

Neo Vasudeva and Mehul Dugar
ECE 120 Honors Lab
12/10/18

Final Project Lab Report

Introduction

Statement of Purpose

Badminton coaching is extremely expensive and time consuming, Footworx attempts to save the user the money they might spend on hiring a coach and gives them the convenience of using it whenever and wherever. The device we propose is a lightweight, foldable, and portable training device that optimizes badminton footwork training experience by using a combination of lights and sound. It can be saddled on the badminton net and can direct footwork on both sides of the court. The fabric based device, that consists of lamps and a speaker placed on a cloth with the lines of a badminton court painted or sewn, should be hung on the net towards the player. It directs footwork by lighting lamps in one of many corners of the court and also specifies the shot type that should be hit at the highlighted corner using lights and sound. Parameters such as speed, number of movements, rest between rounds, and others can be adjusted by the user.

Background Research

Badminton, previously considered a “hobby” sport in the US, has been one of the world’s fastest growing sports, and has embedded itself in American youth. With a surge in popularity and an inadequate supply of professional badminton coaches, it is evident that a more economical and efficient system to aid in the development of young badminton players is needed more than ever. Over the years, various drills have been devised to improve a player’s performance, most notably footwork. Footwork is the randomized or predetermined action of moving from the center of the court to one of the many corners of the court and back to the center. Footwork drastically improves players’ agility, consistency, and stamina. However, footwork often requires a second person, typically a coach, to guide the direction of movements. Several training devices and programs have been developed. These are either non-portable devices or are simply software programs that simulate footwork on a computer. Most fail to account for a complete set of user input parameters such as allotted time for rest or the like, while others fail to display runtime parameters such as rounds completed or the like. Therefore, a need exists for a lightweight and portable badminton training apparatus which assists with footwork and accounts for all parameters involved in drills and represents all types of shots.

Analysis of Components

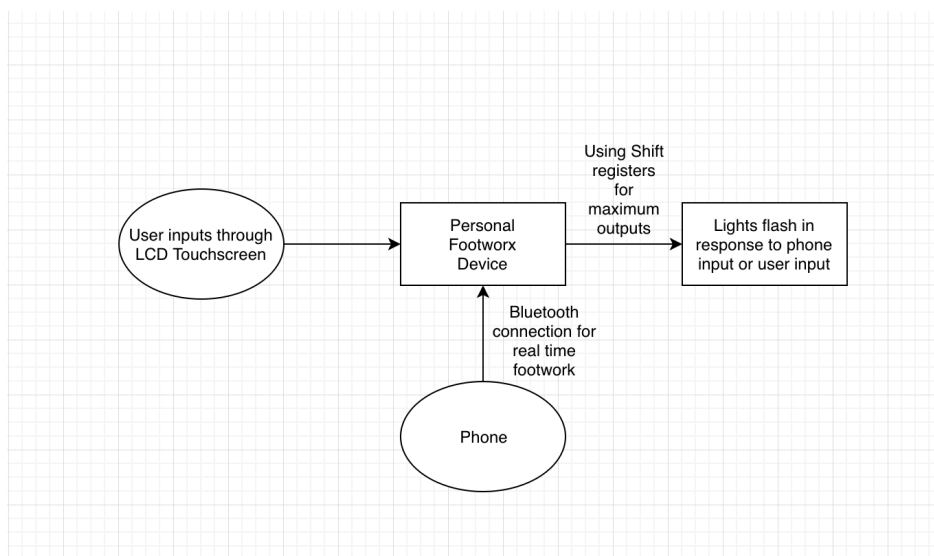
Two shift registers were used to store the output values as the Arduino board in itself did not have enough outputs.

We used RGB LED's to display the outputs.

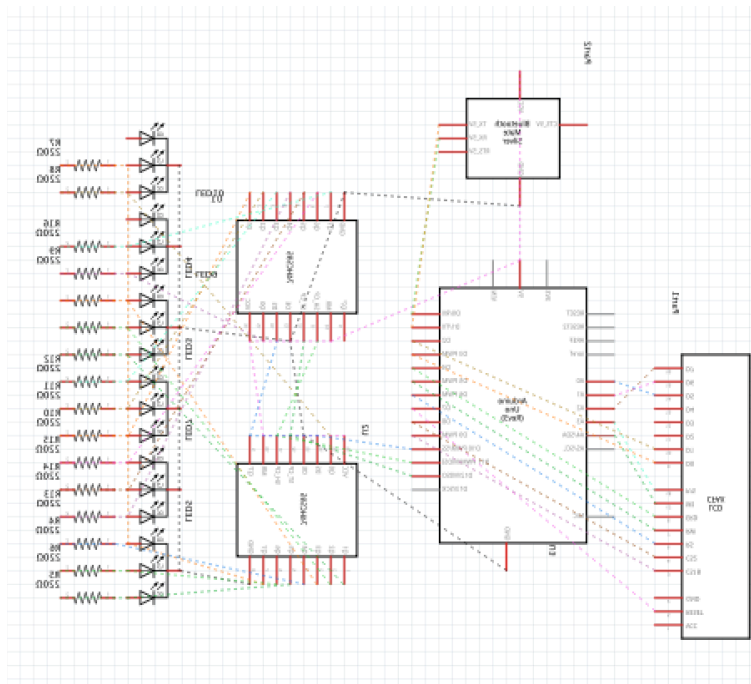
We used a TFT LCD Touchscreen for the user inputs.

Design Description

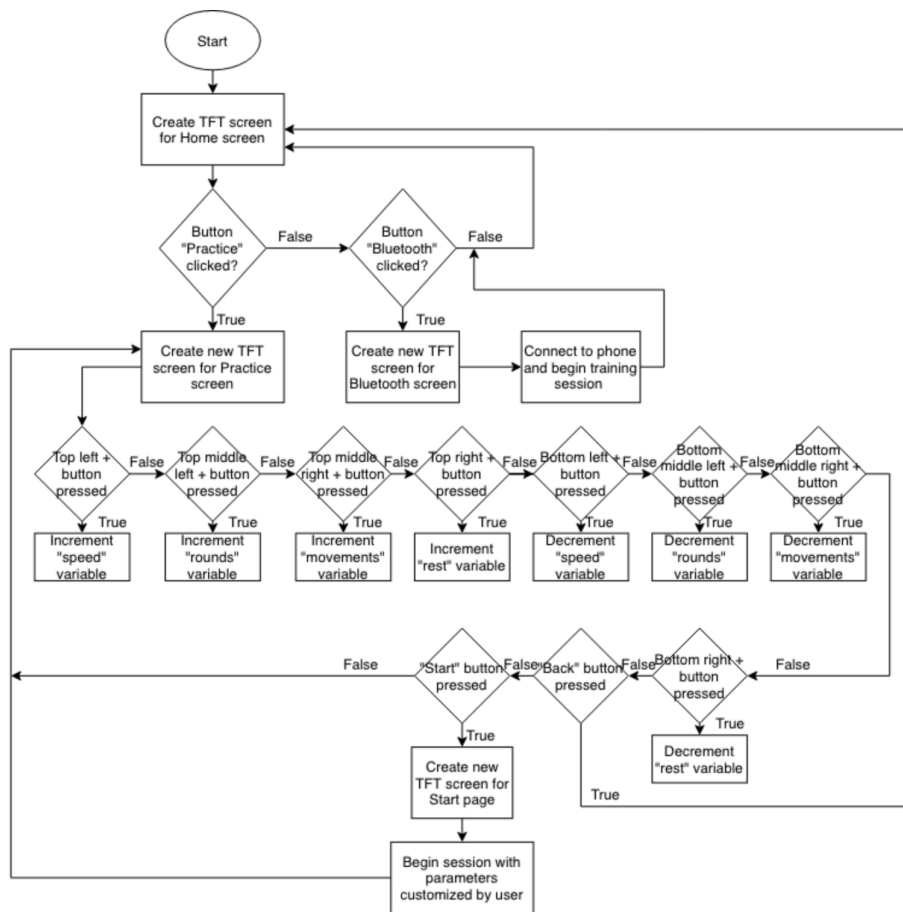
Block Diagram



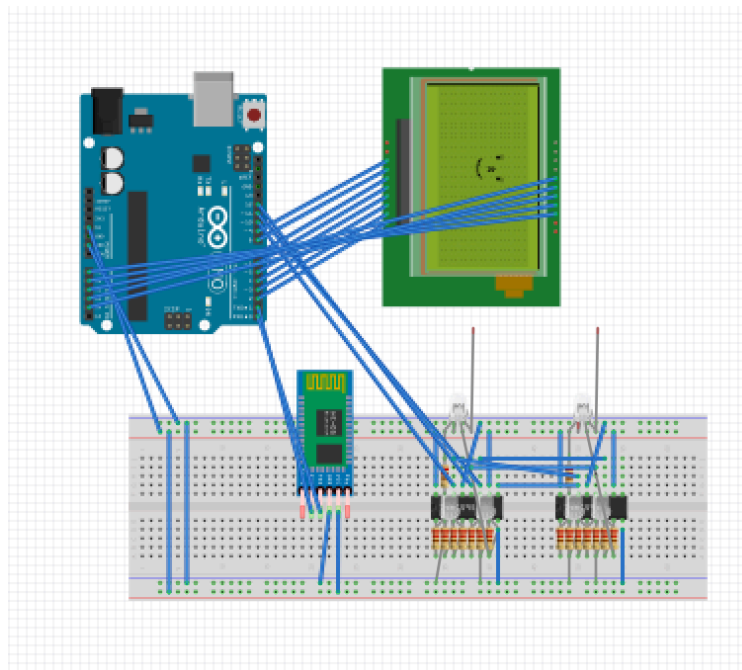
Circuit Schematics



Flow Chart



Breadboard Layout



Conclusion

Challenges Faced

One of the challenges we faced was how we were going to reset the LCD touchscreen, initially the screen would display the next page as part of the code but the buttons from the previous screen would still show up. We were able to find the bug in the code and were able to fix the issue. Another challenge we faced was the getting serial input via Bluetooth. Initially when we sent inputs, the device would not respond to them. We later realised that the device was storing the ASCII values of the inputs and not the actual value and we were able to rectify that.

Future Plans

We currently have an app to go along with the device in development. We hope to also transfer this circuit onto a PCB to get a finished product in hand.