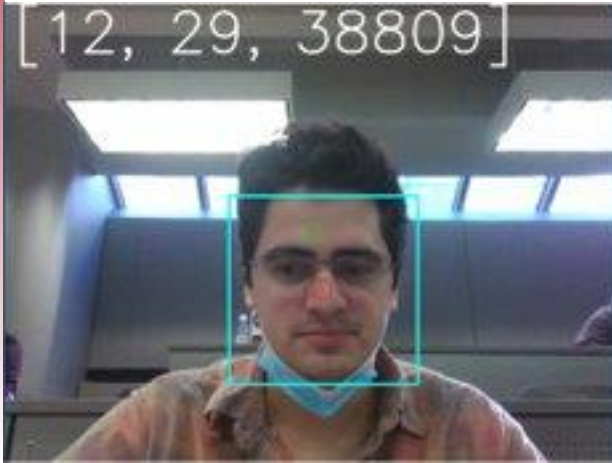


Tasks



Drone Team (Parker, Zachery)

- Socket programming
- Video pipeline
- Control communication



AI Team (Andre, Byron, Corbett)

- Facial detection
- Expert system



Tasks	Dates
Finish Final Proposal	11/29
Read Haar Cascade documentation	11/30-12/6
Read Tello drone documentation	11/30-12/6
Winter Break	12/17-1/18
Develop a process to allow for fluent connectivity between drone and computer	1/18-1/24
Define input/output of face detection model and expert system	1/24-1/31
Develop a process to stream video from drone camera to computer	1/31-2/7
Develop a process to detect human face using face detection model	2/7-2/21
Develop a program to detect data files from drone	2/21-2/28
Create an expert system that reads data files and issues response to drone	2/28-3/14
Create the set of potential responses to the drone (how it will move in response to human movement)	3/14-3/28
Create set of tests for a live test	3/28-4/6
Live test the system	4/6-4/7
Debug the system	4/7-4/14
Create presentation for the project	4/14-4/21
Present the project	TBD

Sources

Cascade Classifier Illustration [2]. - Researchgate.net.

https://researchgate.net/figure/Cascade-classifier-illustration-2_fig2_323057610.

“Cascade Classifier.” *OpenCV*,

https://docs.opencv.org/3.4/db/d28/tutorial_cascade_classifier.html.

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