Smart Eco Car

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Abstract- Due to the growing interest in problems such as global warming and energy constraints, automobile manufacturers are being called upon to make greater improvements in fuel efficiency than ever before and to reduce the transportation sector's dependence on oil in order to achieve a low-carbon society. Thus, they are introducing Electric Vehicles (EVs) and Plug-in Hybrid Electric Vehicles (PHEVs) that are powered by electric motors. The industry trend globally is toward the development of next-generation vehicles known as smart cars, which will be made highly intelligent by integrating new information and communication technologies into the vehicle.The existing system,vehicles are running by fuel and gases,by using these fuel and gases it causes pollution.The cost of fuels are also high.Another system is driverless car it sense their surroundings using technology such as lidar,radar,GPS and computer vision.The sensory information is then processed to navigate appropriate pathways for the vehicle to take and avoid any obstacles and also obeying the road signs.The car uses a digital map,which can be constantly updated according to sensory input.Price of these vehicles are very high.The main aim of project is to design an smart eco car for the environment which runs on the solar energy which is pollution free.It uses two IR sensors for colour path following where the paths are directed to several places like hospital,gym,markets,theatre etc,automatically in the gated communities.All sides of the vehicle are integrated with IR sensors for obstacle detection which alerts the drivers if vehicle is about crash.The smart car is integrated with the RF communication as it can be controlled with a remote.The special feature of this vehicle is it can be driven in water using propellers connected to the smartcar.All these are connected to the ARDUINO controller and connected to the motor driver with the geared and gearless motors.

Key words: Motor driver, Motors, ARDUINO micro controller,IR sensors,RF transitter and receive

I.INTRODUCTION

The main aim of project is to design an smart eco car for the environment which runs on the solar energy which is pollution free.It uses two IR sensors for colour path following where the paths are directed to several places like hospital,gym,markets,theatre etc,automatically in the gated communities.All sides of the vehicle are integrated with IR sensors for obstacle detection which alerts the drivers if vehicle is about crash.The smart car is integrated with the RF communication as it can be controlled with a remote.The special feature of this vehicle is it can be driven in water using propellers connected to the smartcar.All these are connected to the ARDUINO controller and connected to the motor driver with the geared and gearless motors.

II. PROPOSED SYSTEM

A. Block Diagram

The main objective is to design The main objective is to design a smart eco car using Arduino micro controller.In this project solar panel is used instead of fuel in the vehicle.In this project the car moves by following a colour path directed to several places in the gated communities.By using IRsensors with the help of micro controller.In this project the vehicle is driven in water using propellers connected to smart eco car.The smart eco car will run on solar power coonected to rechargable battery and when a persons wants to travel in a gated communities then the car follows the colour path and reaches the destination with the help of IRsensors connected to the Arduino micro controller present in the smart eco car.While travelling if any obstacles occurs it will detect obstacles by obstacle sensors present around the car interfaced to micro controller.The special feature of this car is it can diven on water using propellers connected to the smart car which are controlled by RFcommunication.

B. Algorithm steps

The working of the project can be explained in the following steps:

Step 1: Initially 12v is getting from solar panel from that it is given to the rechargable battery.And the battery is connected to the power supply board where we get constant 5v DC supply and it is given to ARDUINO microcontroller and motor drivers.

Step 2: If left sensor,right sensor and obstacle sensor is off then smart car moves forward direction.

Step 3: If left sensor,right sensor is off and obstacle sensor is on then smart car stops.

Step 4: If left sensor is on,right sensor and obstacle sensor is off then smart car moves left side.

Step 5: If left sensor is off,right sensor is on and obstacle sensor is off then smart car moves right side.

Step 6: When switch1 of RF transmitter is pressed then the smart car moves forward direction.

Step 7: When switch2 of RF transmitter is pressed then the smart car moves backward direction.

Step 8: When switch3 of RF transmitter is pressed then the smart car moves left side.

Step 9: When switch4 of RF transmitter is pressed then the smart car moves Right side.

Step 10:When no switches is pressed then the smart car stop.
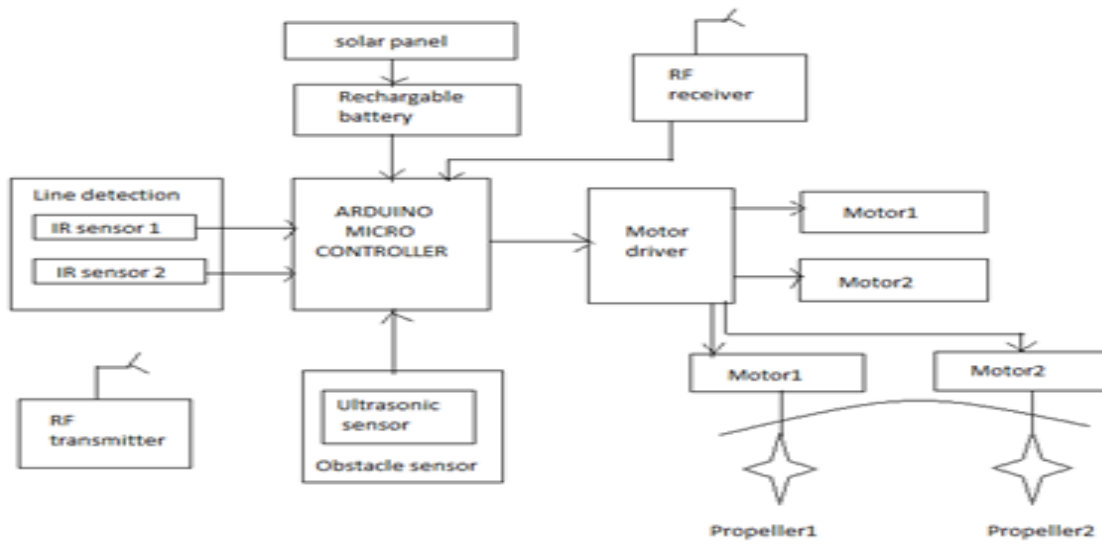
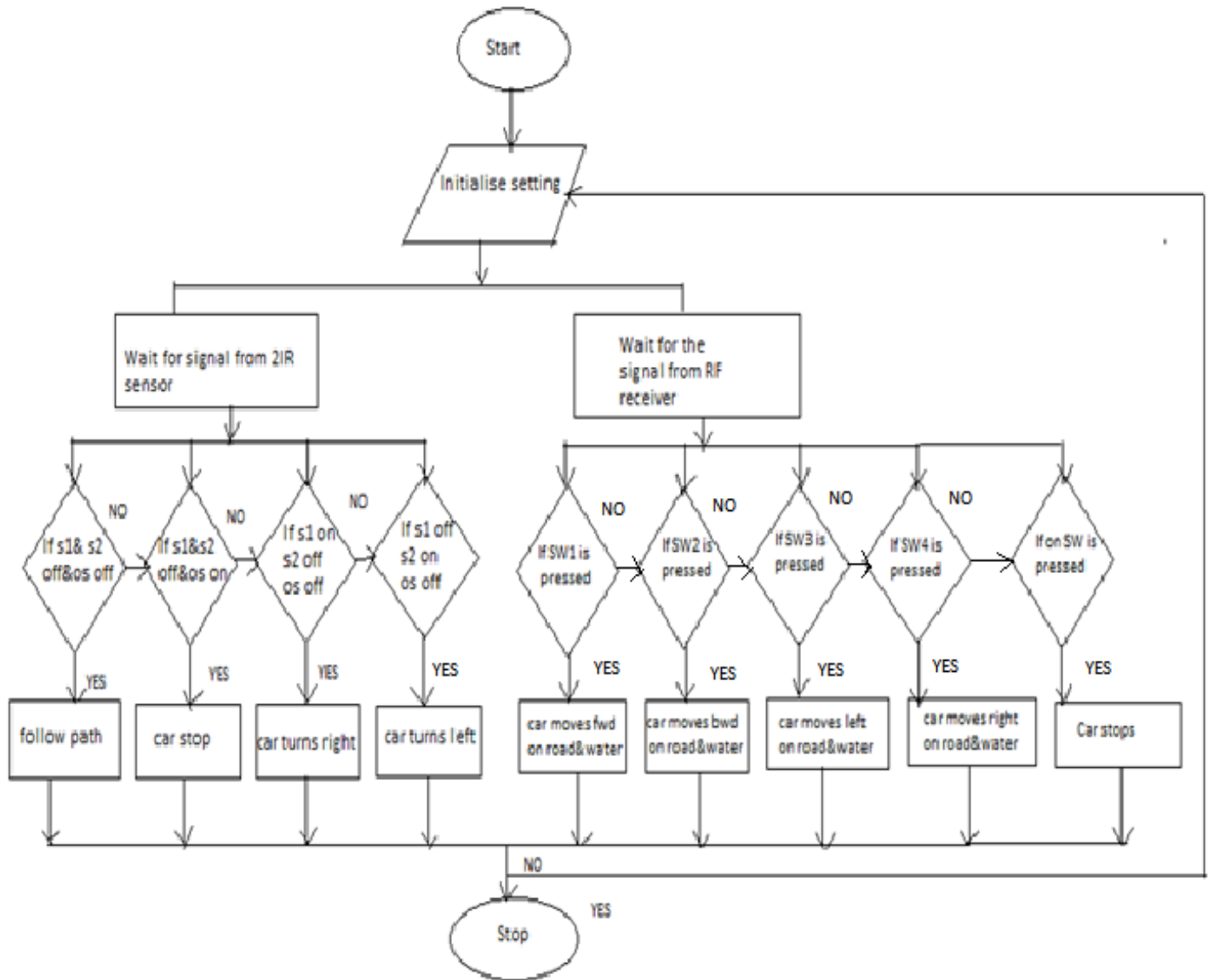*BLOCK DIAGRAM:*

Fig:block diagram of smart eco car

C.Flow chart

Fig2:Smart eco car flowchart

D. Hardware Implimentation

Power supply
Power supply is given to *the Arduino microcontroller* and motor driver. 7805 regulator IC is used to give constant dc 5v output which is given as operating voltage for the solarpanel, controller as well as motor driver.

Solar panel
12V Solar panel is connected to the12V rechargable battery from there it is connected to the power supply board.Where we get constant 5V dc output and it is given to the Arduino micro controller.

Rechargable battery
12v Rechargable battery is used to store the power from solar panel and it is connected to the power supply board.From there we get constant 5v dc supply as an output.

Micro controller

Rechargable battery is connected to the arduino micro controller so that micro controller will get a constant dc 5v supply to theArduino board.The two IR sensors are connected to the pin2 and pin 3of microcontrolleras an input.such that it will sense the path and it will move in given direction according to the program build in a board.Ultrasonic sensor is connected to the pin 4 of micro controller for obstacle detection.An L293D motor driver is also connected to the pins(9-12) of microcontroller to run the motors simultaneously..RF communication switches are connected to the pins(5-8) of arduino micro controller,so that RF Receiver will receive the signals from the wireless RF transmitter.

IR Sensor and ultra sonic sensor

We are using two two IRsensors and one ultra sonic sensor.IRsensors consists of 3pins the output is given as input to the microcontroller and it is used to follow the path. Its sensing range is of 2-10cm,and ultrasonic sensor output pin is connected as input to the microcontroller and it is used to detect the obstacles.Its sensing range is of 10- 30cm.

Sensor Logic	**Motor Outputs**
Left sensor=0,Right sensor =0 & ultra sonic sensor=0	Forward
Left sensor=1,Right sensor =1 & ultra sonic sensor=0	backward
Left sensor=1,Right sensor =0 & ultra sonic sensor=0	left
Left sensor=0,Right sensor =1 & ultra sonic sensor=0	right
Left sensor=0,Right sensor =0 & ultra sonic sensor=1	stop

RF Transmitter and Receiver

The RF receiver pins are connected to the micro controller board.The RF Transmitted signals are transmitted to the RF Receiver through wireless communication.If switch 1 is pressed on the RF transmitter then the car moves forward,If switch 2 is pressed then the car moves backward,If switch3 is pressed then the car moves left side,If sitch 4 is pressed then the car moves right side,Initially the car is in off state,if no switch is pressed.

Motor Driver and Motors

L293D Motor driver input pins are connected to the pins(9-12)of micro controller.Rechargable battery is connected to the pin8 to the motor driver.Two motors pins are connected to the motor driver output pins(3,6,10,14).5v from power supply board is given to the vcc pins of motor driver.Two l shaped motors are connected to the L293D motor driver

III.EXPERIMENT AND RESULT
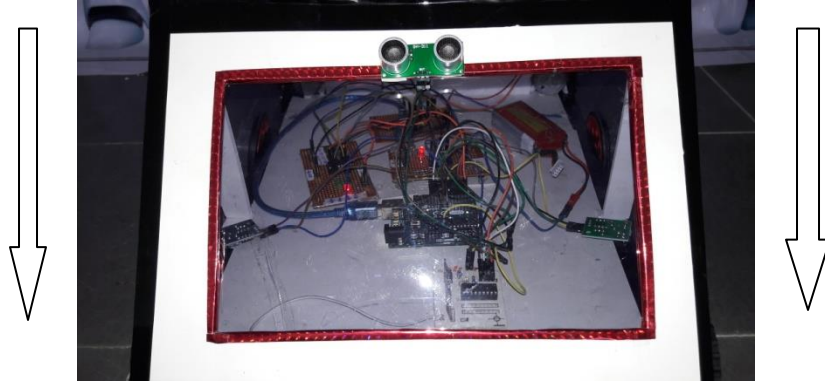

Figure3:Smart Eco Car

Figure3(a):Smart Eco Car Is Moving Forward
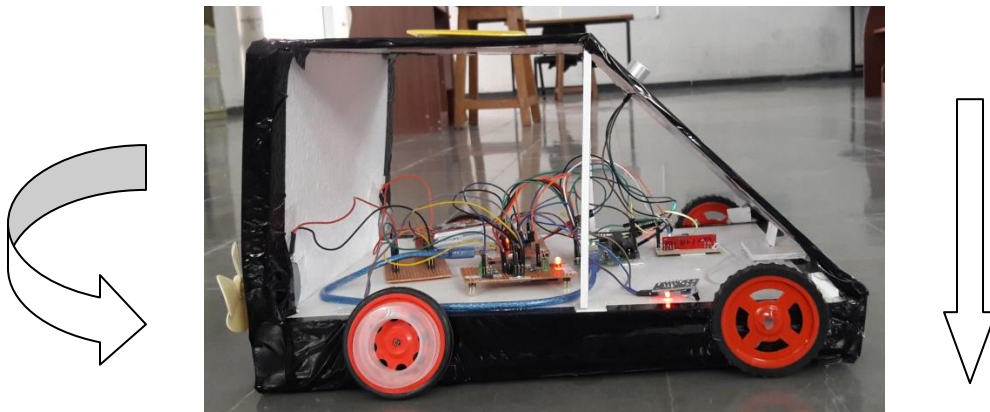

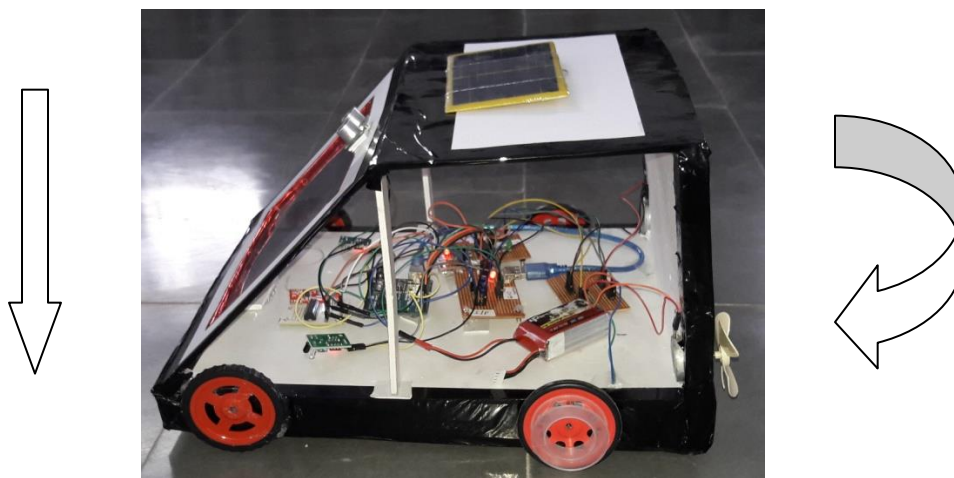Figure3(c):Smart Eco Car Is Moving Left Side

Figure3(d):Smart Eco Car Is Moving Right Side

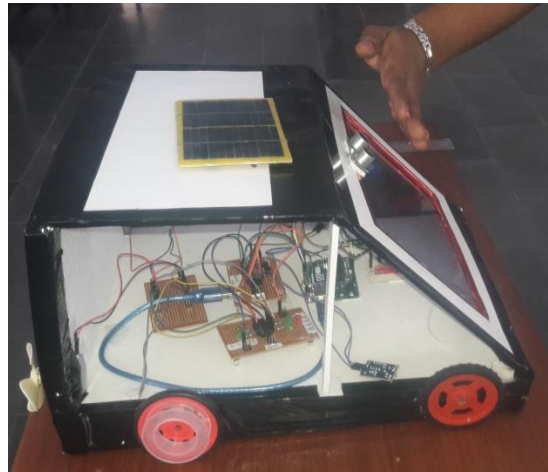Figure3(E):Smart Car Is Stopped Initially

Figure3(f):Smart Car Is Stops when obstacle is detected

When the car is driven in water

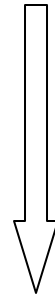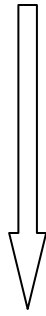Figure 4(a): Smart Eco Car Is In Water Initially It Is In Stop Condition
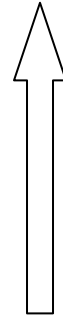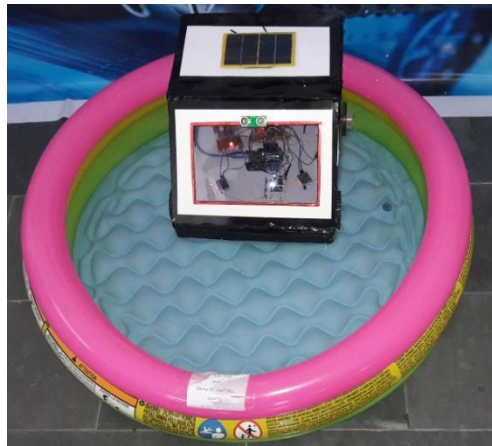
Figure4(b)The Smart Car Is Moving Forward

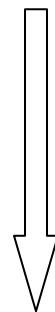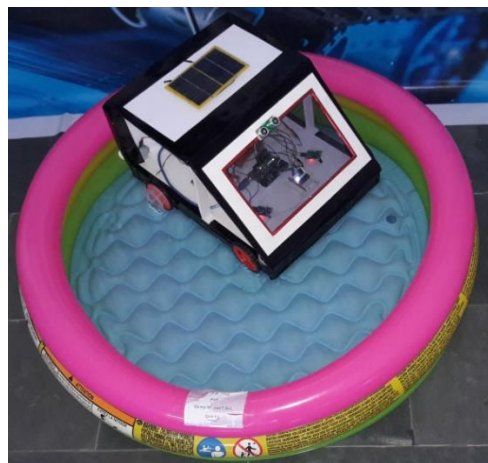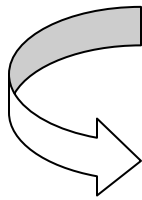Figure4(c):The Smart Car Is Moving Backward

Figure4(d):The Smart Car Is Moving Left Side

Figure4(e):The Smart Car Is Moving Right Side

Figure4(a):no switches are pressed then car is on stop condition i,e initial condition
Figure4(b):when switch1 is pressed then car moves farward.
Figure4(c):when switch2 is pressed then car moves backward.
Figure4(d):when switch3 is pressed then car moves left side
Figure4(e):when switch4 is pressed then car moves right side.

IV.CONCLUSION

The paper has been successfully designed and tested. It has been mainly designed in order to reduce the fuel and make environment free. Many existing systems has discussed about the smart cars and has proposed many methods for reducing their efforts. But still the usage of fuel rate is high . So, in order to avoid that difficulty, instead of using fuel we are using solar panel , our project succeeded in moving the car. We are using IR sensors for path detection to movethe car in a gated communities.ultrasonic sensor is used for obstscle detection to avoid accidents.By RF communication we can control the car with a remote when it is driven on water.

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