Obstacle Avoiding Lane Shifter (Car)

A project as a part of the EE224 Course by:
Vasant (160020026)
Manika (160020020)
Vaishnavi (160020008)
Siddharth (160010027)

Introduction

Road Accidents are common and fatal.

The major cause of this is the drivers delayed reflexes.
This can be avoided by using an automated lane shifting and braking system

This project is an analog of a self driving car that shifts it's lane when it detects an obstacle.

Implementation

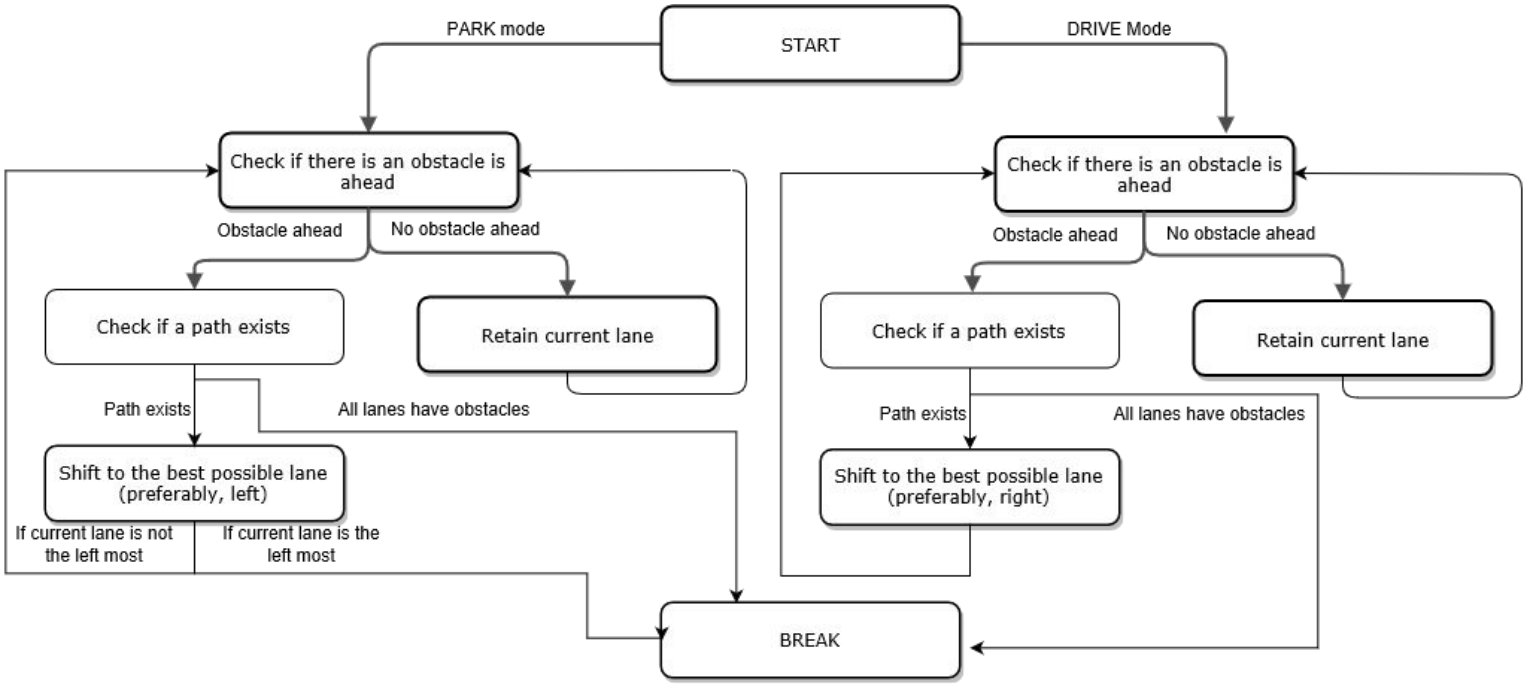
Implementation Details

There are four lanes, and, we give obstacles, by a smart phone by touching the screen.
There are tiles on the screen which scroll downward.
A WHITE tile denotes a free path
A BLACK tile denotes an obstacle

The inputs are read through LDRs, converted into digital Logic and taken as input through the Helium board.

Helium board has a VHDL description that takes in the input from the smartphones screen, processes, and gives output which is input for the arduino. Arduino then uses this input to display on the LCD display.

Overview

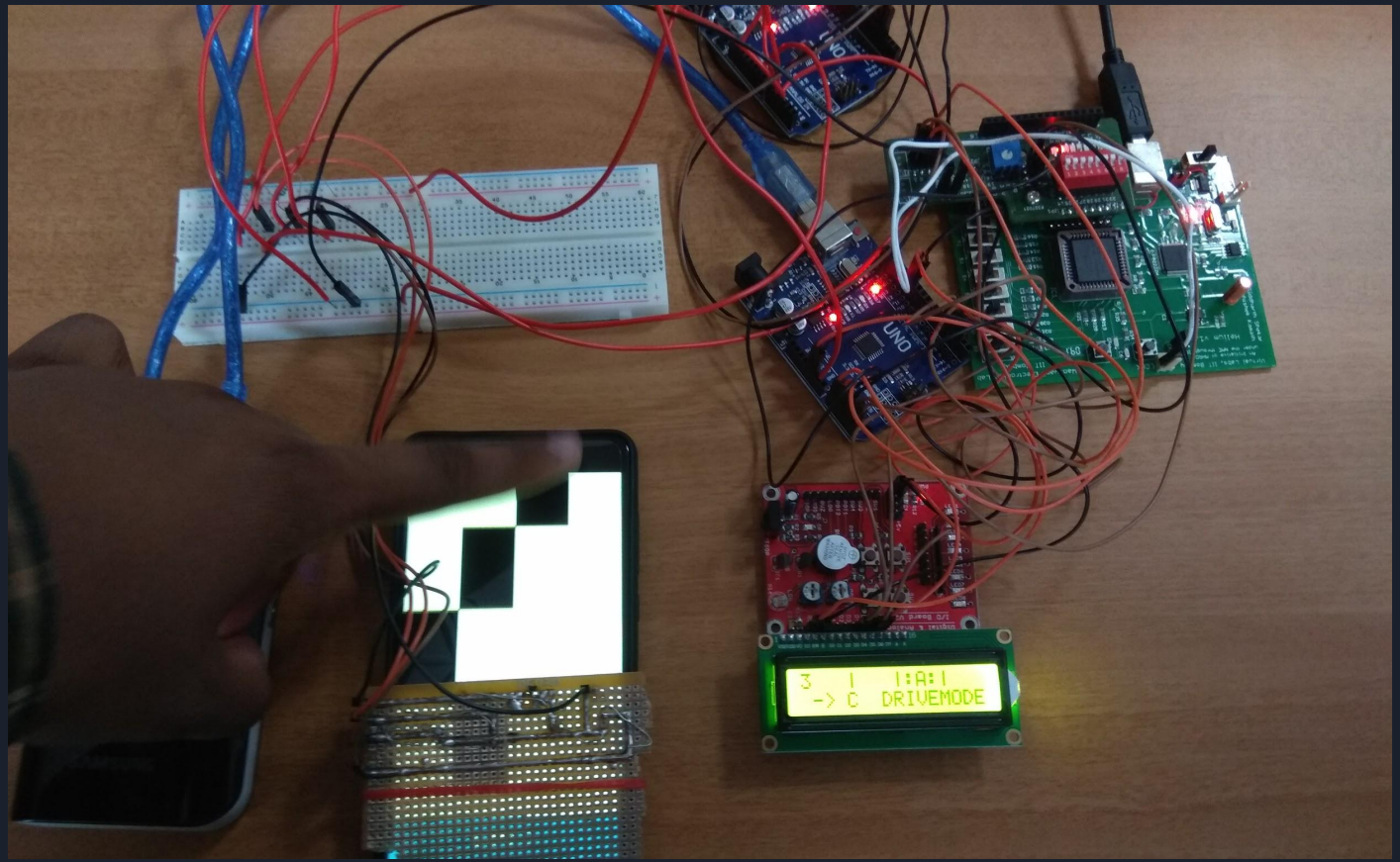

START
PARK mode
DRIVE Mode
Check if there is an obstacle is ahead
Obstacle ahead
No obstacle ahead
Check if a path exists
Retain current lane
Path exists
All lanes have obstacles
Shift to the best possible lane (preferably, left)
If current lane is not the left most
If current lane is the left most
Check if there is an obstacle is ahead
Obstacle ahead
No obstacle ahead
Check if a path exists
Retain current lane
Path exists
All lanes have obstacles
Shift to the best possible lane (preferably, right)
BREAK

Here is what the project physically looks like

COMPONENTS USED:

Helium Board
//LED 7 Segment Display (to enlarge the view)
Arduino (for input to Helium board)
Arduino (for Displaying the Lane, Laneshift information)
LED Display JRD
Breadboard and wire
LDRs
Power Source
Op-amps as comparators
CMOS inverters
Perforated circuit board

Here is a Picture



Result

The LCD display shows the current lane of the car by ‘:A:’. All other lanes are blank.

Brake is denoted by B on the display itself.

Left shift is denoted by ‘<-’ and right shift is denoted by ‘->’.

It also displays the current lane number and Drive/Park Mode.

Conclusion

The Obstacles are avoided as the lane shifts

References and Credits

Credits to Dr. Nandakumar Nambath for handling such an interesting course involving digital circuits and guiding us in implementing and fabricating this project.

Credits to Unity that helped develop an android application.

Credits to draw.io to help us design a flowchart

Credits to Prof. Prakash Dandekar for conducting the IoT workshop at IIT Goa which helped in the arduino part