Developer’s Guide

This document will help you get up and developing for UCSD Global TIES DVS project.

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# Project Overview

## Summary

The DVS Image Analysis team works on developing algorithms that perform computational image analysis on a patient's image to determine the presence of two types of vision disorders: amblyopia and strabismus. Amblyopia, or more commonly referred to as "lazy eye," is the loss of or reduced vision in one eye. It is the most common cause of visual impairment in children. Strabismus, more commonly known as "crossed eyes", refers to the misalignment of both eyes. This prevents the eyes from working together, resulting in vision impairment, faulty depth perception, double vision, and, if left untreated, amblyopia.

For more information about the two types of vision disorders we are working to identify, the following links are useful resources.

Amblyopia: <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002009/>

Strabismus: http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001999/

The Image Analysis team works on one of the essential parts of the Image Analysis application; primarily the detection of the iris in an image of the patient's eye and from there assessing the amount of the reflection in the eye caused by the Bruckner Reflex test to ultimately determine whether the patient has amblyopia. The Bruckner Reflex test is highly dependent on capturing images with a strong red-eye effect.

## Ultimate Goal

The setup we’ll be working with is a laptop connected to a camera. This camera will take two pictures, one horizontal and one vertical (this is to maximize the crescent effect of red eye). The program will then detect the child’s eyes, allow the user to confirm this detection, detect several other features including the pupil, crescent, and sclera. These features will also be confirmed by the user. The program will then move on to analyze these eye features using machine learning and notify the user of the application which, if any, eye disease the child may have.

## Subject Matter

# Get Coding!

## Technologies Overview

### Front End

### Back End

#### Technologies list

*dependent technologies are indented*

* OpenCV 2.4.5
  + NumPy (latest revision as of 05/01/13)
    - Python 2.7.4
* PIL 1.1.7
  + Python 2.7.4
* IDLE Python
  + Python 2.7.4

## Environment Setup

### Windows

1. Install Python
2. Instal NumPy
3. Install OpenCV
4. Copy a file?
5. Install the Python Imaging Library
6. Set Path

### Linux

### Mac

## Code Structure

### Front End

### Backend

# Resources

## Documents

### User Stories

### Requirements

### Class Diagrams

## Links

### Eye Detection

### Pupil and Iris Detection

### OOP

### Miscellaneous