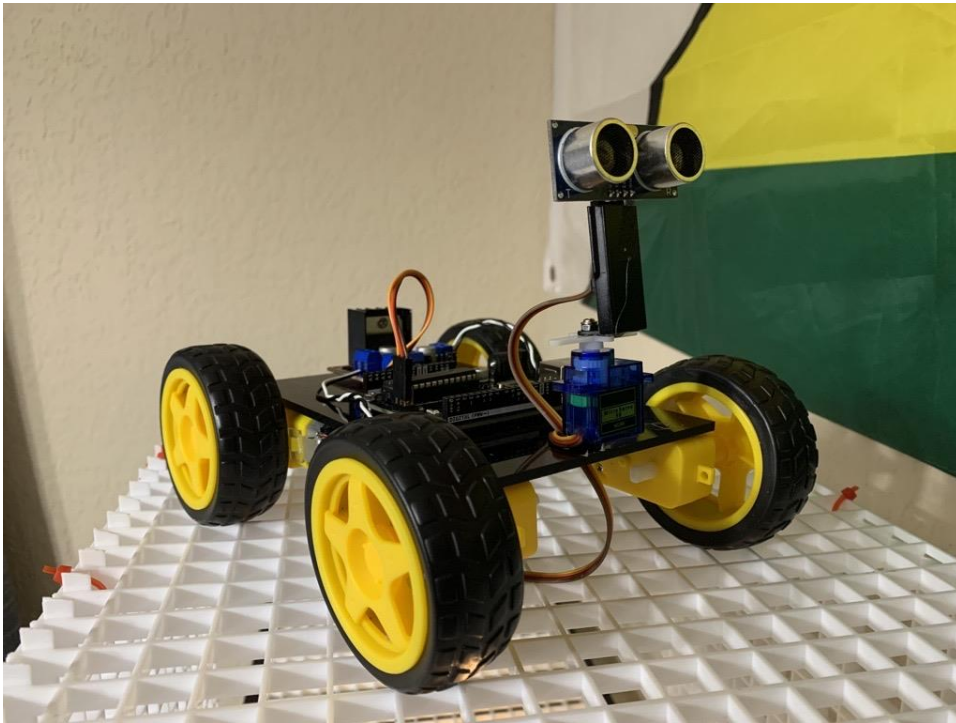


Project Testing Assignment - Group 11

Team GANWP

Project Engineering Lead: Guce, Erjo | Design Engineering Lead: Aguru, Lakshminarayanateja | Product Development Lead: Ndhlovu, Brian | Software Engineering Lead: Wazio, Adrian | Test Engineering Lead: Pittman, Douglas

1. Photo of Chassis:



2. Video link that demonstrates the integration of the ultrasonic sensor with the motors:
<https://drive.google.com/file/d/1tzEWkwQYOafGxWjm5Y4AdM4JL2K9Rcdb/view?usp=sharing>

Code actuating the reversal of the wheel when measured sensor distance is greater or less than 20cm:

```
if((cm>20))
{
    digitalWrite(leftPos,HIGH);
    digitalWrite(leftNeg,LOW);
    digitalWrite(rightPos,LOW);
    digitalWrite(rightNeg,HIGH);
}

else if(cm<20)
{
    digitalWrite(leftPos,LOW);
    digitalWrite(leftNeg,HIGH);
    digitalWrite(rightPos,LOW);
    digitalWrite(rightNeg,HIGH);
}
```

- 3.

Our prototype has been built and is undergoing wiring tests to ensure all electronic components are functional. Individual components have been tested with programmed code to ensure functionality, our motors and sensor components have been integrated and tested. All that remains is live trials of the entire assembled car to prove that it can follow a wall and turn away from it when getting too close.

Our planned use of two L298N H-Bridges has been dropped in favor of using only one as it saves space and costs in our design. During testing it was discovered that each side of the car can share the same H-Bridge circuit.

However, we did deviate from some of the engineering specifications. The chassis size is large then the 6" x 6" x 6" as mentioned by the project requirements. Also, we are a bit over budget. Our robotic car cost is \$35 dollars when the requirements were to keep it under \$30.

4.

Table: List of Engineering Specifications and Target Values

Metric	Target Value
Chassis Length	6 In
Chassis Width	4 In
Weight	16.4 oz
Maximum speed	4 Mph
Expected Battery Life	30 hours
Chassis Material	Acrylic sheet
Maximum components	14
Preparation time after car “power-on” (placing the robot car before it begins moving)	5 seconds
Maximum Manufacturing Cost	\$34.86
Project Development Time	3 months(approx.)
Wheel Diameter Minimum	1.4 In
Wheel Width Minimum	0.78 In
Car ground clearance	1.5 In
Maximum 360 degrees turn time	2 sec

Component	Cost
Arduino	\$4.27
4x Wheels	\$6.64
Ultrasonic Sensor	\$3.40
9v Battery	\$2.00
Multimeter	\$3.50
4 DC Motors	\$3.60
Jumper Wire Kit	\$1.00
Acrylic Sheet	\$10.45

Approximate cost: \$35

5.

The issue the group had was regarding the base material. Cardboard was a problem regarding stability. Taking this into consideration, our hardware lead suggested acrylic sheets. It was accepted by the group. Everyone in the group will have it by the end of the week (it is yet to be delivered for some of the group members). Other than this, no one on the group had any issues.