Journal Report 1
9/2/19-9/9/19
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Period 1, White

Daily Log

Tuesday September 3

Re-downloaded PyCharm Edu. Afterward, found that I had PyCharm Community Edition, so decided to use that instead. Moved gamevid.mp4 from flash drive to Mac desktop. Calculated video is 30 fps, which will help me isolate specific frames if I know the timestamp in the actual video. Downloaded OpenCV library and imported into PyCharm environment.

Thursday September 5

Found frames 209 to 243 is an excerpt of a pass where ball is seen the whole time, but the camera is unstable. 483 to 512 is a good pass with camera stable. Created VideoCapture object and was able to read the video frames. Converted to grayscale and applied Hough Circle Transform. Did not work. Tried abdif and subtracting adjacent frames and gaussian blur to remove noise. Applied Hough Circle transform now; still did not work.

Timeline

Date	Goal	Met
Aug 26	Locate and mark a lacrosse ball when it is visible in frame	No
Sept 2	Locate and mark a lacrosse ball when it is visible in frame	No
Sept 9	Locate and mark a lacrosse ball when it is visible in frame	to be determined.
Sept 16	Identify and track all players on the field	No
Sept 23	Identify and track all players on the field	No

Reflection

Last year in Computer Vision, it was a pain to download the OpenCV library and use it within XCode, the text editor I chose to use for c++ coding. However, getting the OpenCV library onto PyCharm was easier. All I needed to do was download the library and PyCharm, proceed to preferences, project interpreter and include the library in the table that appears on that page.

Because I did not meet last week's goal, I decided to push down my next goal a week to work on meeting this first goal. I feel like it's one of those cases that once I get the ball rolling, it will roll fast. As in, many aspects of future goals for this project will build on or borrow from this first goal. Therefore, it is vital I meet this goal before anything else as a foundation of my project.

We did a coin project in Computer Vision last year, in which the objective was to find coins in an image using Hough Circle Transform. Because the lacrosse ball was circular, I thought I could use the same method to find the ball. However, the ball is likely too small for the method to work. I found a sequence of frames when the ball was visible during a pass. Even after I applied Gaussian Blur and tried Image Subtraction, which was much easier to apply than I had initially thought because of OpenCV, the ball was too small, and barely even visible in a single frame.

I believe going forward the best way to locate the ball, at least given that it is being passed, is to focus on movement. The ball will be the fastest object that moves during a pass, and my idea will be to use that fact along with image subtraction to develop a new algorithm. However, a problem with this is that I would need to find a way to track which moving object is the ball, frame to frame, and be able to distinguish it from other moving entities, like players.
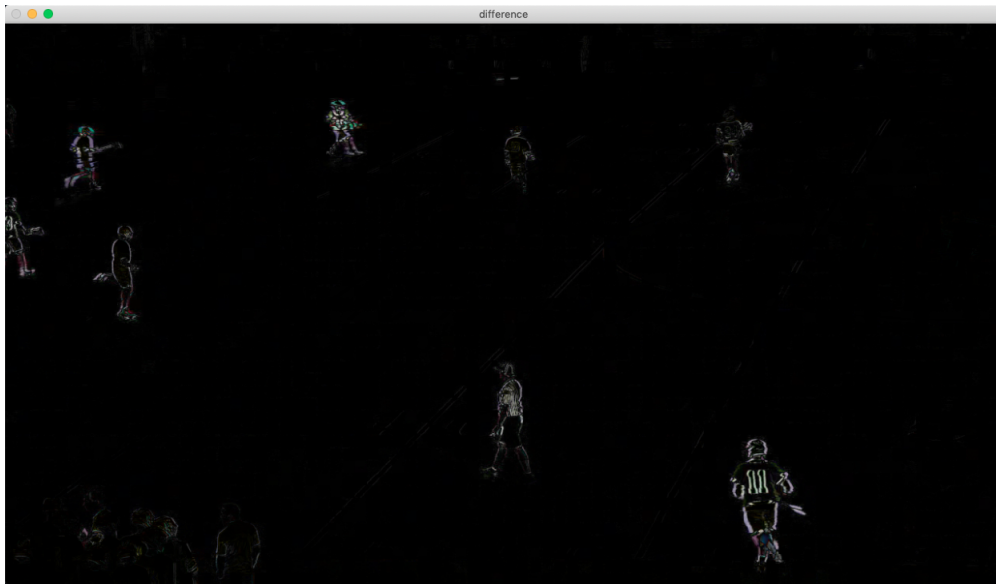
Figure 1: Frame after abdiff and threshold combined with Gaussian Blur (ball is in the top middle of frame).

Figure 2: Original Frame (ball is in the air, in front of the red track towards the upper middle of the frame).)