FACIAL AND GESTURE RECOGNITION

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Objectives

FACIAL RECOGNITION

EYE TRACKING

GESTURE RECOGNITION

Facial Recognition

- Recognize a person from a webcam
  Achieved Tasks:
  - Our first task was to locate the person's face in each frame, which we were able to do using openCV Haar cascades
  - Once we have the face, we use it to compare against our database of faces using an open source project called pyfaces
  - The program will also add a person to the database if they aren't already in it

Facial Recognition

- Challenges
  - multiple people in view of webcam
  - images in database have to have the same dimensions
  - if a person is not in the database, it will still match that person to someone in the database

Eigenfaces

- Pyfaces
  - Implements Eigenfaces
    - based off of PCA (Principal Component Analysis) method : finds the directions with the greatest variance in that data by the use of eigenvalues and eigenvectors

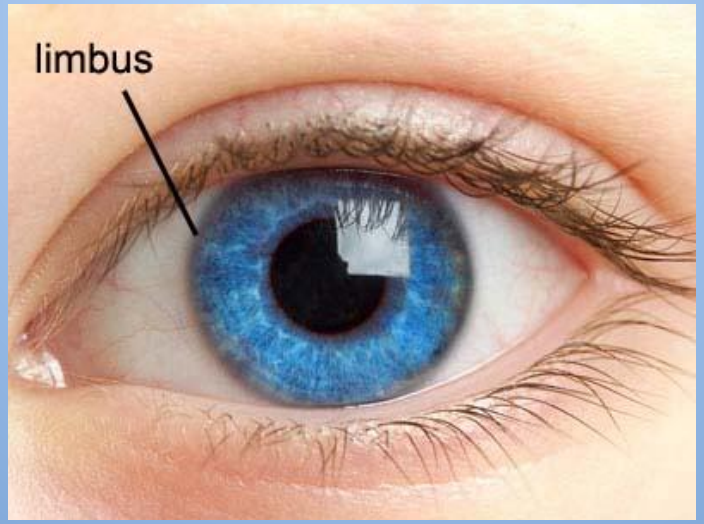
Facial Recognition

DEMO

- database with 7 people in it

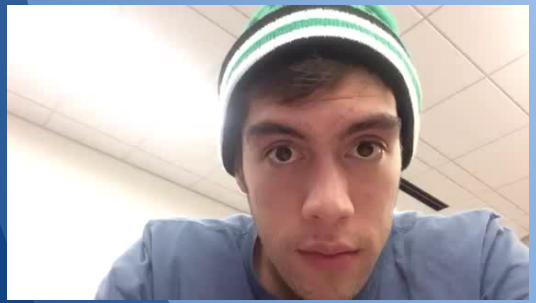
Eye Tracking

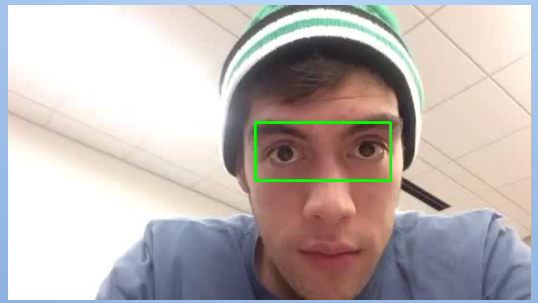
- Track eye movement
  - Our first task was to identify the limbus our region (ROI), the area where the color meets the sclera (white part of the eye)



Eye Tracking

- We used haar cascades to single out a region of interest where the cascades detected eyes in the video.
- Hough circle detection used to locate the center of the irises within the region of interest
- Analyzed coordinates using basic math in order to determine what direction eyes are moving





Eye Tracking

Demo

Emotion Recognition

- Optical flow
- Implementation of PCA
- Average expressions