Fitman™

Overview

This project is a runner game built using an Arduino UNO R4 and an LCD screen. The player controls a character with AI that enables it to run and jump over obstacles.

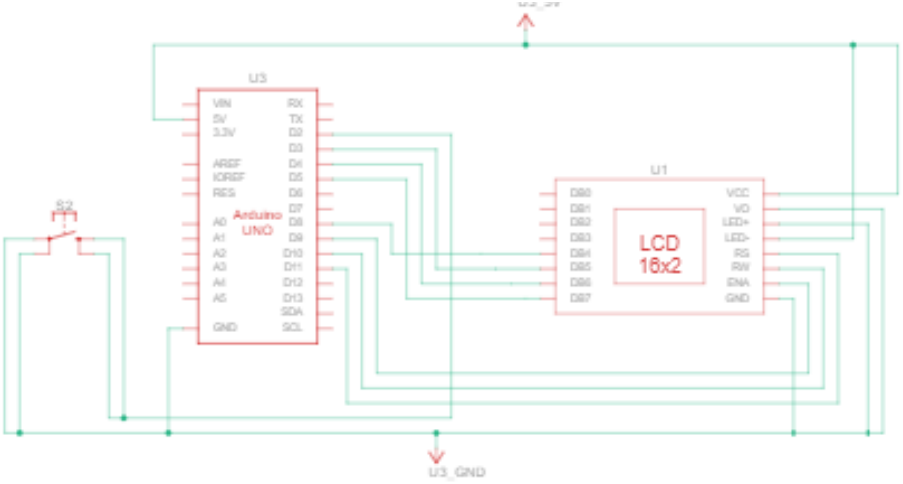
Materials Used

- Arduino UNO R4
- 16x2 LCD Screen
- Breadboard
- Jumper Wires
- Laptop
- USB Cable (Type B)
- AI input system (pose recognition via external device or PC)

Final Circuit Design

LCD

- RS - Pin 11
- RW - GND
- E - Pin 10
- D4 - Pin 9
- D5 - Pin 8
- D6 - Pin 4
- D7 - Pin 3
- VSS - GND
- VDD - 5V
- VO - GND
- A- 5V
- K - GND



Explanation

Game Mechanics

- The 16x2 LCD screen displays terrain (top and bottom rows).
- Character moves forward automatically.
- The player jumps to avoid obstacles.
- Distance increases the longer the player survives.

Graphics:

- Custom-created sprites are loaded into the LCD RAM.
- Sprites are like art blocks.

- Sprites include run1, run2, jump, jump lower, solid terrain, left/right terrain edges.

Game Loop:

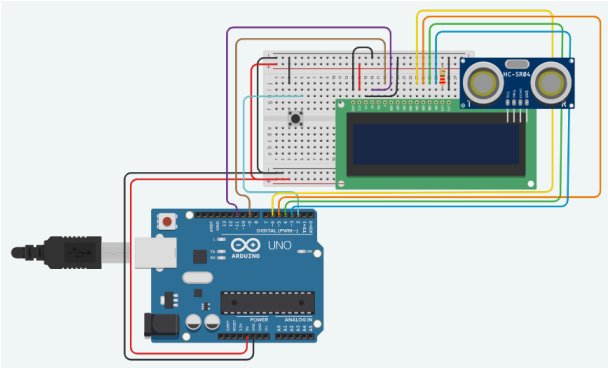
- Advances in terrain every cycle.
- Handles jump transition and animations.
- Update the LCD screen with new terrain and character position.
- Update score (distance).
- Checks for collision (ends game if detected).

Input Handling:

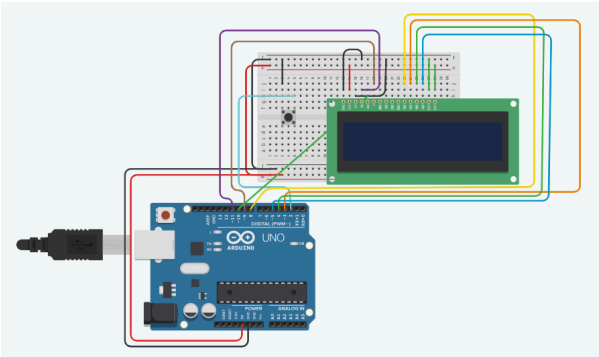
- If the human player is standing, the input is 'jump' and the character jumps. If the human player is crouching, the input is executed, and the character continues to run.

Challenges Faced

- In TinkerCad, the simulation used a 220-ohm resistor; however, the LCD didn't display properly on the real hardware.
- First, we replaced the fixed resistor with a variable resistor, which did not work. After that, we learned that connecting the RW pin to one of the pins worked without using any resistor.
- We experienced issues with integrating the AI software into the Arduino software.
- Then there was an issue with the input values changing too slowly, so we switched from an if() statement to a while() statement for quicker speed.



Old TinkerCad



New TinkerCad

Improvements

- More neat and clean-looking hardware (3-D printed parts).
- More smooth game animations.
- Better and less funky game logic.
- A permanent high-score keeping logic.

- Add different types of difficulty (easy, medium, hard) or power-ups.