MILITARY INSTITUTE OF SCIENCE AND TECHNOLOGY

Department of Computer Science and Engineering

Course Code: CSE-306

Course Name: Microprocessor, Microcontroller and Assembly Language Sessional

Report on Project

Group Number: 10

Group members:
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Project Name:

Hand Gesture Controlled Car Using Arduino.

Short Introduction:

For our project, we made a hand gesture-controlled car using Arduino. We have to make two separate-circuits, one we use as a transmitter circuit and the other we use as a receiver circuit. Now, we will talk about how the gesture-controlled car works.

There is serial communication between the two Arduino boards. One Arduino is used for sending the signals and the other Arduino is used for receiving those signals and move the car accordingly. The transmitter sends the signals via Wi-Fi module that we use for wireless communication. We have to tie the transmitter circuit on our hands and the car will move as we move our hands. For controlling the dc-motors we have an L298N motor driver module.

This project has tremendous applications especially in health domain. For example, a person who is disabled and is on wheelchair can control his wheelchair just by using hand gestures. We know how dangerous it can be to meet a covid-19 positive patient. This project can be used there as well to open doors wirelessly, to supply food to patients through robot or robotic car just by using hand gestures.

The different gestures that have been mapped to the direction of the bot are-

Hand Gestures	Bot Movement
Hand parallel to the ground	stationary
Hand tilted forward	forward
Hand tilted backward	backward
Hand tilted left	right

In short, we have used hand tilt angles as gestures using gyro module and sent this data through Wi-Fi module.

Components:

Transmitter:

Item No	Name	Quantity
1	Arduino Nano	1
2	NRF24L01+	1
3	MPU6050	1
4	7-12 V DC battery	1

Receiver:

Item No	Name	Quantity
1	4WD car kit	1
2	Arduino UNO	1
3	NRF24L01+	1
4	L298N driver module	1
5	7-12 V DC battery	1

Methodology:

When signal is passed through Wi-Fi module depending upon the gestures, the car receives the signal, and the wheel of the car rotates according to the tilt angle of hand. Like the more the hand is tilt on right the more the car will turn right. Same goes for the forward, backward and left movement. We will use Arduino UNO on the car device and Arduino Nano on the hand gesture device as we need to be concern about space and cost management. L298N driver module will control the motors. NRF24L01+ and NRF adapter will help us to transmit and receive signal. We will use MPU6050 as our gyroscope module to implement hand gestures. 4WD car kit will help us to build the car and breadboard and jumper wires will be used for connection.
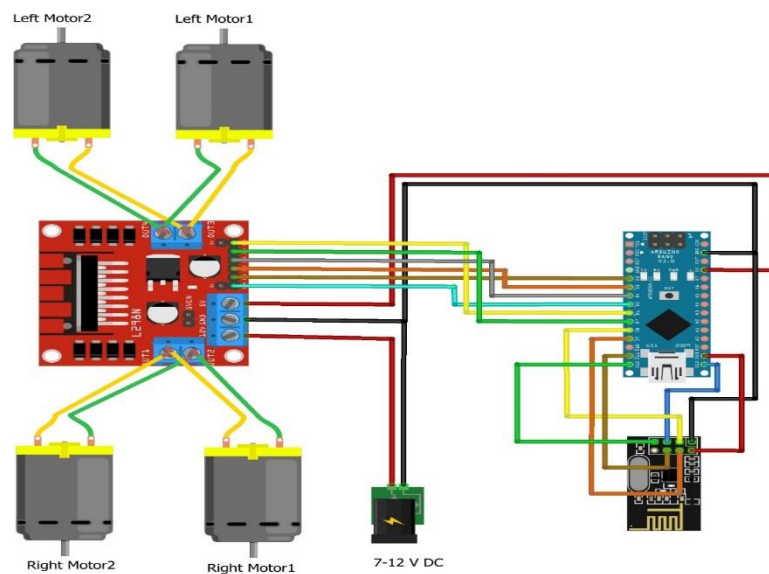
Experimental Circuit Setup:
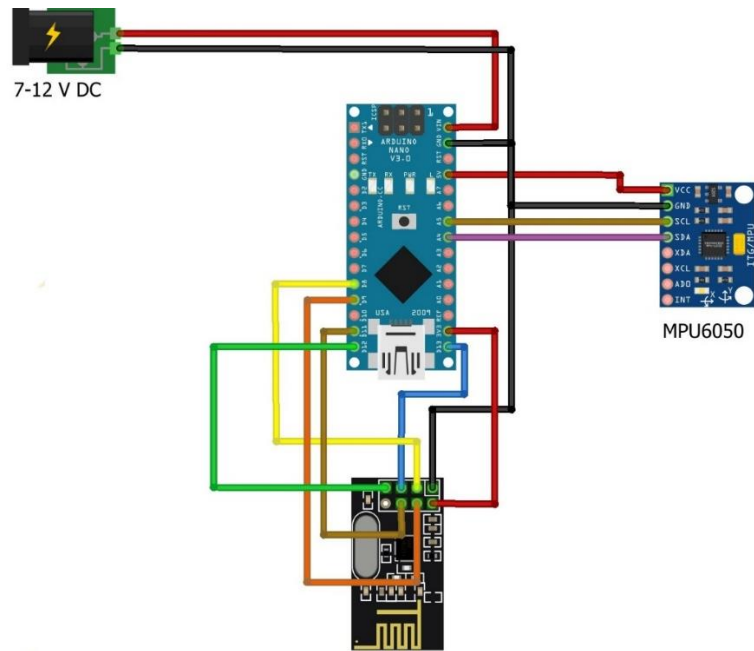

Figure: Receiver

Figure: Transmitter

Outcome:

There can be lots of outcome this hand gesture-controlled bot. One of its benefits is that it can be easily controlled wirelessly without any stress. Anyone can control the bot with having any extra knowledge. This type of bot can be used in fire service, military purpose as it can be easily controlled from any where with out using any large controller. This type of bot can be used in space as it is inconvenient to operate handheld controller in space.

Contribution:

NAME	STUDENT ID	CONTRIBUTION
Jamal Uddin Tanvin	202014016	Managing components, connecting the circuit diagram, implementing code and Finishing touch.
Jubair Ahmed	202014018	Managing components, connecting the circuit diagram, checking all the components connection
Nurshat Fateh Ali	202014040	Managing components, connecting the circuit diagram, helping in implementing the code.
Marzan Samin Ashrafi	202014026	Managing components, connecting the circuit diagram, making sure if all the connections are right.

We have connected the whole circuitry together. The transmitter circuit was connected by Jamal Uddin Tanvin (202014016) and Marzan Samin Ashrafi (202014026). The receiver circuit of the which is the car was made by Nurshat Fateh Ali (2020140140) and Jubair Ahmed (202014018). The coding part of the Arduino was handled by Jamal Uddin Tanvin (202014016) and other rechecked the code and helped with debugging. Jubair Ahmed (202014018), Marzan Samin Ashrafi (202014026), Nurshat Fateh Ali (2020140140) helped with the overall component management. Nurshat Fateh Ali (202014040) specially helped Jamal Uddin Tanvin (202014016) with finding bug in the connection. At last the finishing was done by Jamal Uddin Tanvin (202014016).