EE/CprE/SE 491 WEEKLY REPORT 7

Oct 24, 2024 12:00 PM - Oct 31, 2024

Group number: 49

Project title: Slowpitch softball device

Client/Advisor: Nicholas Fila

Team Members/Role:

Cael Schreier: Bookkeeper and Code Review

Andrew Kinneer: Lead System Designer

Kyle Nachiengane: Lead Testing Engineer

Sam Skaar: Coordination and Documentation Lead

Kolby Moorman: Lead Client Outreach

- **Weekly Summary**

This week our group got some more recordings of softball pitches with precise camera height and distance measurements to work of off for our testing going forward. We also improved our pitch detection algorithm to work in the daytime and throw out measurements that aren't "pitches" which we will continue to work on moving forward. We have also started experimenting with various application development tools, such as QT for iPhone development to see how our application will work when it is deployed, and how we will develop for that deployment.

- **Past week's accomplishments**
  - Andrew Kinneer: Succeeded in tracking the ball during the daytime, wrote some logic to determine if a ball is a pitch, and narrowed the area the script is searching for the ball when it is a pitch.
  - Kyle Nachiengane: Worked with QT and experimented with Xcode and Swift-Objective-C.
  - Cael Schreier: Worked on continuing application development and height-tracking logic on our current videos using known variables to determine what is possible and what must be user inputted. Helped record more footage for testing.
  - Kolby Moorman: Experimented with different frontend frameworks like Beeware and Kivvy to get an idea of what framework we can use. Also recorded more footage with all known measurements
  - Sam Skaar: Figuring out the math we need to determine ball height, and what error that might be. This included accuracy of iphone camera. Went out and recorded exact dimensions of the latest footage with the rest of the guys.

- **Pending issues**
  - Anytime tracking
  - Live height tracking
  - Specific device to use

- **Individual contributions**

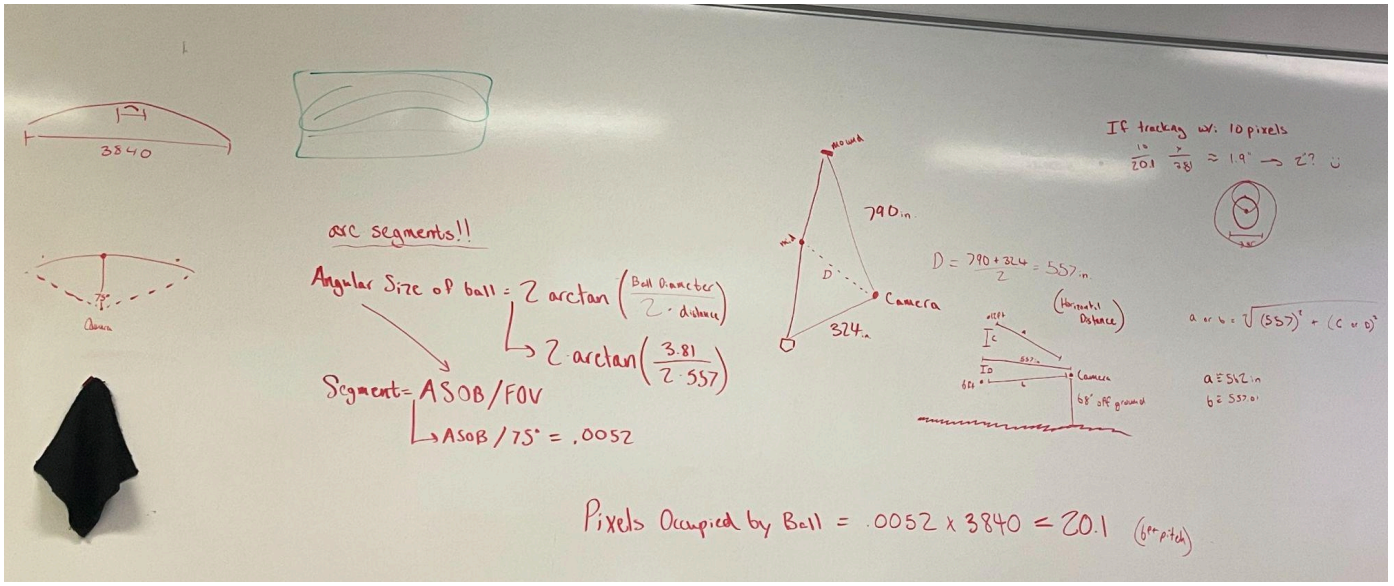
NAME	Individual Contributions	Hours this week	HOURS cumulative
Andrew Kinneer	Daytime tracking, narrowing range for tracking ball, pitch detection	5	29

Kyle Nachiengane	Worked with QT and experimented with Xcode and Swift-Objective-C.	4	27
Cael Schreier	App development, height tracking, and recording	5	29
Kolby Moorman	App development and fieldwork measurements	4	29
Sam Skaar	Figuring out the math we need to determine ball height, and what error that might be.	2	30

- **Plans for the upcoming week**
  - Andrew Kinneer: Work on finding a universal way to track the ball during the day time and nighttime.
  - Kyle Nachiengane: Keep working on app development and accurate height detection with new data.
  - Cael Schreier: Continue making height tracking more accurate and reliable, find ways around users inputting every single field measurement.
  - Kolby Moorman: Work on developing an App that will be able to run our python project with opencv.
  - Sam Skaar: Implement a visible height value using the newest footage.

- **Summary of weekly advisor meeting**

This week in our meeting we talked about some of the front end software we will be using to create the actual application and showed a few small demos of just a spin up of an application. We also talked in detail about tracking the height of the softball. Throughout this we explained all known variables and the different mathematical measurements we need to find based on the measurements we already know.


3840
75°
Camera
arc segments!!
Angular Size of ball = 2 arctan (Ball Diameter / 2 · distance)
2 arctan (3.81 / 2 · 557)
Segment = ASOB/FOV
ASOB / 75° = .0052
Pixels Occupied by Ball = .0052 x 3840 = 20.1 (for pitch)
Forward
790 in
D
Camera
324 in
D = 790 + 324 / 2 = 557 in
If tracking w/ 10 pixels
10/20.1 ≈ 1.9° → 2°?
(Horizontal Distance)
a or b = √(557)² + (C or D)²
a = 542 in
b = 557.01
68° off ground