Peripheral and Interfacing project

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Automatic Luggage Carrier

Objectives:

1.To build up a luggage carrier that will carry luggage easily and to be manageable automatically.

2.To know about object following robot in details.

3.To know how the component of a luggage carrier works to detect a object and follow it.

4.To know about Arduino ATmega328p microcontroller and its one application in luggage carrier.

Introduction:

Automatic or automation means as by electric devices reducing human intervention to a minimum. This will reduce the time delay and human efforts in luggage management system.

The robot that uses sensor to find an object and follow the path, is called object follower robot. The object may be anything such as book, box or hand etc. The robot will follow this object to carry the luggage. Nowadays, everybody uses luggage to travel especially to airport all of them dragging out heavy luggage. Passenger need to carry his/her own luggage. So, this is very slow and expensive process. And it becomes a hectic journey. This problem can be overcome by automatic luggage follower system. It is nothing but smart luggage. It reduces the time delay and human efforts in luggage management. For the implementation, different types of sensor are used. A real time monitoring system using an automated system is introduced to ensure the proper movement following the correct passenger in a definite distance.

Apparatus required:

1.Arduiono Atmega328p development board (quantity-01).

2.Robot car chassis kit (quantity-01).

3.HC-SR04 ultrasonic sensor (quantity-01).

4.IR sensor (quantity-02).

5. Motor driver (quantity-01).

6.Lipo Battery 18650 4800mAh 3.7 V(quantity-04).

7.Battery holder

8.Battery charger

9.Gear motor (quantity-02).

10.Motor wheel (quantity-02).

11. Double sided tape (quantity-01).

12.Wires (as required).

Description:

As the name suggest, “Object follower robot”- the robot meant for following an object in a definite distance. We have used Arduino Uno as our microcontroller. Then, we have detected hand movement using 2 IR sensor and measured distance of 10 to 30cm by Ultrasonic sensor. If the distance is more than 30cm or less than 10cm then the robot will misbehave. This is the minimum and maximum distance range to follow the object of the robot. The robot will move in left or right direction accordingly the input IR signal. If the object is left position, then the left motor speed is decreased and right motor speed is increased for the left movement. And also If the object is right position, then the right motor speed is decreased and left motor speed is increased for the right movement. So, here we have used 2 motors for 2 direction. After movement, we will check the distance using ultrasonic sensor to find that the robot should be moved forward. If the distance is under range, it will move forward otherwise it will be stopped. We also have used L298N motor driver module to control speed on DC gear motors. The battery is used as voltage storage because of its high energy density and good safety for performance. The whole design has been need a robot Car chassis kit with 2 gear motors and 2 wheels for a proper shape, carrying all equipment and moving purpose.

Method:

1.At first, after switch on the IR sensor will try to detect hand or any object and Ultrasonic sensor will measure distance of the object that it is between the range or not.

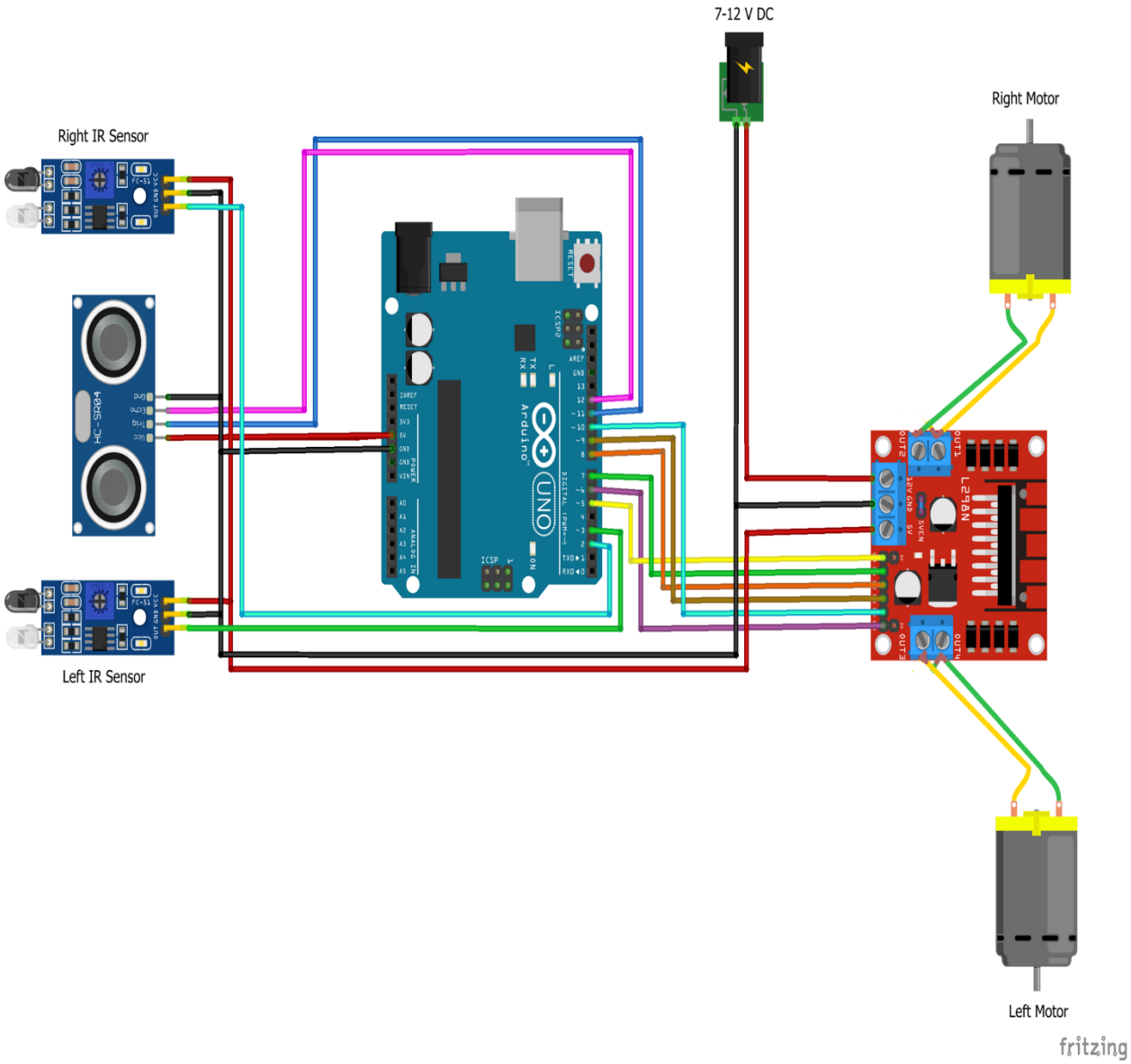
2. If the distance is in the range, then the robot will start move forward by wheel otherwise it will be stopped.

3. The robot will move in left or right direction accordingly the input IR signal by decreasing or increasing the speed of the left or right motor.

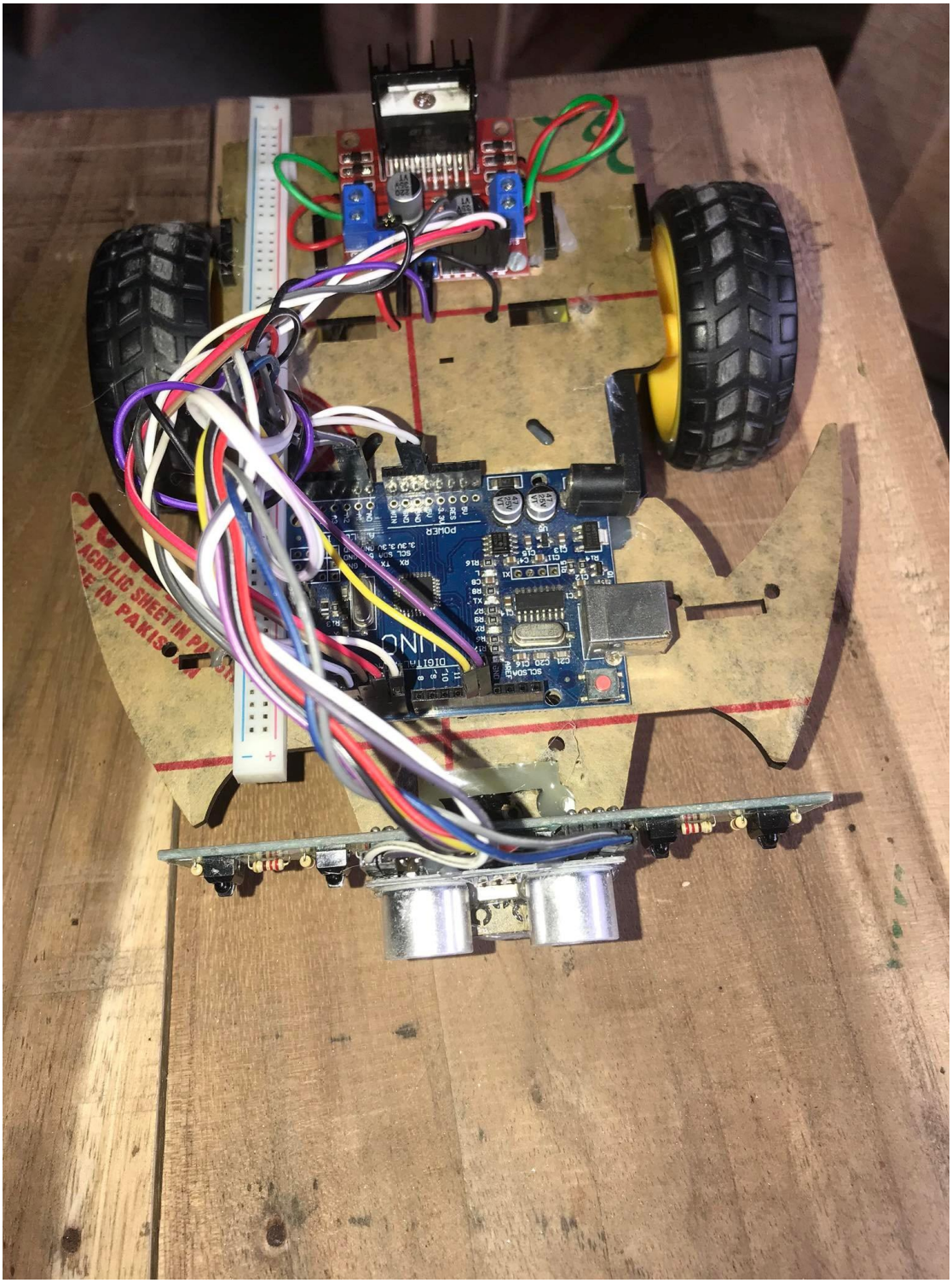
4. The speed of the Gear motor will be controlled by L298N motor driver.

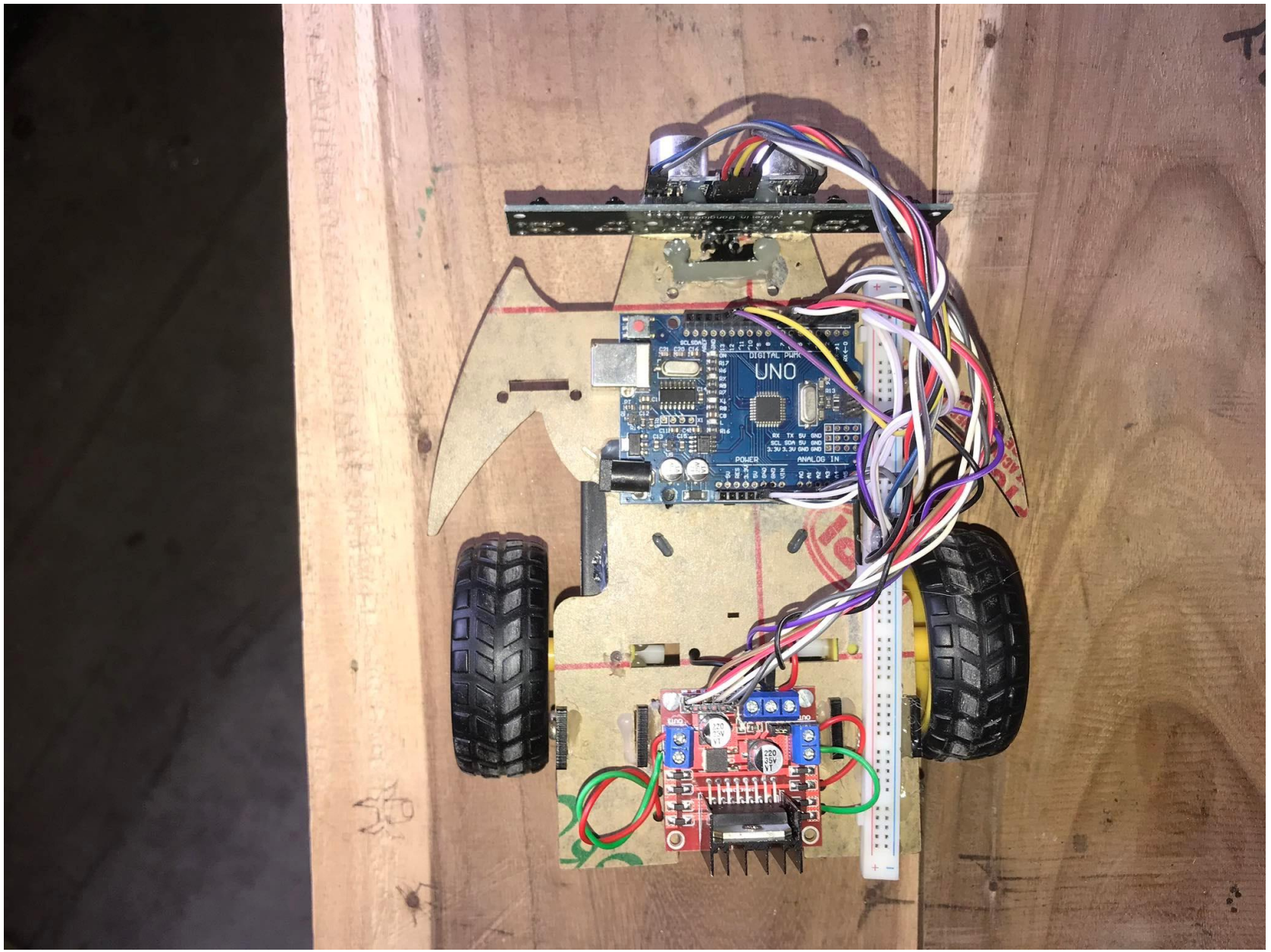
5. All these will be done perfectly if the voltage of battery is enough.

Circuit diagram:


7-12 V DC
Right Motor
Right IR Sensor
HC-SR04
Left IR Sensor
Left Motor
fritzing

Project Image:




UNO
POWER
ANALOG IN

Flowchart:

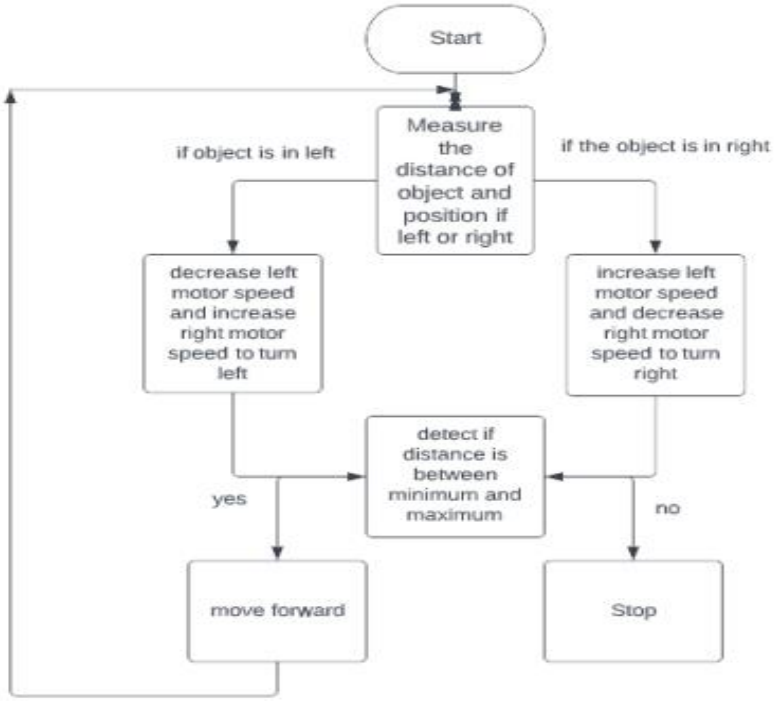


Figure : Flowchart of Operation for automatic luggage carrier

Discussion:

Here, We have created fully functioning smart luggage carrier system. This project is based on the idea of improving on mechanical function of object follower robot and it is a smart way of controlling luggage by using sensors. Here, we have generally used sonar and IR to follow the object. But for betterment, we can use a camera which is used to make a model of face recognition. This model can be able to recognize only the face of the certain passenger and will follow the passenger. For this, artificial intelligence, open cv platform is required which needs more cost. So that we could not do use the camera. Otherwise it is perfect. Here, luggage follows me in the range of distance. Overall, it was a mini project. So accuracy is not enough such as business model.

Conclusion:

From this project, we had learnt many things about the instrument of Arduino, motor, car chassis kit, sensor etc. and their purpose of using. When carrying a heavy luggage is a big problem, then we can overcome it by this technique. In this project we focus on to make less expensive overcome cost and easy to handle a luggage carrier that will overcome human effort. Moreover, A security system can be added that the user can be free of worries of his or her luggage being stolen or left behind. For that a fingerprint system for security purpose can be added. From this project working of sonar sensor, IR sensor, application of Arduino and how to use them to solve real life problem are learnt. Hope that the project will helpful in future for us.