Project 5 : Autonomous Car

Auto driving by Anti Collision Obstacle System

Project Implemented by

Name	Email
Mohamed Ali Ibrahim Ahmed	mohammed_aias@yahoo.com

Objective

- This project aims to implement a self-driving Car that can avoid the obstacles with very fast response by using ultrasonic sensor.

Hardware Components

1. Microcontroller ATmega32
2. Ultrasonic Sensor (HC-SR04)
3. Servo Motor
4. L293D (H_Bridge)
5. 4 Motors
6. LCD Module
7. 4 Caster wheels
8. Chassis
9. 3 Batteries (3.7v)
10. Conductors (Wires)

Features of the components used

Ultrasonic Sensor (HC-SR04)

The Ultrasonic Sensor sends out a high-frequency sound pulse and then how long it takes for the echo of the sound to reflect back

To determine the distance to an object, we will use the following mathematical equation

Distance=Time*Speed of Sound/2

Features of the components used

Servo Motor

The Servo Motor used to change the ultrasonic direction into 2 Rotational angels (0 degree , 180 degrees)

The Servo Motor used in this Project works at 50 Hz frequency which means that the period is 20 ms

The Pulse width sent to servo ranges as follows:

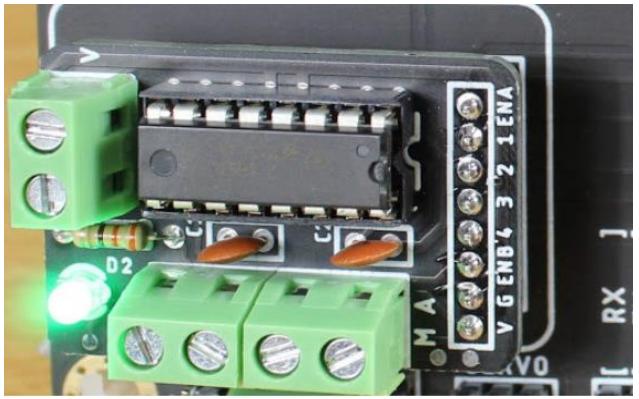
Minimum: 1 millisecond (Corresponds to 0 rotation angle)

Maximum: 2 millisecond (Corresponds to 180 rotation angle)

Features of the components used

L293D
(H_Bridge)

- This Device used to control DC Motors speed and direction



Assembly way

- This H_Bridge device connected to Atmega-32 Board by 8 Pins

Feature

- Only Two DC Motors which can connected to this Device

Features of the components used

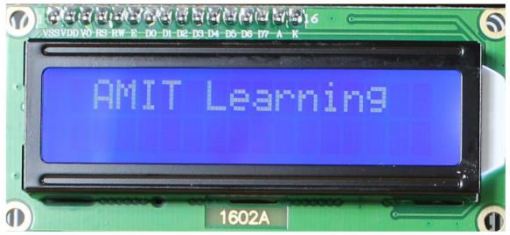
DC MOTOR

The 4 DC Motors had been used to rotate the caster wheels which change the CAR Direction and Speed

Each Motor can move clockwise or anticlockwise

Features of the components used

LCD Module



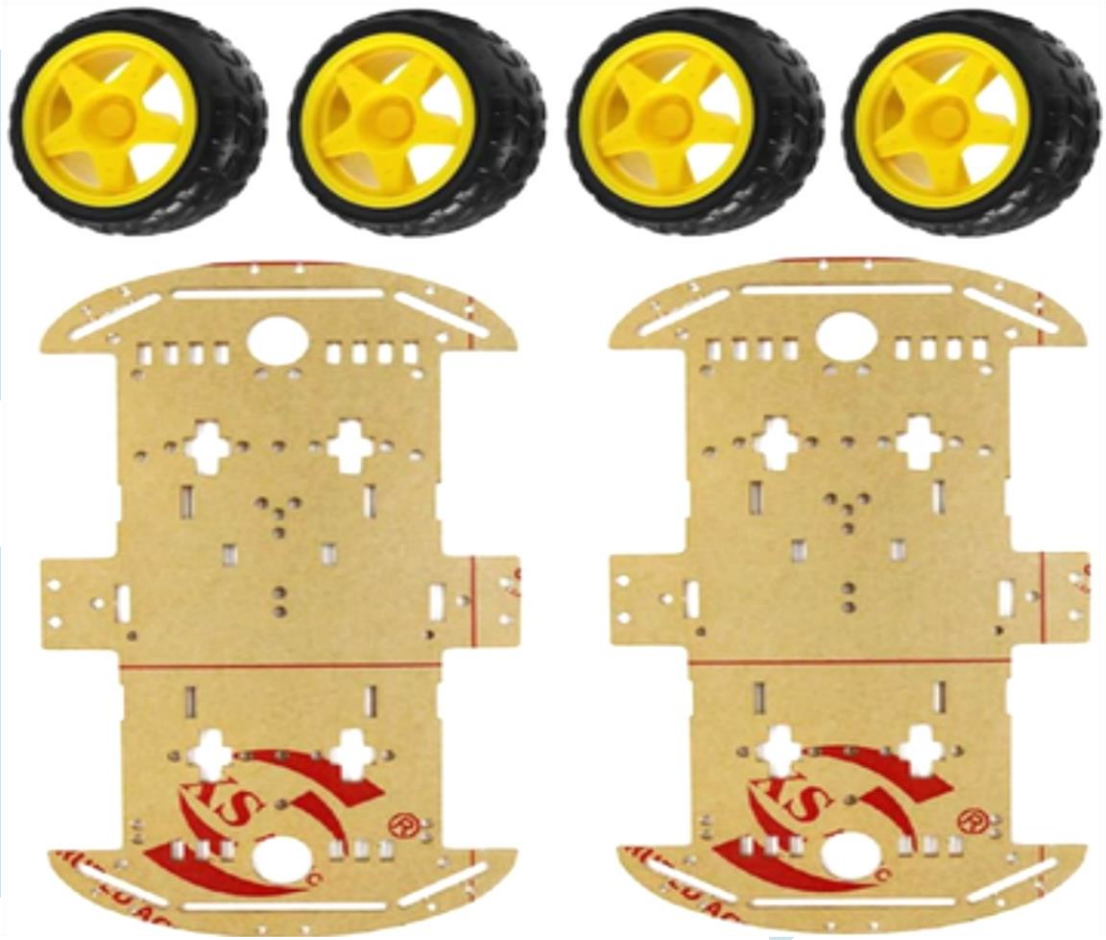
The LCD Module used to Display is (16 * 2) which means the capability for displaying is 2 lines each of them having 16 characters

In this Project the LCD will display the Car Direction simultaneously with current Car state of moving(Forward ,Backward ,Back left ,Back right)

Features of the Components Used

4 Caster wheels

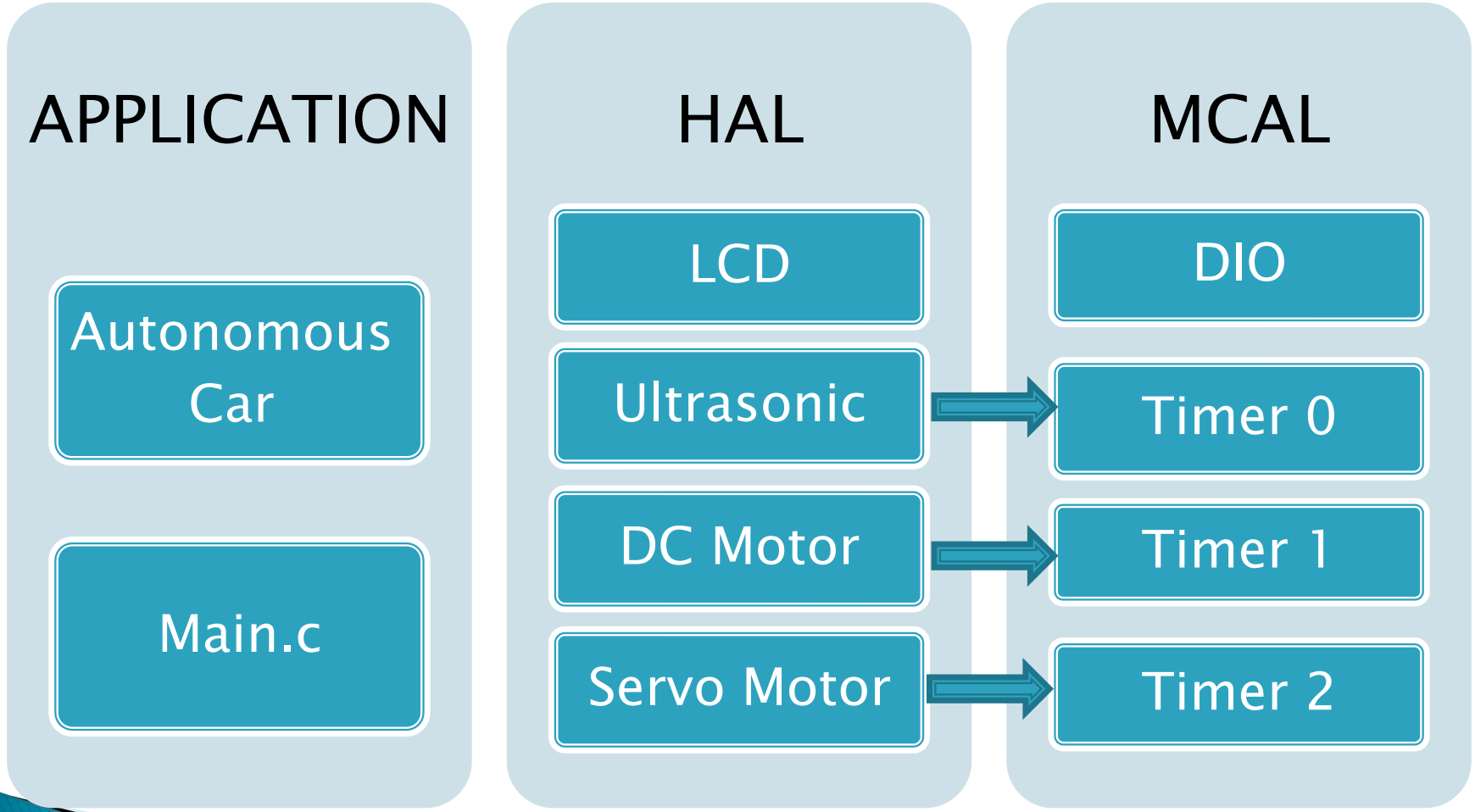
Chassis



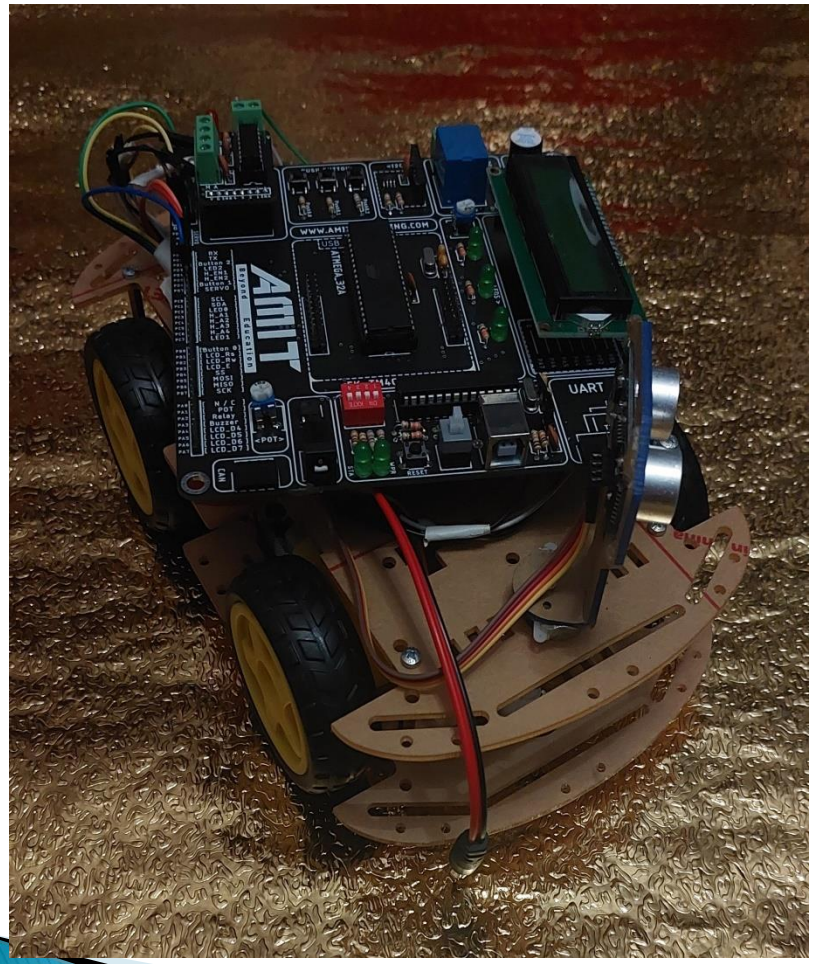
Features of the Components Used

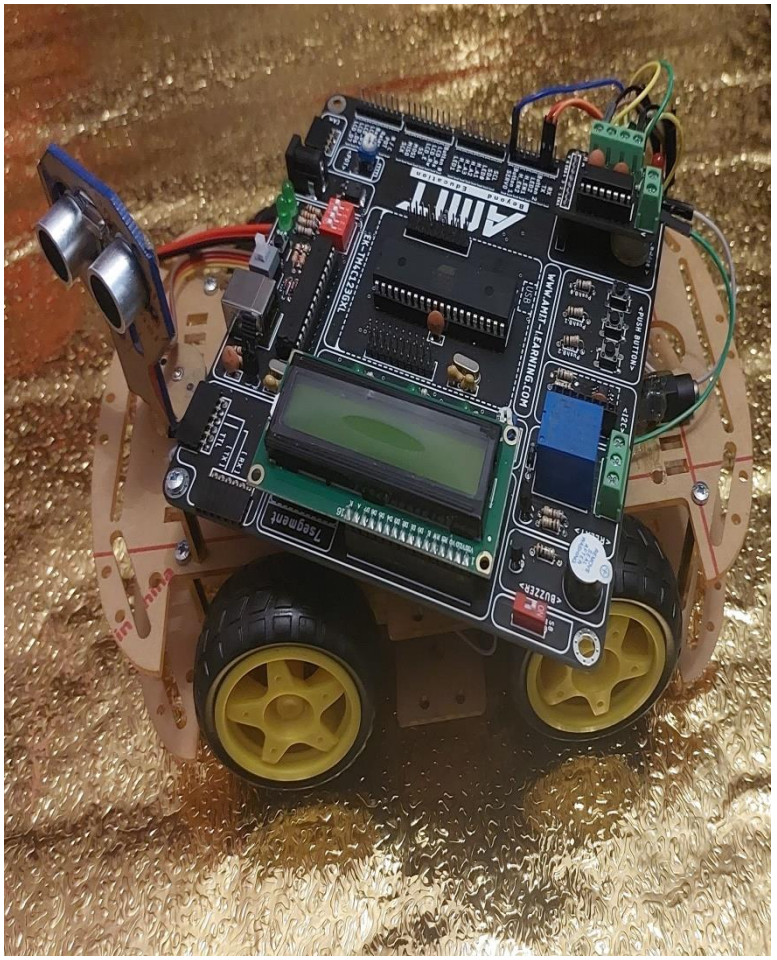
- Conductors (Wires)
- 3 Batteries (3.7v)

Drivers

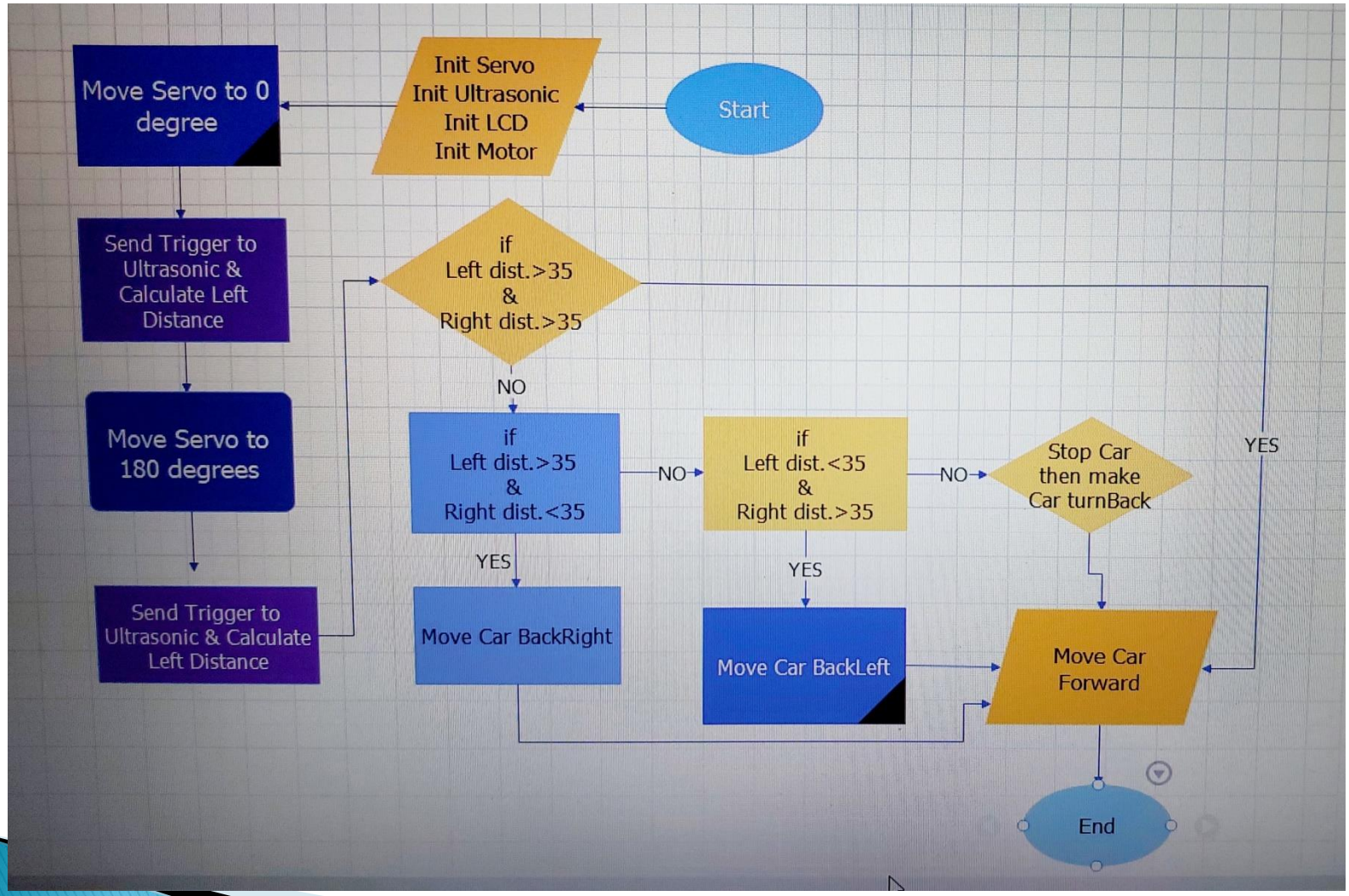

APPLICATION
Autonomous Car
Main.c
HAL
LCD
Ultrasonic
DC Motor
Servo Motor
MCAL
DIO
Timer 0
Timer 1
Timer 2

Project Hardwar after Assembly





Project Flow Chart



Project Links

Software Code in Google Drive

Software Code in GitHub

Presentation File & Video in Google Drive

Thanks for Watching