



# Design with Microprocessors

Laboratory Project

**Line-following Robot with umbrella for component water protection**

3<sup>rd</sup> year

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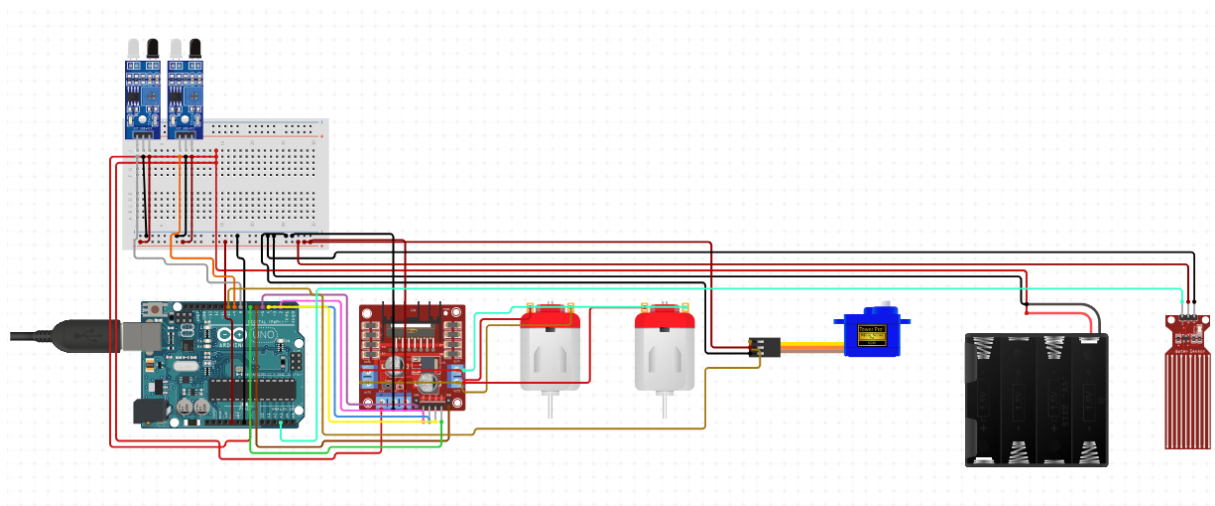
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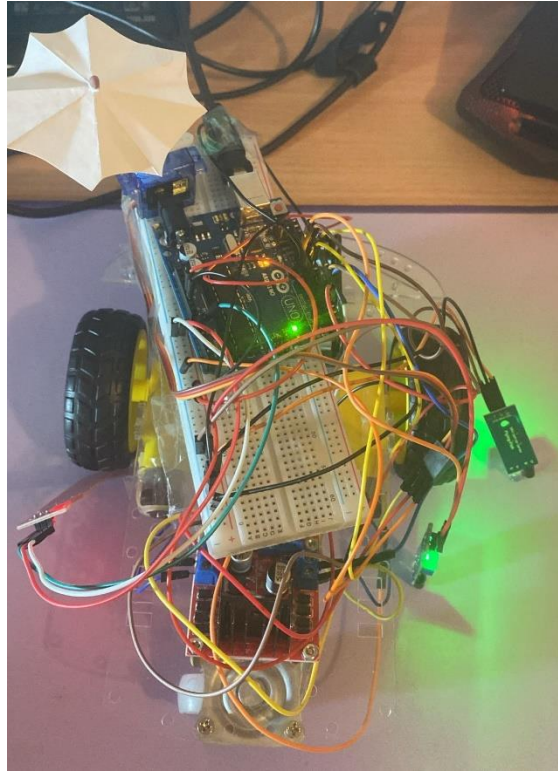
## 1. Introduction

Introducing an innovative project, the Line Follower Car with Arduino Uno and Servomotor, designed to autonomously navigate a predefined path using infrared sensors. This smart car not only follows the line but also incorporates a water sensor that, upon detecting water, activates a servomotor to elevate an umbrella, providing a unique and practical solution to shield the car from rain. Combining robotics, sensor technology, and Arduino programming, this project showcases the convergence of hardware and software to create a versatile and responsive system for real-world applications.

## 2. Hardware implementation

In the hardware setup of our car, we have an H-bridge circuit responsible for controlling the movement of two DC motors connected to the wheels. This H-bridge allows us to dictate whether the motors should make the wheels go forward, backward, or stop. Additionally, two infrared sensors are incorporated into the design, with one placed on the left side and the other on the right. These infrared sensors act as the car's "eyes," detecting a black line on the ground and guiding the car's movements accordingly. To enhance the car's functionality, a water sensor has been included, that is linked to an analog pin on the Arduino Uno, and when it detects the presence of water, it triggers a servo motor. The servo motor's role is to initiate a movement, raising moving an umbrella to protect the car's internal components from water damage. The entire system is controlled by an Arduino Uno, serving as the brain of the car, executing the programmed code.





### 3. Software implementation

The code is a program for controlling a vehicle with water detection capabilities. The code defines pins for motors, sensors, and a water sensor. It utilizes a Servo motor to control a water outlet based on the water sensor readings. The main loop of the program involves continuously reading the left and right sensors to determine the path for the robot. Depending on the sensor readings, the robot can move forward, stop, turn left, or turn right. The water function checks the water sensor value and adjusts the position of the servo motor to control water flow. The code demonstrates the integration of sensor input and motor control for creating a robot with basic obstacle avoidance and water detection features. Additionally, there are some commented-out sections in the code, suggesting potential modifications or improvements during the software development process.

### 4. Conclusions and further developments

In conclusion, the Line Follower Car with Arduino Uno and Servomotor represents a successful integration of cutting-edge technologies to address practical challenges. By implementing infrared sensors for precise path tracking and a water sensor coupled with a servomotor to deploy an umbrella in response to rain, this project demonstrates the adaptability and utility of

robotics in daily scenarios. The amalgamation of hardware components and Arduino programming not only enhances the car's autonomy but also showcases the potential for creating intelligent systems with real-world applications. This project stands as a testament to the limitless possibilities that arise from the synergy between technology and creativity, providing a glimpse into the future of smart and responsive devices.