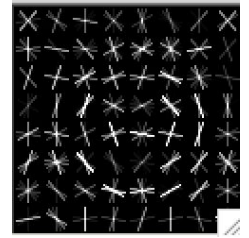


Project Checkpoint

What we have done:

Firstly, we decided to pivot away from using Lukas Kanade to track the basketball, after experimenting with it and learning more about it in Assignment 3. We have decided to go with using the dlib C++ library to perform our object detection. We are currently using a fixed histogram of oriented gradients (HOG) pyramid detector which works by collecting relative intensity values (gradients) within a specified region of the image into a generalized template. An image pyramid is used to be able to track objects both close and far from the camera. We used the imglab tool provided by dlib to train examples of basketballs and create the HOG detector representation.



We then used this to test a stream of video frames that we extracted from a real example of us shooting a basketball and tracked the basketball with a red rectangle. This link will take you to a video showing our current results:

<https://www.youtube.com/watch?v=YXqCeEVwvCo&feature=youtu.be>



Next steps:

We want to move on to getting the ball detector working on an iOS app and then project homographies for the court and hoop so that we have a complete scene laid out. Once we have this, we can move on to parabola approximation and the rest of the steps we have planned.



Schedule:

2nd week first half:

- Finish implementing the ball tracker in iOS.
- User the completed tracker to also implement hoop recognition and tracking

2nd week second half:

- Obtain a parabola parametrization for the basketball shot (use error correction)

3rd week first half:

- Compute shot angle of entry with parametrization.
- Field test with various positions on the basketball court
- Attempt to calculate player (base of parabola) distance from hoop for better target angle data

3rd week second half:

- Create a video of our project in action
- Write up the final report

4th week first half (if applicable):

- Contingency space (wrap up loose ends)