Disability Friendly Game and Security System

CSE 321 - Realtime Embedded Systems

Project 3 Stage 1

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Part A: Project Statement

This proposal is for a household disability friendly game and security system Embedded device. The purpose of the system is to allow individuals that are missing fingers or even their whole hands to easily open their front door or play a drawing game with their friends. The device uses IR sensors to sense the user's movement and an LED dot matrix to display the shapes or characters the individual is drawing with their arm. There is also an LCD screen displaying the current mode of the system along with any information pertaining to the state of the system. Finally there is a vibrator that will help individuals with hearing and seeing disabilities identify when the drawing round is over or if they typed the password to the door correctly of incorrectly.

Part B: Initial Constraints and Specifications

Constraints:

- System Watchdog must make sure program doesn't get stuck in the password enter phase or the door open phase
- System must continuously monitor and analyze hand movements of the individual. Especially because the system takes those inputs to change the current mode of the system from security to gameplay whenever the user decides
- The LED mapping will reflect what the current drawing looks like from the user
- Must use constantly calculating hand movements and phasing out background noise
- The Vibrator will briefly vibrate when the code is entered wrong or the round is over or the round is beginning.

Specifications:

- Code will continuously update the dot matrix to reflect hand movements
- There are

Part C: Asks

Purpose:

Inputs:

Outputs:

Constraints:

- See constraints above

Part D: Preliminary BOM

RGB LED Matrix Panel

https://www.amazon.com/BTF-LIGHTING-Individual-Addressable-Flexible-Controllers/dp/B088BTSPYD/ref=sr_1_7?keywords=dot%2Barray%2Bmatrix&qid=1637214773&sr=8-7&th=1

LCD

104020111 Seeed Studio | Mouser

1 kOhm Resistors

https://www.amazon.com/smseace-Resistor-Tolerance-Projects-Experiments/dp/B08P2NXT6Q/ref=sr_1_4?crid=3IKGJSAMVW1M5&keywords=1kohm+resistor&qid=1637221511&sprefix=1+kOhm+%2Caps%2C179&sr=8-4

Breadboard

https://www.amazon.com/Breadboards-Solderless-Breadboard-Distribution-Connecting/dp/B07DL13RZH/ref=sr_1_1_sspa?keywords=breadboard&qid=1637221556&sr=8-1-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUFJQUQwTFZWSVkxSFgmZW5jcnlwdGVkSWQ9QTA2NDcwNjkzUFY5NUhOTkI2Q1JLJmVuY3J5cHRlZEFkSWQ9QTA3ODI1MDYzOTdGQVNNODVCT0g1JndpZGdldE5hbWU9c3BfYXRmJmFjdGlvbj1jbGlja1JlZGlyZWN0JmRvTm90TG9nQ2xpY2s9dHJ1ZQ==

Long Jumper Wires

https://www.amazon.com/Elegoo-EL-CP-004-Multicolored-Breadboard-arduino/dp/B01EV70C78/ref=sr_1_1_sspa?keywords=100cm%2Bbreadboard%2Bjumper%2Bwires&qid=1637357014&sr=8-1-spons&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEyQlVPVlY2TEJPR0NLJmVuY3J5cHRlZElkPUEwMTEwMTQ5MVJFVFFHN0FUWEhKTSZlbmNyeXB0ZWRBZElkPUEwOTQ1MzIxMUVLUFZPSjk1OTFYOSZ3aWRnZXROYW1lPXNwX2F0ZiZhY3Rpb249Y2xpY2tSZWRpcmVjdCZkb05vdExvZ0NsaWNrPXRydWU&th=1

References