MC Robotic Vehicle

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Outline

- **MC Robotic Vehicle Definition**
- **MC Robotic Vehicle modes**
  - Manual mode
  - Autonomous mode
  - RFID mode
- **Switching between modes**
- **Building Mechanism**
  - Analyze and choose component
  - Design the scheme
  - Programming the Arduino
- **Programming The Arduino**
- **Conclusion & future work**
- **Demo**

MC Robotic Vehicle Definition

- Provides multi functions and features with various algorithms .

- Consist of three major modes.

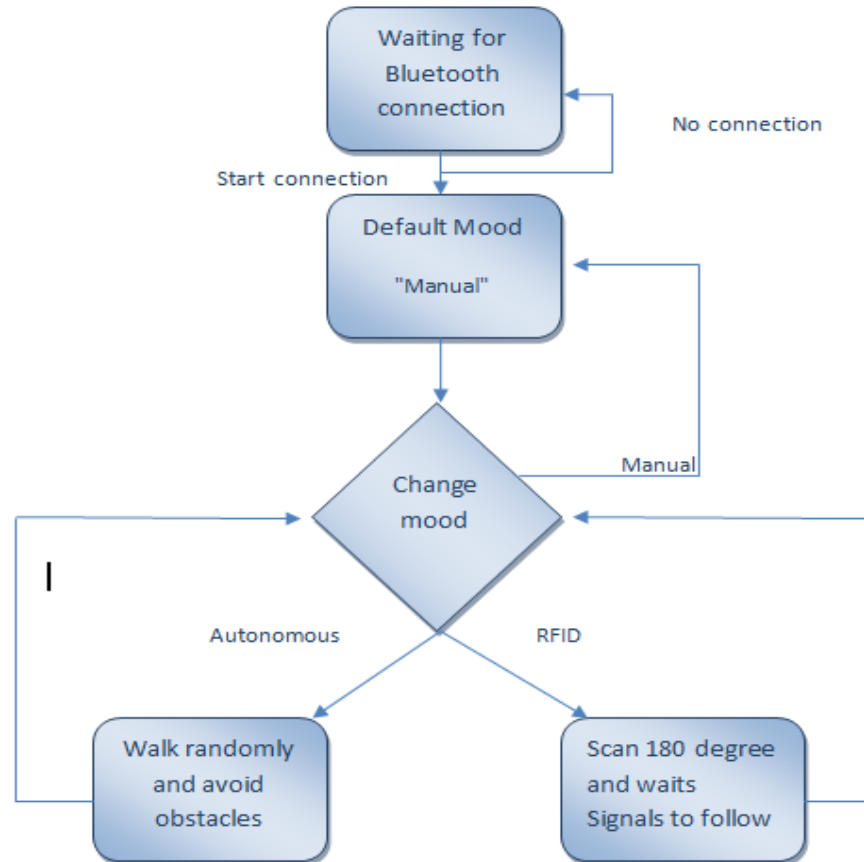- Can be used as smart follower robot, or finding hidden objects based on their tags.

MC Robotic Vehicle Modes

- Manual Mode.
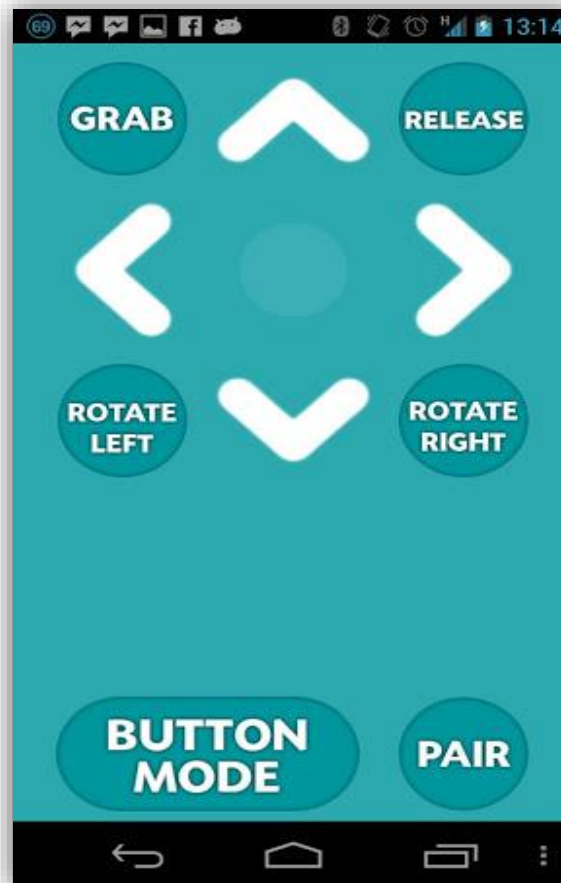
- Autonomous Mode.

- RFID Mode.

Switching between modes
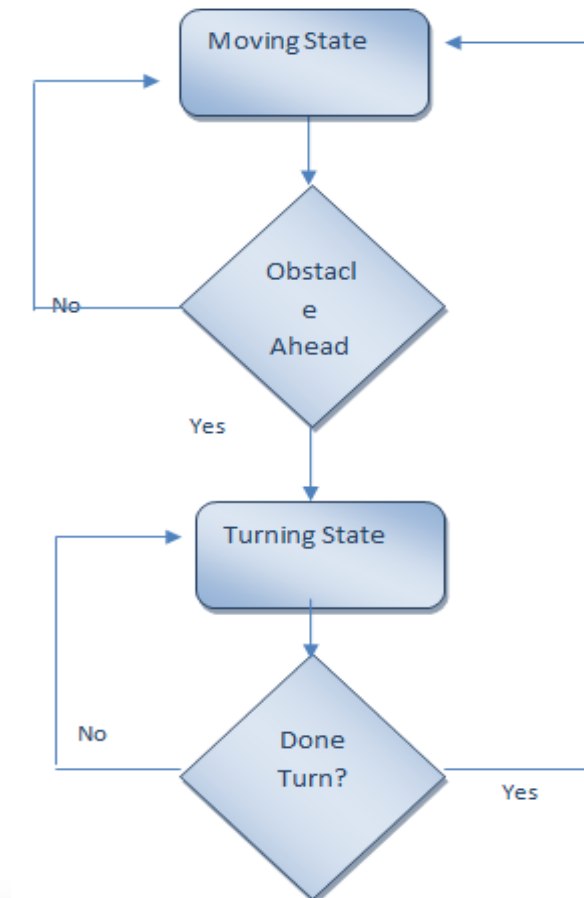
MC Robotic Vehicle Modes

Manual Mode

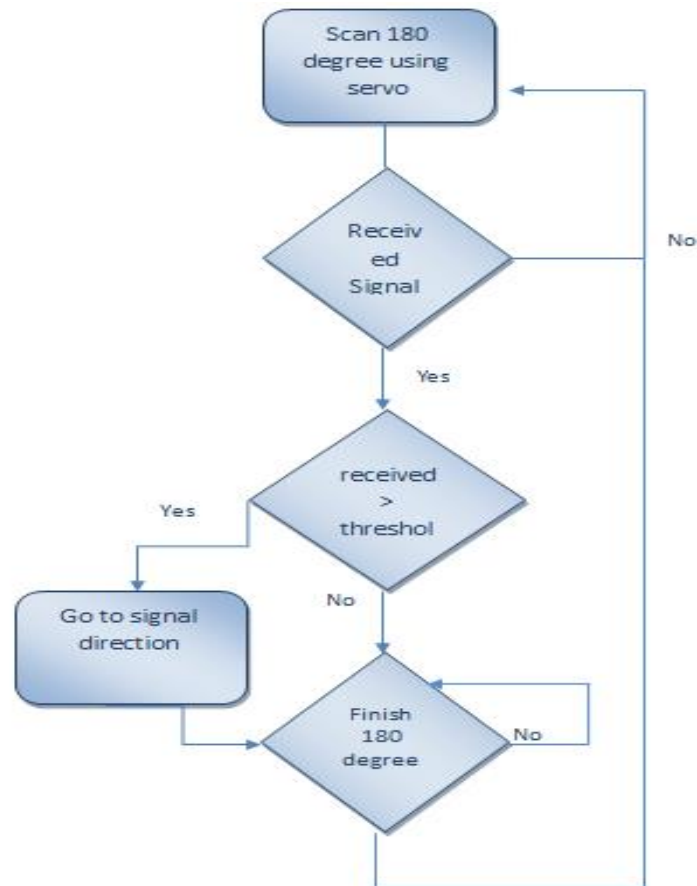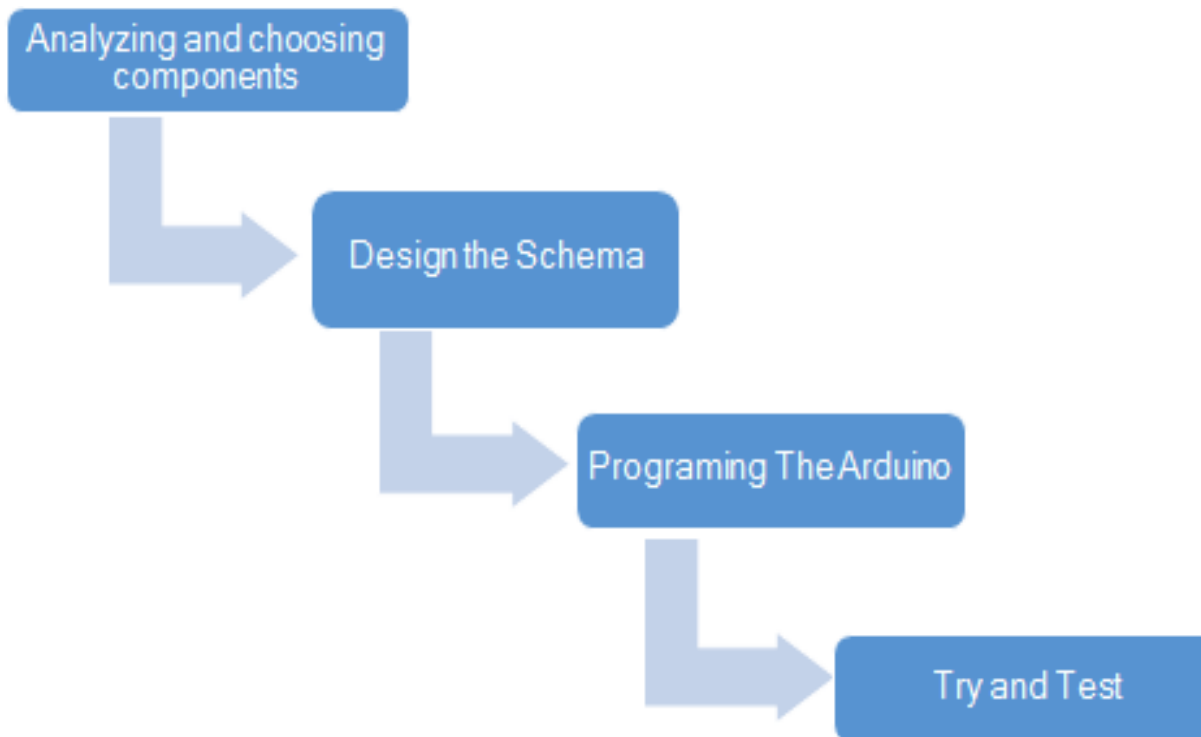# Autonomous Mode

RFID Mode

Building Mechanism

Analyzing and choosing components

Design the Schema

Programing The Arduino

Try and Test
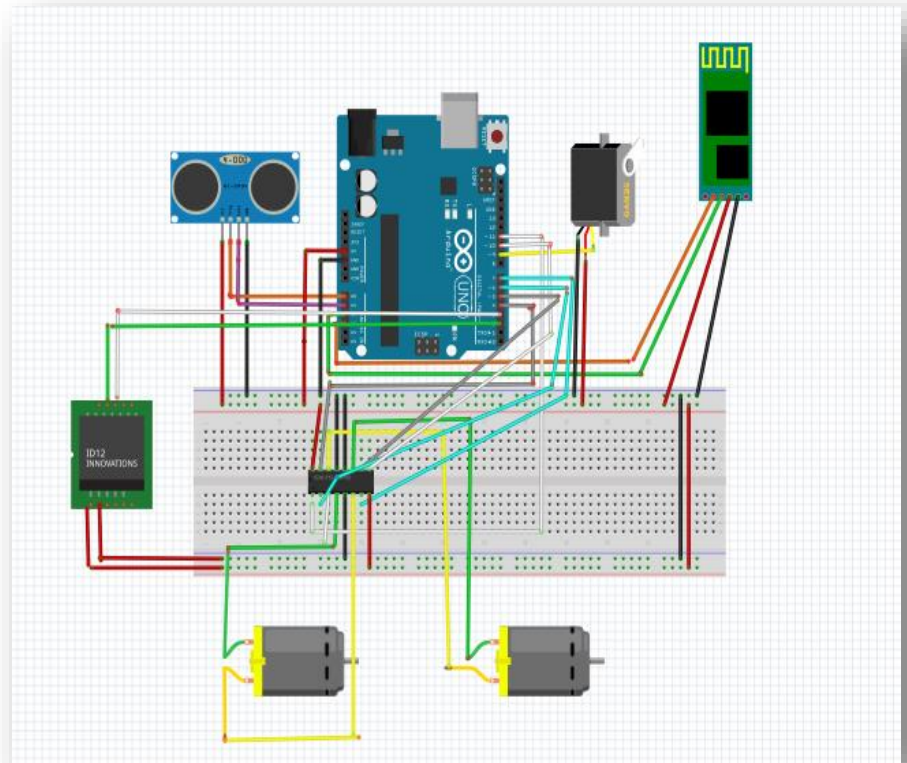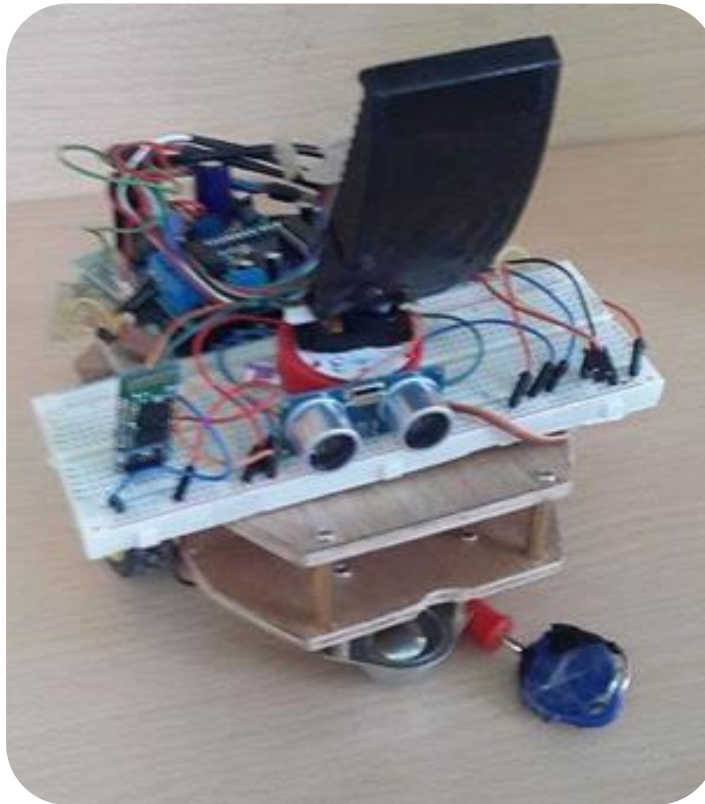
Analyzing & choosing the components

- Arduino Uno
- DC motor
- Bluetooth Slave
- Ultrasonic sensor
- Wiegand RFID
- Servo Motor

Design the schema

Analyzing & choosing the components
RFID tag and reader

- Wiegand RFID reader which is a directional antenna

- Magnetic field generated between the tag and the reader is inversely proportional to the distance between the two

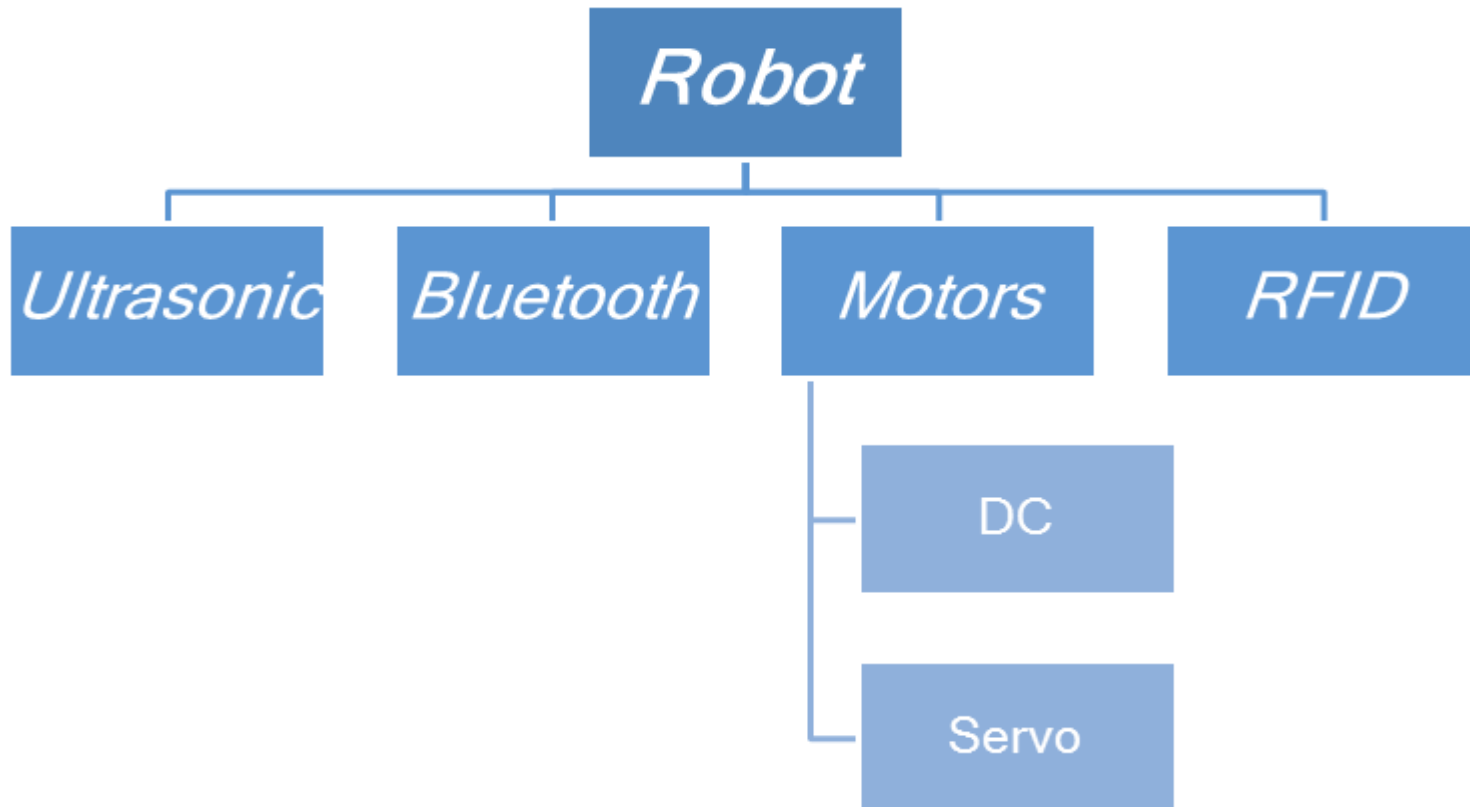- Wiegand reader range is 5cm or less

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Servo Motor

- Servos takes commands from a series of pulses sent from the Arduino.

- Scan the area 180 degree.

- Attached RFID reader on it.

Programming the Arduino

Sensor Reading	150	157	150	150	8	150	150	155	150	150	150	6	150
Average			152	152	102	102	102	151	151	151	150	102	102

```
V add(V new_sample)
{
    sum = sum - samples[p] + new_sample;
    samples[p++] = new_sample;
    if (p >= N)
        p = 0;
    return sum / N;
}
```

Bluetooth

```
virtual bool getRemoteCommand(command_t& cmd)
{
    cmd.stop();
    cmd.key = command_t::keyNone;

    if (BTSerial.available() <= 0)
        return false; // no commands available
    char ch = BTSerial.read();
    switch (ch) {
        case '8': // up
            cmd.goForward();
            break;
        case '2': // down
            cmd.goBack();
            break;
        case '4': // left
            cmd.turnLeft();
            break;
        case '6': // right
            cmd.turnRight();
            break;
        case 'A': // function key #1
        case 'C':
            cmd.key = command_t::keyF1;
            break;
```

RFID

- The Wiegand interface has two data lines, DATA0 and DATA1.

- RFID attached to servo motor to scan the area .

- used timer 2 interrupt to call RFID function every 10 ms.

Smart Timing

- delay() function use to make actions last a certain amount of time.

- calling delay() makes the entire program go to sleep.

- Using Smart timing approach sole the delay problem.

Conclousion & Future work

- Building a controlled robot vehicle with multiple modes and features.

- Switching between modes can be done easily using simple Android application.

- use another RFID component to send and receive a signal over a wider area

Demo