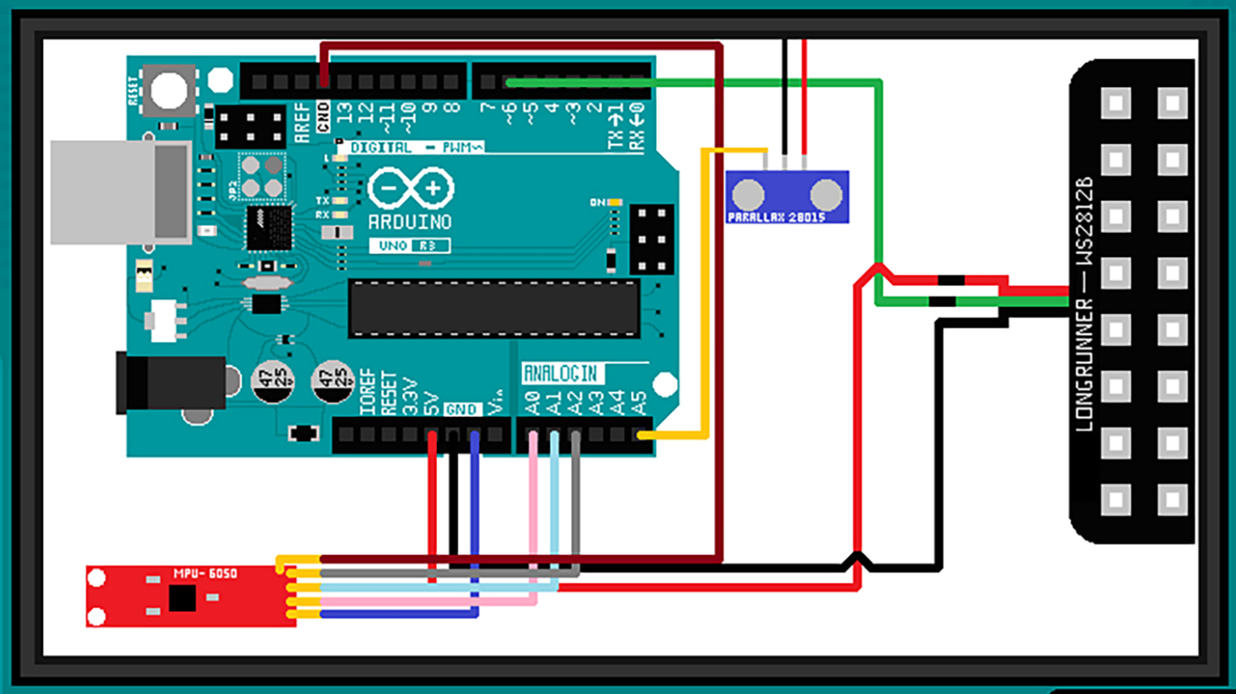
Low Fidelity Game Canvas

REALISATION OF DATA DRIVEN SYSTEMS

Introduction

The aim of this project is to create an LED canvas that can be used to display how different user inputs can influence the output of data driven embedded systems.

The LED canvas is made up of WS2812B LEDs.



Methods

This Project was written and developed for the arduino Uno. This is because arduino has a large array of libraries designed with these parts in mind.

ARDUINO

Accelerometer Data

The data from the accelerometer is used to influence the path with which the ball will take.

If the accelerometer outputs that the canvas is leaning to the right, the virtual ball will respond in turn and will react to this angle.

Distance Sensor Data

To demonstrate how these inputs can be used the project uses a game of LED Tennis that will use the two inputs as both player movement and to change the court.

The data from the distance sensor is used as a virtual paddle, detecting a user's hand moving to "Push" the LED ball in the given direction.

By using two distance sensors the Arduino can calculate the difference between the two and can then generate an angle, check for a collision between the players hand and the virtual position of the ball and then return the ball along its new vector.

Future Work

To further expand on this project, the next step would be to use the full extent of the accelerometers to simulate a more realistic gravity/force effect.

Another way forward would be to add more accelerometers, this way a user can adjust at multiple points, allowing for more accuracy.

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Low Fidelity gaming is now a serious topic, allowing anyone to develop simple tools for teaching as well as games themselves. Low Fidelity Gaming has also now started to attract interest in a diverse range of scenarios such as medical-based Cultural Competence Education[1].

[1] Z.Khan and B.Kapralos, A low-fidelity serious game for medical-based cultural competence education, University of Ontario Institute of Technology, Canada, July 21, 2017