Softball Team 1

PITCH PERFECT

EE/CprE/SE 491 Status Report 1

Dec 20, 2024 12:00 PM-Jan 30, 2025

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 Frontend Developer

- **Weekly Summary**

Since our last meeting, we have enjoyed a nice winter break to rejuvenate ourselves before our final semester, and have begun working on our project again as the semester resumed. We have continued to improve our height-tracking methods and run some tests on how valid our methods are, with some strong results. We have also continued to work on our mobile application research, and hope to have a specific environment we feel confident in soon.

- o **Past week's accomplishments**
  - ● Andrew Kinneer: Looked into the potential for using MacOS VMs for those of us on Windows. Turns out this process isn't exactly legal, so that might not be the best choice for a school project. Looked into Google's Project IDX for a cloud solution with an IOS emulator however, even though IOS emulators are advertised, Google is still working on implementing it into the service, and the feature is not yet available. Created a Flutter project with OpenCV as a dependency. Currently unclear based on what I've found to go with Flutter or React Native. There is currently an open-source plugin for Flutter called opencv_core that implements OpenCV from the native C++ code. React Native also has an open-source plugin called React Native Fast OpenCV, and it boasts most of the same features. Both require minimal effort to install as they're just libraries. Both are missing a few features from native OpenCV, so we'll need to do a comparison and see which one has the features we use/want to use.

  - ● Kyle Nachiengane: Did some research on react native and found a good amount of resources that supported open cv and react integration.

  - ● Cael Schreier: Over the past few weeks I worked on testing the validity of using YOLO's ultralytics model to track the height of a softball in our application. I ran tests on a small scale tracking a softball at a constant height and at various distances. I found that a ball's height can be tracked within our 4-inch accuracy measurement with a human's height inputted within 4 inches of accuracy at 6 ft, and then found how far I could go off of where I measured my baseline height before the algorithm broke down. All of my results are outlined below:

Inputted Height for Cael	Ball error at 6ft (ft)	Distance from >4 in error (ft)	Percentage distance error from camera	Equivalent distance in field testing (mound)	Equivalent distance in field testing (plate)	
73 in (correct)	~0.01	2	0.2034587996	13.39369278	5.493387589	
74 in	0.07	1.916	0.19491353	12.83115768	5.26266531	
72 in	0.11	2.25	0.2288911495	15.06790437	6.180061038	
71 in	0.2	2.625	0.2670396745	17.57922177	7.210071211	Camera to wall (ft)
70 in	0.29	2.666	0.2712105799	17.85379247	7.322685656	9.83
69 in	0.37	2.916	0.2966429298	19.52800407	8.009359105	
75 in	0.12	1.4583	0.1483519837	9.766011089	4.005503561	
76 in	0.2	1.33	0.1353001017	8.906805697	3.653102747	
77 in	0.28	1.083	0.11017294	7.252684639	2.974669379	

  - ● Kolby Moorman: This past week I got back into the swing of things by getting an application up and running on my phone and began to look into how to develop different pages for the ui.

- Sam Skaar: I spent my extra freetime over break attempting to get a flutter application running. I was successful in running a simple counter application via android studio and I can see a future workflow where we build this tracker there. I tried to get the first steps of an ios application going, which is the whole point we're using flutter, and I found it extremely trying. I was unable to find documentation related to running ios flutter on a windows machine, that produced any fruitful results.
- **CONCLUSIONS: I think we should heavily discuss our final deliverable and maybe try to pivot to an android only application. We can still make it in flutter, which would hopefully offer some easier transferring to ios at the end should we have time.**
    - We could also rent macbooks from the bookstore and then test on our Iphones if we would rather stay with an Iphone first focus.

o **Pending issues**

- Specific mobile development client
- Universal ball tracking algorithm
- Height tracking improvements for edge cases

o **Individual contributions**

NAME	Individual Contributions	Hours this week (break)	HOURS cumulative
Andrew Kinneer	Research into IOS emulation options and Flutter Environment with OpenCV	6	50
Kyle Nachiengane	Did research on react native and open cv integration	2	44
Cael Schreier	Height tracking small-scale live testing	6	49
Kolby Moorman	Got back into the swing of things by pulling up an app on my phone using flutter.	3	45
Sam Skaar	Flutter research and attempted workspaces	15	54

- **Plans for the upcoming week**
    - Andrew Kinneer: Confirm that the Flutter and/or the React Native OpenCV plugin have the features we need

    - Kyle Nachiengane: Create an environment in react native

    - Cael Schreier: Determine where our height tracking algorithm breaks down and work on ways to identify and remedy these situations

    - Kolby Moorman: Really focus in on Developing mobile pages using flutter for our application. Get the home page done and figure out how to make the camera pull up as a page.

    - Sam Skaar: Completely depends on what our meeting is about this friday (Tomorrow)

- **Summary of weekly advisor meeting**

    We have not yet met with our advisors. Our first meeting will take place the day after this report is due, as it was difficult to coordinate schedules to narrow down a meeting time. We will include weekly meeting summaries in all following status reports.