Padel Pals

Team G01-2

Deliverable F: Prototype I and Costumer Feedback

Engineering Design GNG1103

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Abstract

Previously in deliverable E, a final design was created and prepared for presentation to the client. A project outline and task list were created as well as a list of risks that may appear during the completion of the project. A bill of materials was created listing all required materials and cost required upon completion of the final product. The following deliverable will discuss the feedback received from the client and a detailed description of prototype one.

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1. Introduction

The purpose of this deliverable is to form an initial prototype of our final conceptual design. The prototype will be represented through Unity. Testing will also be performed to determine the functionality of the prototype; this will later be used to improve the design and eventually form our final application. Customer feedback will be discussed from the previous client meeting and how we implemented their feedback into our new design.

2. Prototype I

The target of this prototype is to present the basics of the application based on the final conceptual design. This will include the user interface, home screen, camera set up, ball tracking and their main tasks. This prototype is intended to be a focused prototype and does not include all the details.

2.1. User Interface Home Screen

The home screen is the introductory visual interface displayed, from which will allow access to functions. The buttons on the Main home screen provide access to different screens, initially it gives access to the player screen or the coach screen. Secondly, on both player and coach home screen it asks for name and ID, also there is a button for new members. Based on the info you enter depending on initially what you selected you would have access to the main screens, for instance if you had selected player at the beginning and entered your full name and ID, then the main screen for player will pop up which includes the option for recording a new match, watching previous matches, Feedbacks and the user manual from which allow us to access different things. Most of the buttons are associated with a function. However, this application's different parts were created in different computers and need to be exported from unity, allowing us to assign all the buttons with a function.

Moreover, to complete the home screen there will be many changes to the interfaces to fit a more aesthetically pleasing model and look more professional. There will be a user manual which could possibly be a video or a short statement on how to use the app. For 'Record New Match' the code has been completed and will be associated with the button.

Figure 1: Application Home Screen

Figure 2. Application Home screen Player

Figure 3. Application Home Screen Coach

Figure 4. Main Home Screen for player

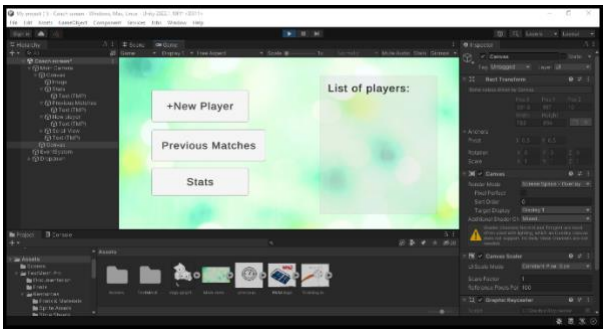

Figure 5. Main Home Screen For Coach

2.2. Camera Set Up

As discussed in a previous deliverable, the first camera will be placed at the corner of the court as demonstrated in figure # below. The camera will be placed outside the court on a tripod and look through the glass surrounding the court. We considered the possibility of having three cameras to increase the accuracy of our data collection and positioned them in such a way that there would be the least number of blind spots for the program, as shown in figure #. Consequently, we assumed that the camera used would have an ample field of view.

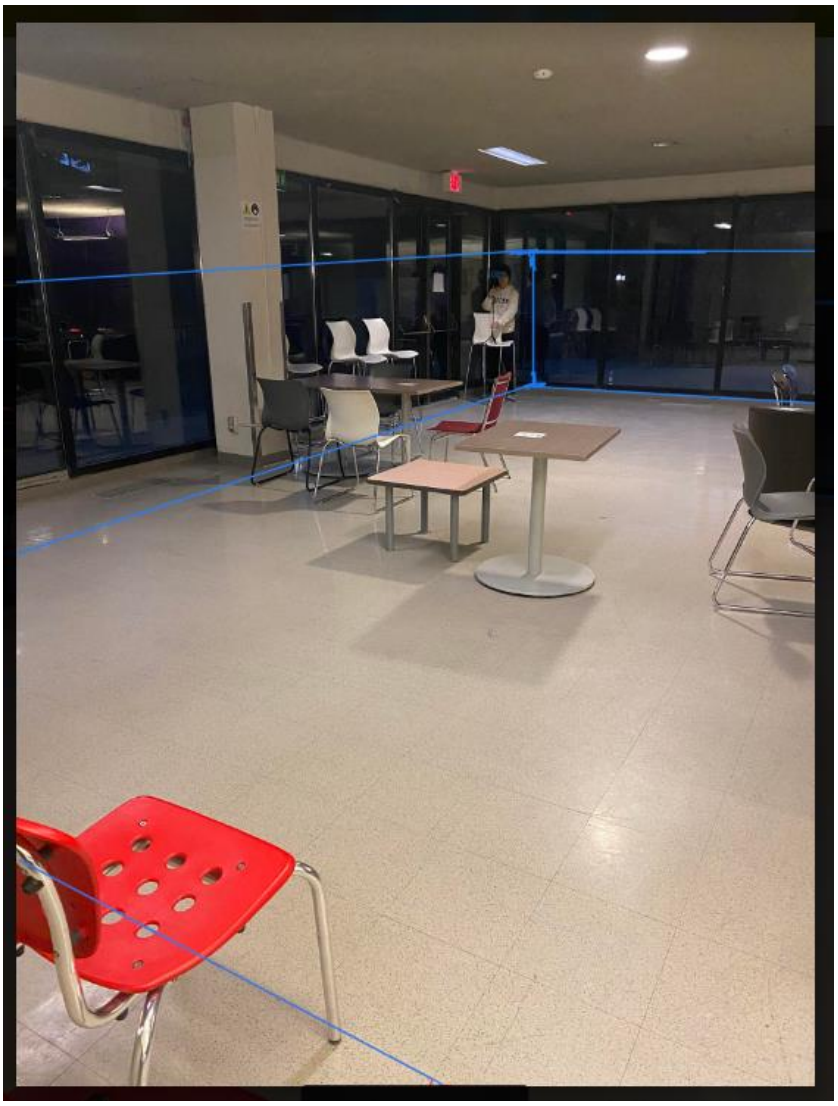

Figure 6. View of Camera Set-Up with Demo Court

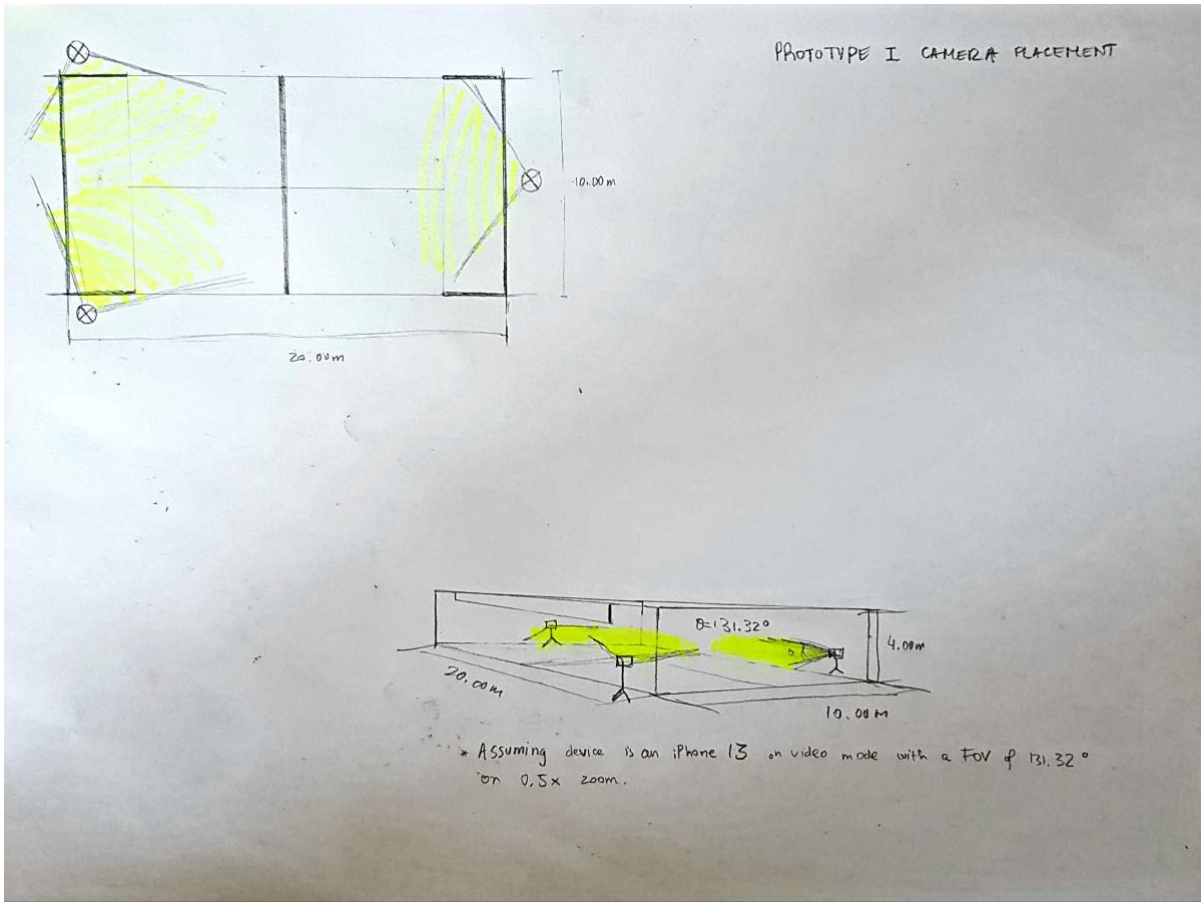

Figure 7. Detailed Sketch of Camera Set-Up

2.3. Ball Tracking

The tracking of the ball is crucial to the applications functionality, and for this reason we formed a focused prototype to test our first version of this program. Most of the data we collect or calculate to be presented to the user will come from this position data, so making these values as accurate as possible would be extremely beneficial for the functionality of our application. As mentioned previously, our goal is to eventually add 3 cameras, but we formed this prototype to work using two cameras. It is expected to print the (x,y,z) positions of the ball from two separate cameras by tracking the color of the ball.

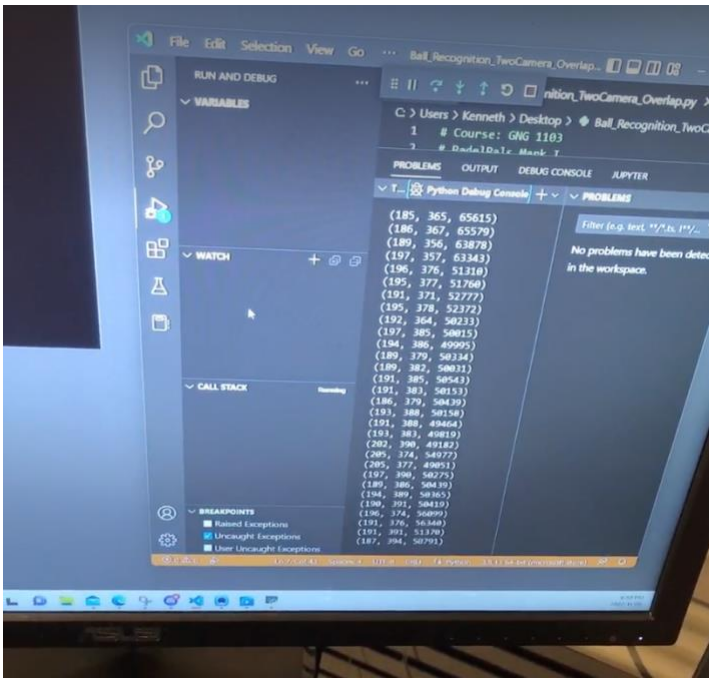

Figure 8: Ball Tracking (x,y,z) position

2.4. Testing

It is crucial to test the functionality of each prototype for further improvements and potential risk assessment of the software. This is a focused prototype, rather than a comprehensive prototype. It focuses on the object tracking aspects of our application as well as camera set up and UI screens. Although the full design has not been prototyped yet, we structured the most important parts of our project first so that we have more time to make suggestions and improve upon them.

Our UI focused prototype was successful. We took suggestions from the client to add a player-coach login opening screen. This was included in our prototype as seen in figure 1. The suggestions flowed smoothly into our original conceptual design. In the next prototype we will focus on exporting these screens into unity and creating functions to link them together.

We also briefly tested our camera set up ideas for our design. We received feedback from the client concerning our original idea and made improvements to it. We chose angles that leave the least number of blind spots on the court. The positioning of our cameras was tested and passed, as it was set up to follow figure 8. These angles should be used for further testing since it optimized the view of the cameras.

To test our team's first ball tracking prototype, we ran the program on Unity. Our expectations were that the program would be able to recognize the data from the two cameras as one ball (rather than two) and be able to show the (x,y,z) position of the ball. The results of our testing showed that the prototype can successfully print the (x,y,z) position for the ball from both cameras. However, it was not as accurate as we had hoped it to be, this can be improved in the next prototype.

Overall, the prototypes were successful and met our expectations. In further prototypes we plan to perform more advanced testing of the design as we progressively build our application. The next prototype specifically will focus more on testing aspects such as ball tracking accuracy, interface aesthetics and developing our interfaces for other functions in our design like recording a new match or viewing previous matches.

3. Feedback

3.1. The Overall Focus from Client

After client meet one, the feedback was very positive towards the outline of prototype one. The client really emphasized that the focus should be on getting one camera to track a padel ball accurately with room for multiple cameras in the future. Our prototype one can track the ball and record its placement in the court with two cameras as discussed in the prototype one section above.

3.2. Personal Client Feedback

The client was surprised and excited by the drawings the group created to show our design idea for the user interface and expressed that we had done more thinking towards the future compared to other groups so far. Although our original design had the camera attached to the wall inside the court in a glass box, the client provided the group with more information on how padel ball is played and how the camera cannot be placed inside the court. Considering this feedback, we have adjusted our camera placement to be on a tripod placed outside the court glass.

The group had other detailed ideas such as showing tutorials on how to play padel ball and a user manual. The client suggested showing players and coaches what the highest statistical shot would be and not having the user manual so visible on the main screen as we had presented the user manual section to be the same size as buttons for more relevant functions (like recording a new match).

Finally, another suggestion was to keep the feature which allows the user to choose between player and coach as they open the application. Originally, we had cut this idea out of our conceptual design. After discussing this idea with the client, we decided to add this feature back into our design. Just as we did with the other suggestions, we will adopt these proposals and improve our design and prototype.

3.3. What is Next?

Since we have directly presented our final design idea to the client in the client meeting one and based prototype one on client feedback we will continue to do so for our next prototype and so on. Our prototype one covered the clients focus of tracking the ball and collecting its coordinates with two cameras and our ideas for the user-interface. The prototype one also considered the feedback on placing the camera outside the court and hiding the user manual from the main screen. In the future we will consider adding more cameras and improve the quality of the ball tracking along with adding additional features of game tutorials and player-coach sections.

4. Conclusion

Considering all the client feedback, overall, the prototype one was a success and covers the focus expressed by the client and more. For the next prototype we will begin to add an additional features of game tutorials and the use of multiple cameras and continue to develop the look of the user interface.