Gesture Based UI For Elevator Operation

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Abstract- *Elevators in buildings, hotels and hospitals are used by many people. If it's a structure with over more than 5-10 floors, then using stairs is not a convenient option, especially for physically challenged and old-age people. Furthermore, in current circumstances of COVID-19, the chances of spreading the virus and other germs by touching the surface of switches and buttons have increased. Taking an example of a Hospital, everyday a new patient comes and unlike doctors, patients might not have PPE kits necessarily so they have to get in contact with the elevator switch, now the same switch might have been used by countless other people, out of which some might be infected and due to lack of preventive measures more people are subjected to this virus. Our project will break this cycle of contact by introducing contactless gesture control. The movement detected, and the presented control interface determines the assigned gesture according to the hand's movement.*

Keywords- component, gesture, covid 19, hand movement.

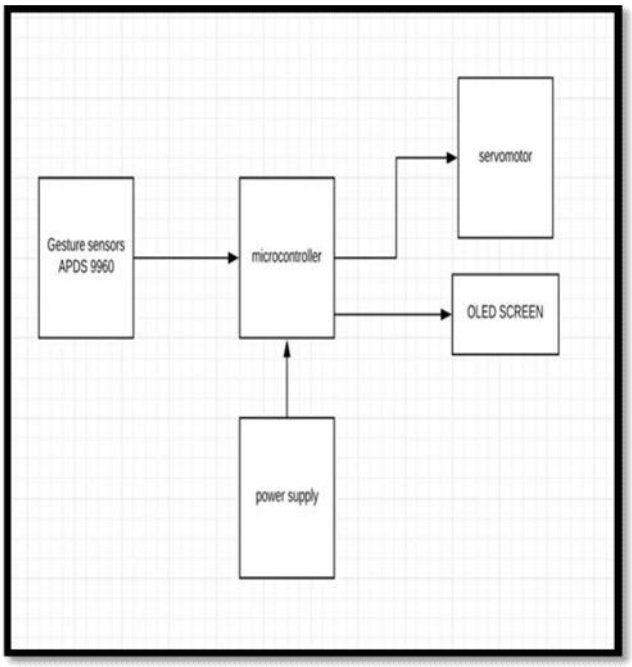
I. INTRODUCTION

In the current scenario of COVID-19, the possibility of virus multiplication by touching the surface of switches and buttons has increased. This design can effectively replace the old button based panel used in elevators. The gesture detected will select the floor number and will select whether the elevator should go up or down. It uses a development board based microcontroller, gesture sensor and OLED screen. Accordingly the UI will show the number selected and will indicate whether the elevator is called for going up or down. It uses 4 types of gestures, namely up-swipe, down-swipe, right-swipe, left-swipe. Right and left swipe is dedicated for floor selection, up and down swipe for calling the lift. The hardware part consists of connecting the components (OLED screen and gesture sensor) to the microcontroller on the development board. The software part consists of designing the UI and assigning the gestures to content of the UI. The components used are Arduino board, apds 9960 gesture sensor, and an I2C OLED screen.

Prototype consists of an additional dc motor which will react according to the input from selected gesture. The up-swipe will rotate the motor clockwise and downs-swipe will rotate the motor anticlockwise.

II. BLOCK DIAGRAM

- Input -data collected from the gesture sensor(apds 9960)
- Output-Detected gesture on the OLED panel. Corresponding movement of the motor.
- Power supply-For prototype the power supply will be taken from the computer USB.
- Microcontroller – Development board arduino uno.

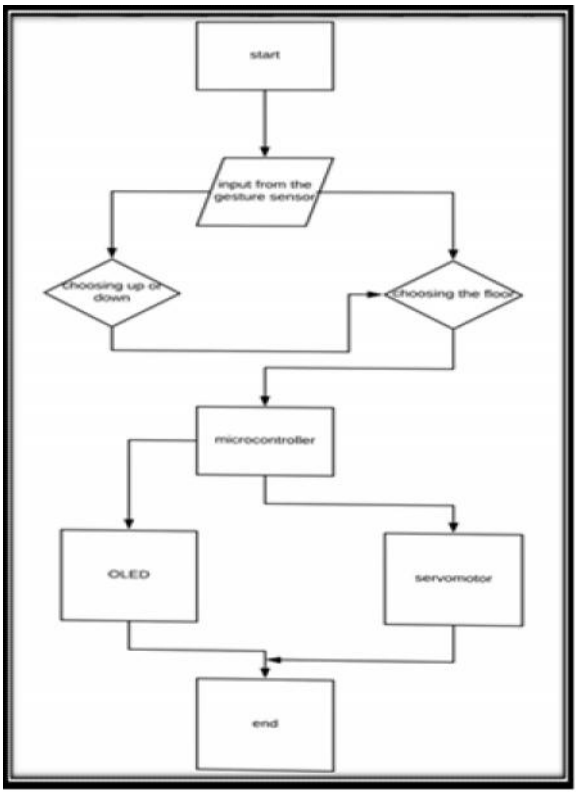


III. FLOWCHART

Flowchart will consist of working of the hardware part according to the designed software. The UI and program for this project is designed in the arduino IDE, in C programming language. It will first take in the inputs from gesture sensor then the result will be shown on the OLED screen, and the motor will work accordingly. For the prototype, servo motor is used which will rotate clockwise for up-swipe and anti-clockwise for down-swipe.t of

The UI on OLED display consist of 5 symbols-numerical digit for floor number, up arrow for up-swipe, down arrow for down-swipe and door closed / door open. Although

in prototype we have not used any sensors to detect the door closed or door open condition, as the memory of microcontroller was not enough.



IV. COMPONENTS USED

- Arduino nano
- OLED
- APDS 9960 gesture sensor
- Servomotor
- Connecting wires.
- Arduino IDE.

a.) APDS 9960

Touch less gestures are the new frontier in the world of human-machine interfaces. By swiping your hand over a sensor, you can control a computer, microcontroller, etc.The APDS-9960 offers ambient light and color (as clear, red, green, and blue) measuring, proximity detection, and gesture sensing.The APDS-9960 uses the I2C interface for communications.

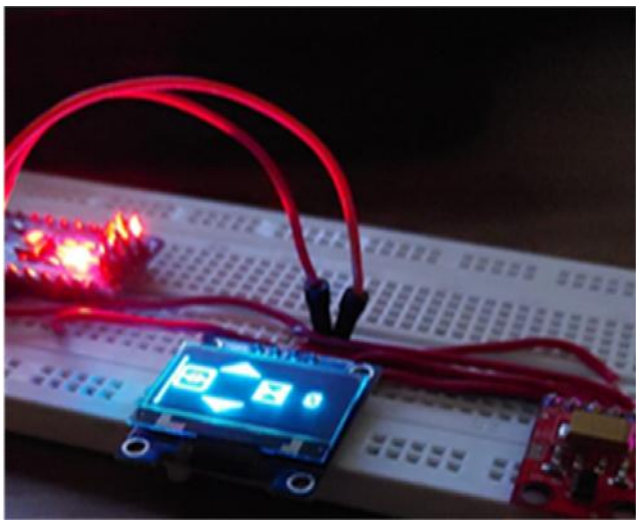
I2C - This is a 3-way solder jumper that is used to connect and disconnect the I2C pull-up resistors. By default, this jumper is closed, which means that both SDA and SCL lines have connected pull-up resistors on the breakout board. Use some solder wick to open the jumper if you do not need the pull-up resistors.

b.) Gesture Description

- UP- A swipe from the bottom of the board to the top and out of range of the sensor.
- DOWN- A swipe from the top of the board to the bottom and out of range of the sensor.
- LEFT-A swipe from the right side of the board to the left and out of range of the sensor.
- RIGHT-A swipe from the left side of the board to the right and out of range of the sensor.
- NEAR- Hand starts far above the sensor, moves close to the sensor, hovers for at least 1 second, and moves out of range of the sensor.
- FAR-Object starts near the sensor, hovers for at least 1 second, and then moves up and out of range of the sensor.
- NONE-The sensor did not correctly guess the gesture being performed.

V. RESULTS

As we can see the UI on OLED is quite visible. There is a symbol for floor number, up and down arrow and door open/doorclosed.(Last function not included in prototype).



VI. CONCLUSION AND FUTURE SCOPE

We've concluded that the gesture based UI for elevator operation can be used to help stop the spread of virus. Even after the pandemic this system can be proved efficient.It can also be used for other electronics like wending machines and ATM's.

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