Interamerican University of Puerto Rico
College of Engineering - MECN3976
FINAL PROJECT – Rover "Eugene"

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Inspiration & main idea →

Inspiration

"Eugene" is inspired by the Zhu Zhu pets line of toys released in 2010.

- Their main gimmick is that they run on their own
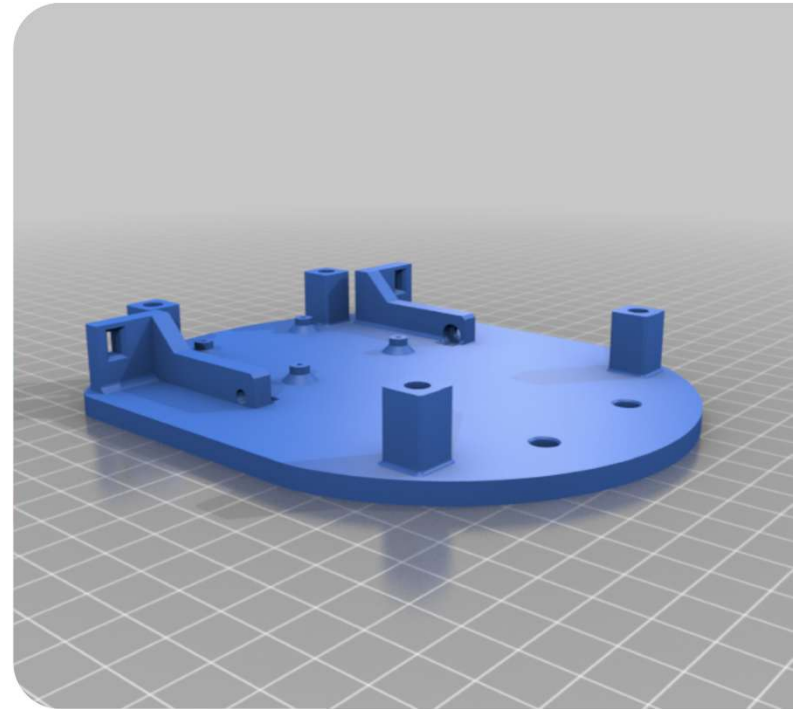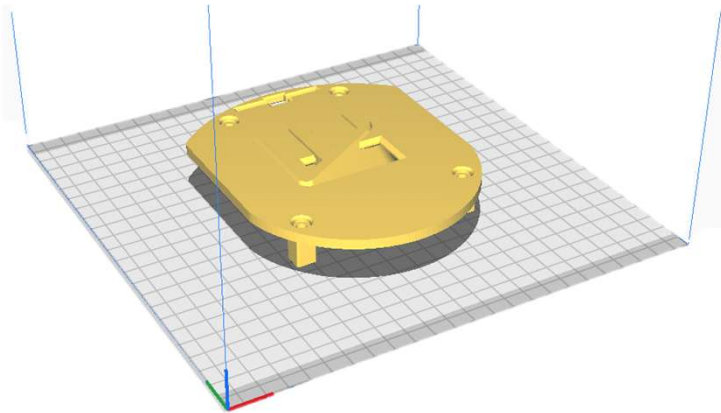- Their nose is a button that triggers on impact

CAD design →

Picture of rover stl

The original CAD pieces were designed by **Ian Carey**
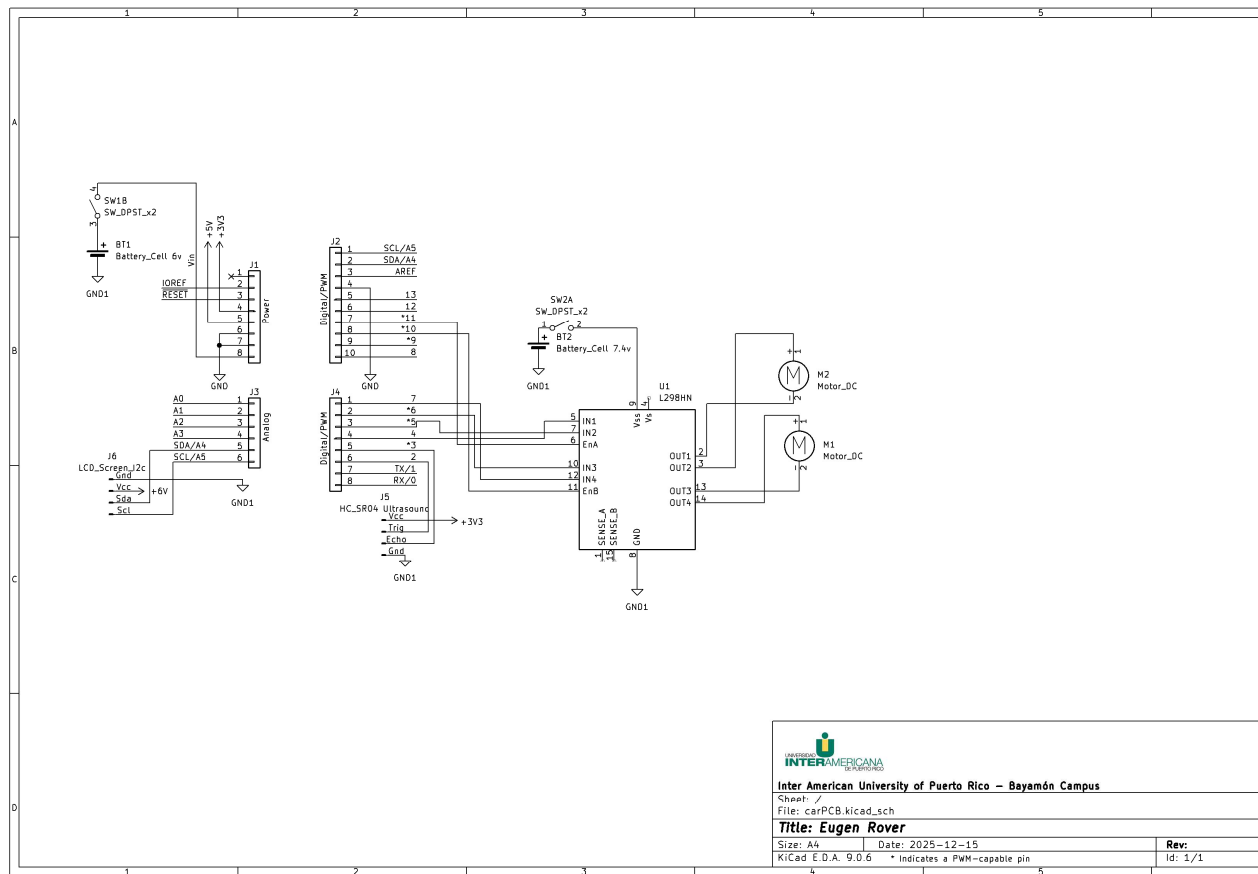
His design consists of three parts:

- Top

- Bottom

- Castor spacer (for caster wheel)

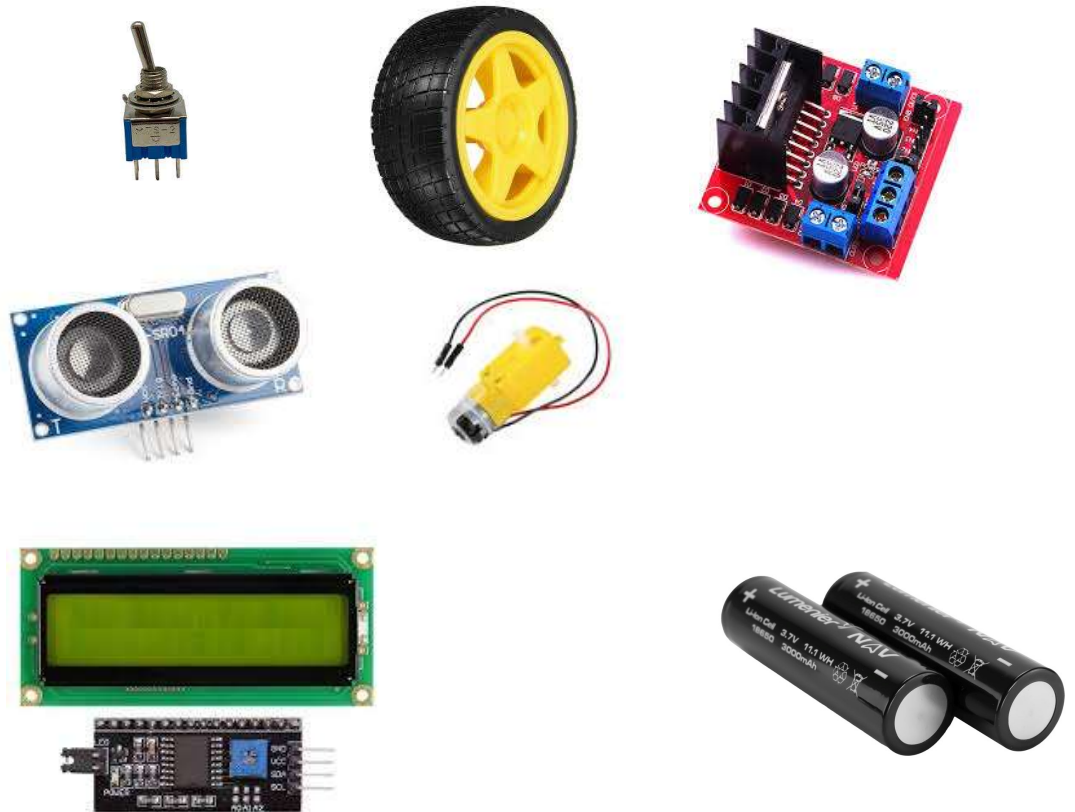# Electrical diagram, components & code

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Electrical diagram made in KiCad

Schematic made with KiCad can also be made into PCB

Components

- L298N Motor Driver x1

- DC Gear motor modules x2

- HC-SR04 Ultrasound Sensor

- 18650 3.7 rechargable batteries x2

- Switches x2

- LCD w/ I2C Module x1

- Wheels x2

- Arduino UNO x1

Code snippet

```
#include "ultrasound_function.h"
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);

const int leftPin1  = 4;
const int leftPin2  = 5;
const int rightPin3 = 6;
const int rightPin4 = 7;
const int enA = 11;
const int enB = 10;
const int trigPin   = 2;  // ultrasound trigger
const int echoPin   = 3;  // ultrasound echo

float value = 0;


void setup() {
  lcd.init();
  lcd.backlight();
  lcd.clear();
  lcd.noAutoscroll();

  lcd.setCursor(5,5);
  lcd.print("^ - ^");
  pinMode(leftPin1,OUTPUT);
  pinMode(leftPin2,OUTPUT);
  pinMode(rightPin3,OUTPUT);
  pinMode(rightPin4,OUTPUT);
  pinMode(enA, OUTPUT);
  pinMode(enB, OUTPUT);

  pinMode(trigPin,OUTPUT);
  pinMode(echoPin,INPUT);

  Serial.begin(9600);
```

```
  analogWrite(enA, 97);
  analogWrite(enB, 97);
}
void loop() {
  value = ultraSound(trigPin, echoPin);
  Serial.println(value);
  delay(100);

  if (value < 30.0 && value > 0) {
    digitalWrite(leftPin1,HIGH);
    digitalWrite(leftPin2,LOW);
    digitalWrite(rightPin3,LOW);
    digitalWrite(rightPin4,HIGH);
    delay(980);


    digitalWrite(leftPin1,LOW);
    digitalWrite(leftPin2,HIGH);
    digitalWrite(rightPin3,LOW);
    digitalWrite(rightPin4,LOW);
    delay(400);


    delay(600);

  } else {
    digitalWrite(leftPin1,LOW);
    digitalWrite(leftPin2,HIGH);  // left backward
    digitalWrite(rightPin3,HIGH);
    digitalWrite(rightPin4,LOW);  // right forward
  }
}
```

Workflow:
- Included are header files for a user defined ultrasound function to calculate distance
- If the distance is 0cm < value < 30.0cm
  The car moves back a few inches, then steers to the right
- If the distance is above 30.0cm the car keeps going forward
- This keeps repeating in a loop, essentially the car just avoids basic obstacles

GITHUB

For reference my code will be found in a repository in my GITHUB

- They will be found under the repo MECN3976

Conclusion and Recommendations →

Observations

The next iteration Eugene 2.0 is already in the works; these are my suggested improvements based on this experience:

- With time, make PCB for a cleaner and compacted design

- Eugene is tied down with screws, but should me more modular for accessibility to batteries

- A suspension system should be considered

- Adding a minicomputer(e.g. Raspberry Pi4 or Pi5) could add AI driven automation

Why is this useful?

As of right now Eugene can be a fun toy for kids, but this project has the potential to be used in areas such as: Space exploration, bomb disarmament, as well as being a companion to people with visual impediments.

Thank you

If you have any suggestions, please let me know