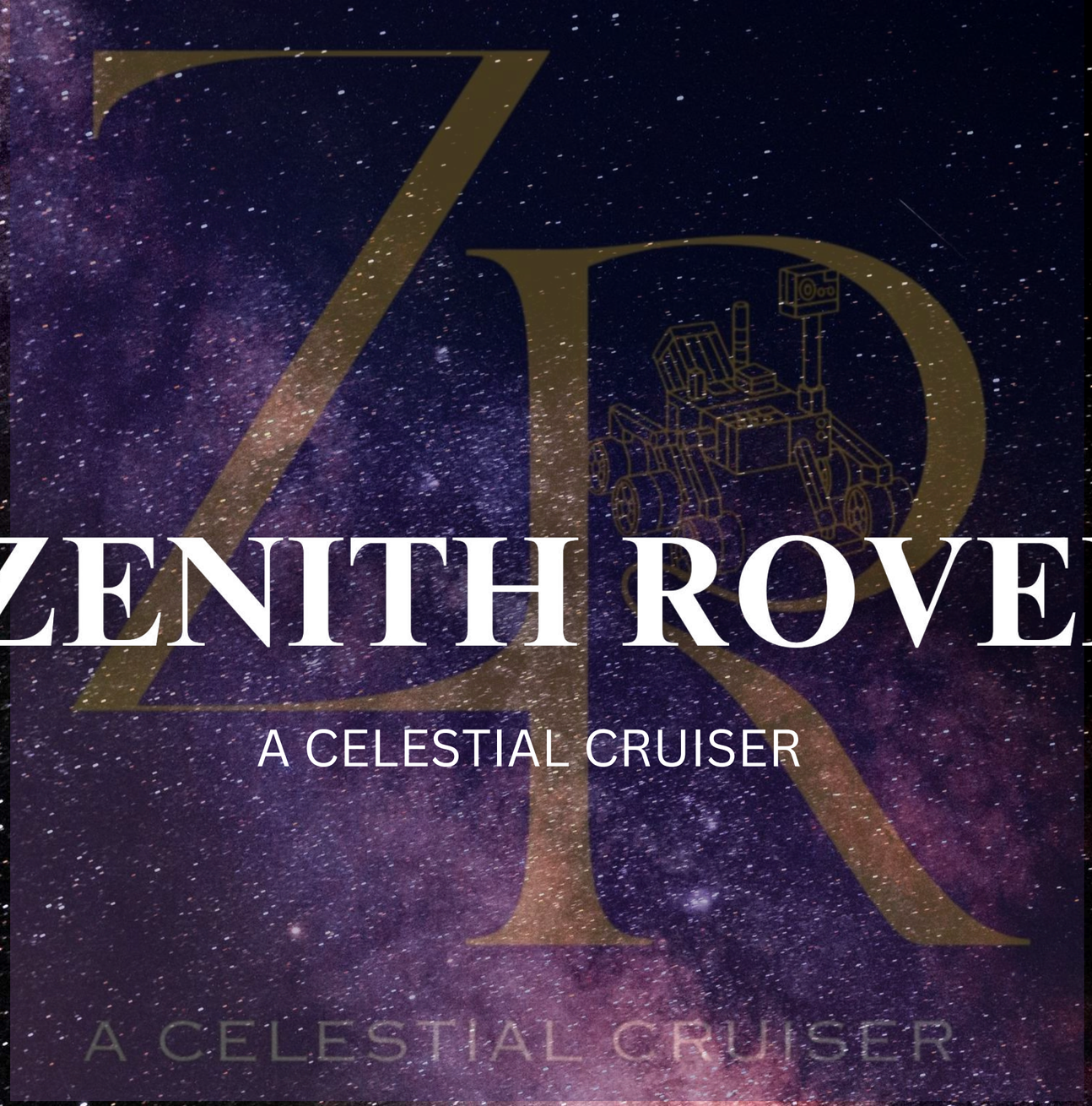

GALACTIC PATHFINDERS
PRESENTS

ZENITH ROVER

A CELESTIAL CRUISER



TEAM MEMBERS

NAGA VINAY AVVARU

NEHANITHA SUGUMARAN

POORNIMA . B

MOHAMED RIFAY

NABEEL AHMED I

OBJECTIVE

“Create an innovative obstacle-avoidance system for a rover, enhancing its ability to autonomously traverse challenging terrains and navigate complex environments, thereby pushing the boundaries of autonomous robotics”

SCOPE

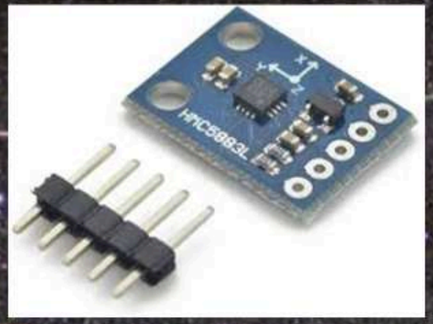
The project will be centered around creating the tools and programs that the rover needs to:

1."See" obstacles using sensors
2. Make quick decisions about where to go
3. Get around obstacles without any human help

COMPONENTS

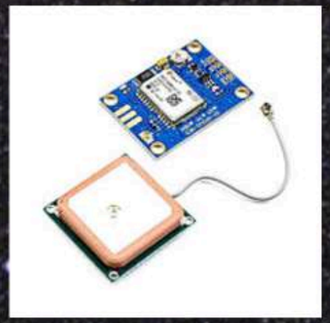
ARDUINO UNO

ULTRASONIC SENSOR

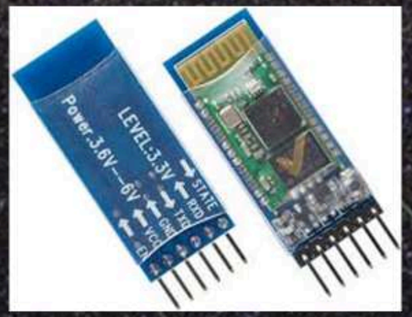


HMC5883L COMPASS

SERVO SG90



GPS MODULE



HC05 BLUETOOTH MODULE

MOTOR

FACT

One fascinating thing about obstacle-avoiding rovers is that they use Simultaneous Localization and Mapping (SLAM) technology to navigate through complex environments.

A. Inertial Navigation Systems (INS): INS uses sensors to track the rover's movement from a known starting point, helping it stay oriented and know where it is.

B. Odometry: By tracking the movement of the rover's wheels, we can estimate how far it has traveled. However, rough terrain and wheel slippage can introduce errors.

C. Visual Navigation: Rovers like the Mars rovers use cameras to take pictures and create 3D maps of the terrain. By tracking landmarks, the rover can determine its movement and update its position.

How is zenith different from others?

Our project is special because we have combined GPS navigation with obstacle avoidance in a unique way.

This means that our rover can independently travel to specific destinations while also making sure to avoid any obstacles in its path.

This kind of integration is not commonly seen in regular robotics projects. What makes it even more exciting is that this combination has real-world applications. It can be used for exploring other planets and responding to disasters, showing both innovation and practical usefulness. We're really proud of how our project brings together cutting-edge technology and practical relevance.

methodology

To make an obstacle-avoiding rover with an Arduino Uno, start by setting clear goals and picking out the key components like the Arduino Uno, DC motors, L298N motor driver, HC-SR04 ultrasonic sensors, a chassis, and a battery pack.

Next, create the circuit by connecting the motors to the motor driver and the sensors to the Arduino, making sure everything gets the right power.

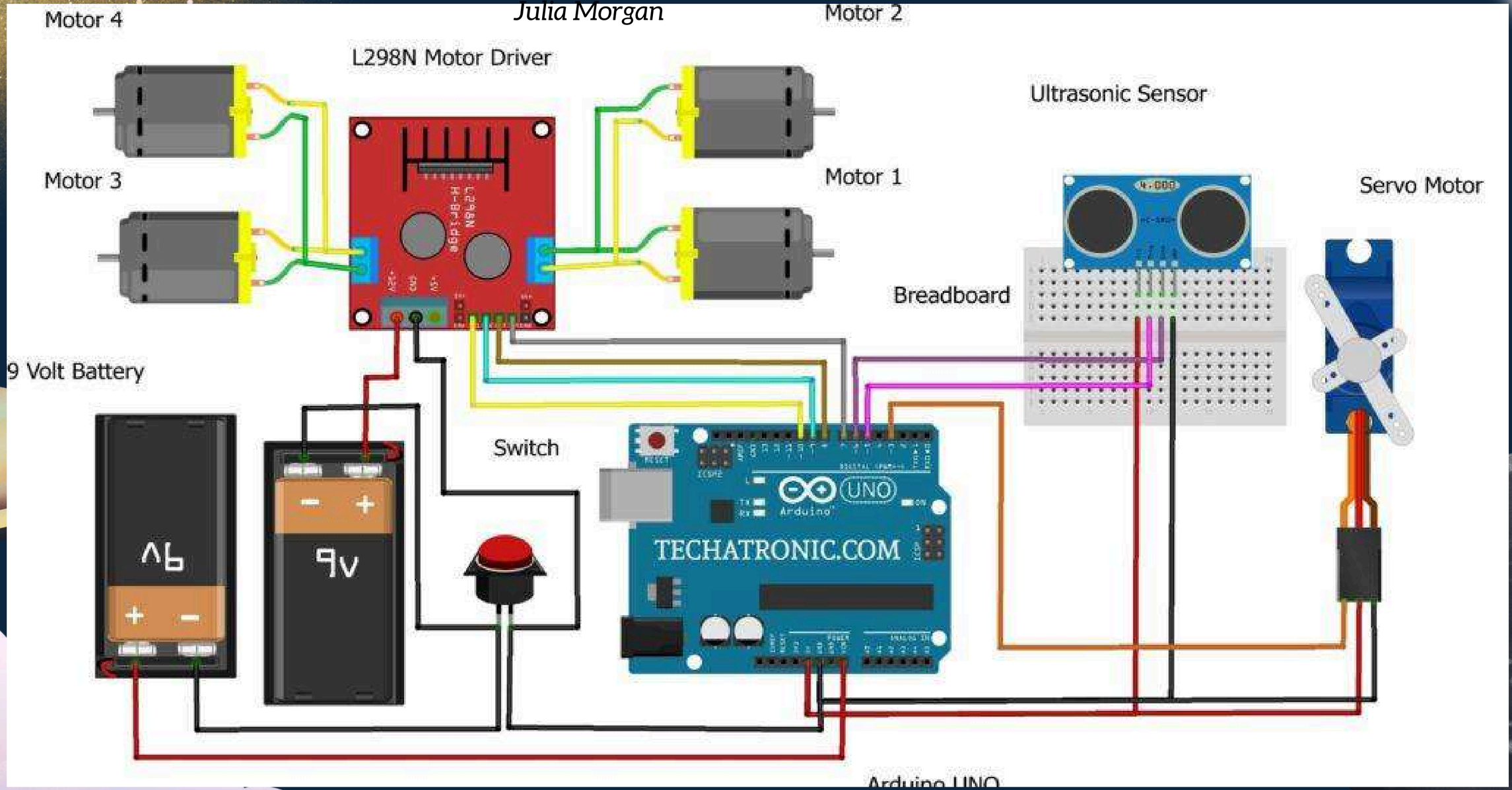
Then, put the hardware together by mounting the components on the chassis and making sure all the wiring is secure.

After that, work on the software by writing and uploading the code to the Arduino for controlling the motors and detecting obstacles.

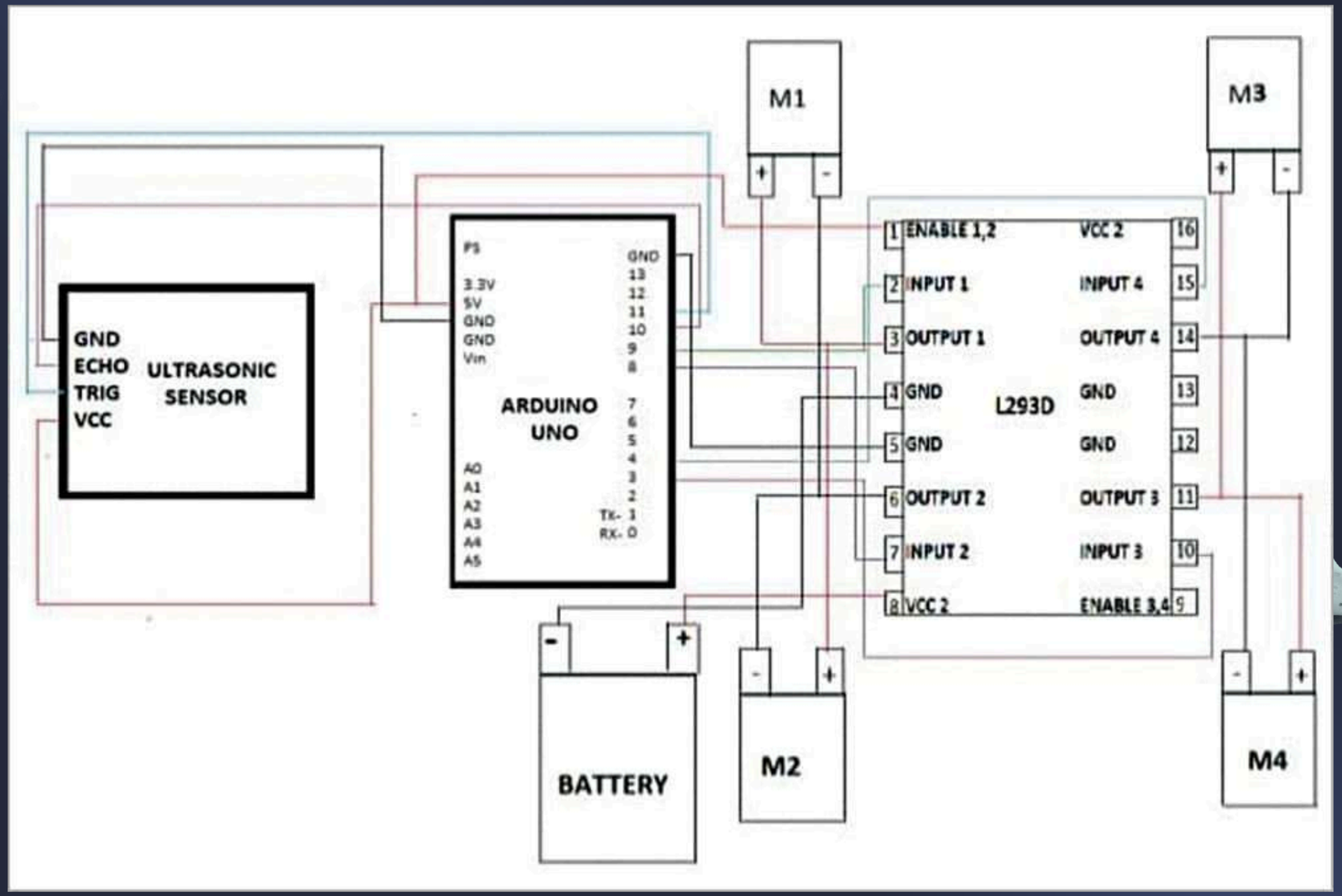
Finally, give the rover a test run, fix any problems, and keep improving its performance through trial and error testing.

CIRCUIT DIAGRAM

Julia Morgan



BLOCK DIAGRAM



FUTURE GOALS!

*High Precision Mapping
*360-Degree Coverage

*Long-Range Detection
*Adaptability to Various Conditions

* Integration with Autonomous
*Navigation Systems

Future Plans: Inertial Navigation Systems (INS)

Integrating Inertial Navigation Systems (INS) will revolutionize our rover's navigation.

Using accelerometers and gyroscopes, INS continuously tracks the rover's position and orientation without needing external signals like GPS.

It's a self-contained, reliable solution that ensures uninterrupted navigation, even in challenging environments where other systems might fail. With INS, our rover gains autonomy and precision, setting the stage for exciting future exploration.


Thank you!