Coordinate Tracking Car

Proposal

Mechatronics Engineering

MCTR 601

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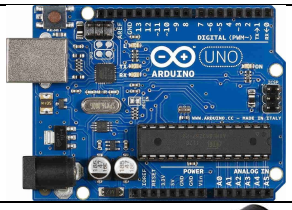
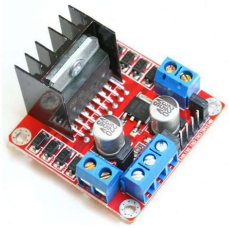
Device Behavior Description

The micro-controlled car will be awaiting an input in the form of x-y coordinates through a keypad(3x4). The objective of the car is to reach the desired location. For the car to reach the location, we will use an encoder that measures the number of revolutions required by the motor to reach its destination. The output of the encoder will be received by the micro-controller as x-y coordinates to maintain closed-loop feedback control. These x-y coordinates will be calculated using a certain algorithm to be able to know the required speed (v) and rotational torque (θ) of the car. Then using Differential Robot Model in MATLAB (Differential Drive), we will translate the speed and rotational torque into angular velocity for each wheel (ω_L,ω_R) to accurately reach the destination. When the car reaches its destination, LEDs will turn on.

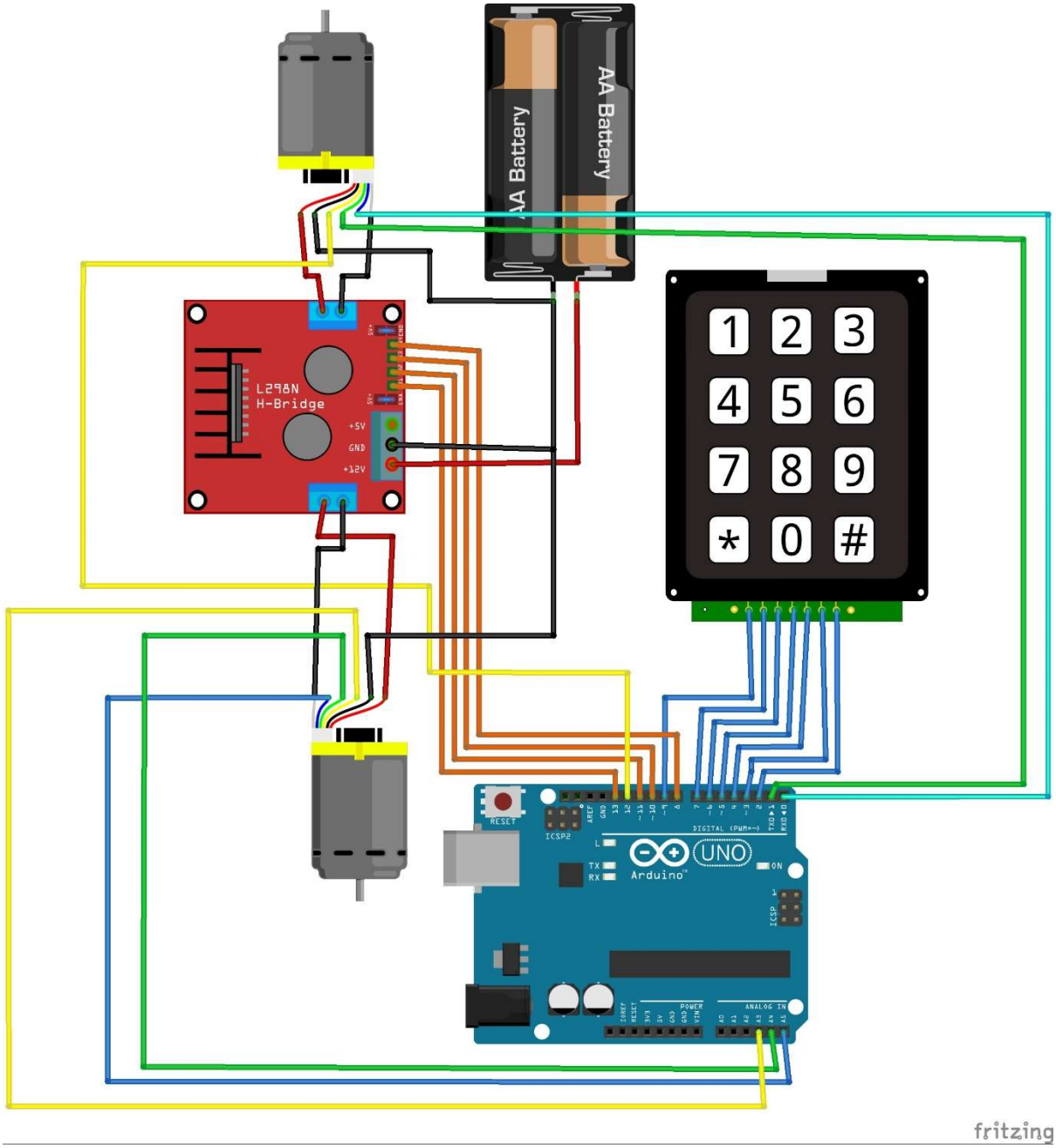
Device Design

The car will move forward using 2 wheels that are controlled by the motor driver that is controlled by the Arduino development board PWM modes. During turns, left or right, the steering technique is made by increasing the speed of a wheel while keeping the other constant. The turn is made by the single caster wheel.

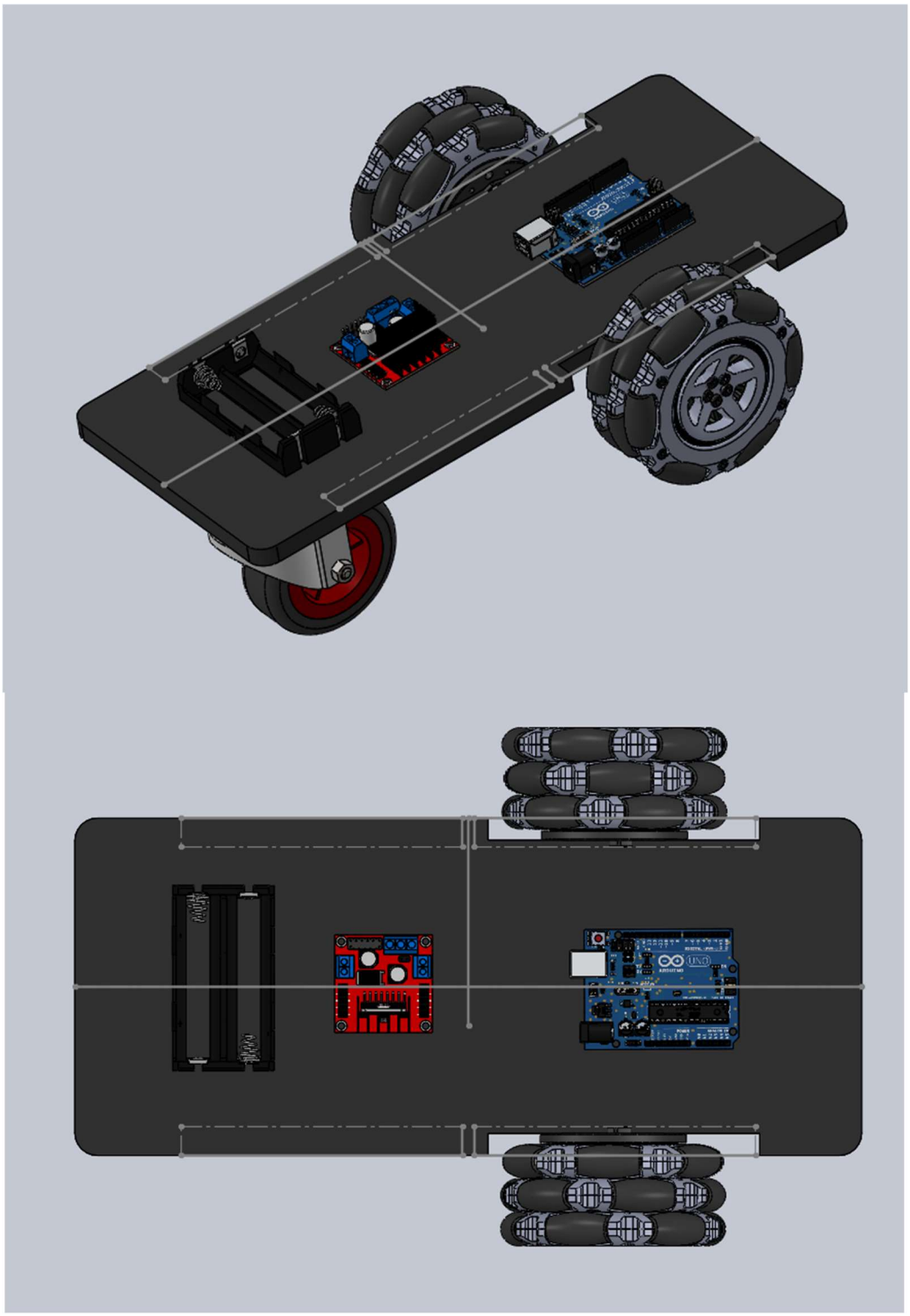
Main Components

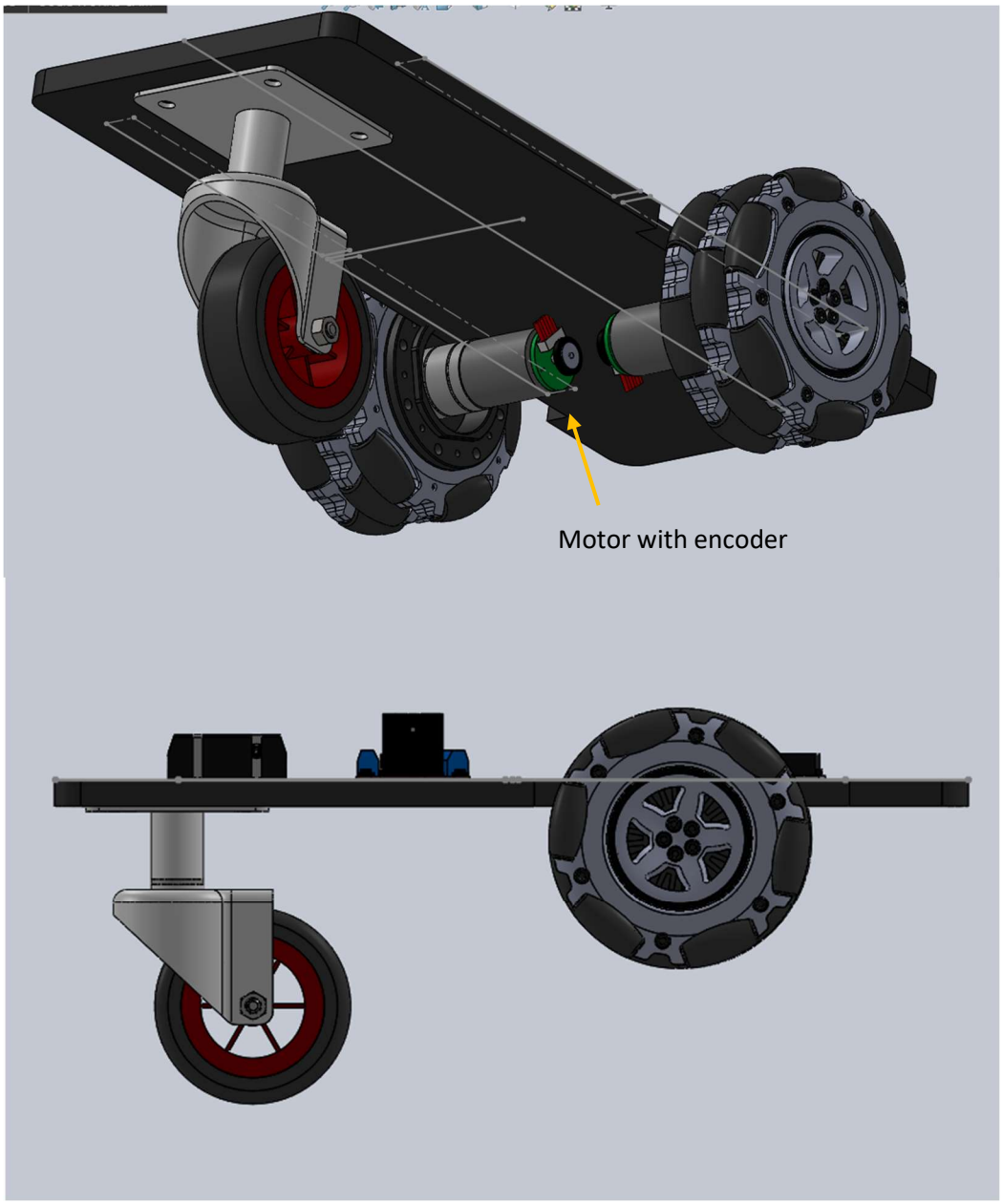
Arduino Uno Development Board	
DC MOTOR with Encoder (8.8 Kg.cm - 133 RPM - 6:12V)	
1x L298N Motor Driver (H Bridge)	
Batteries and battery holder	
Standard Matrix Key Pad 3×4 Flat	

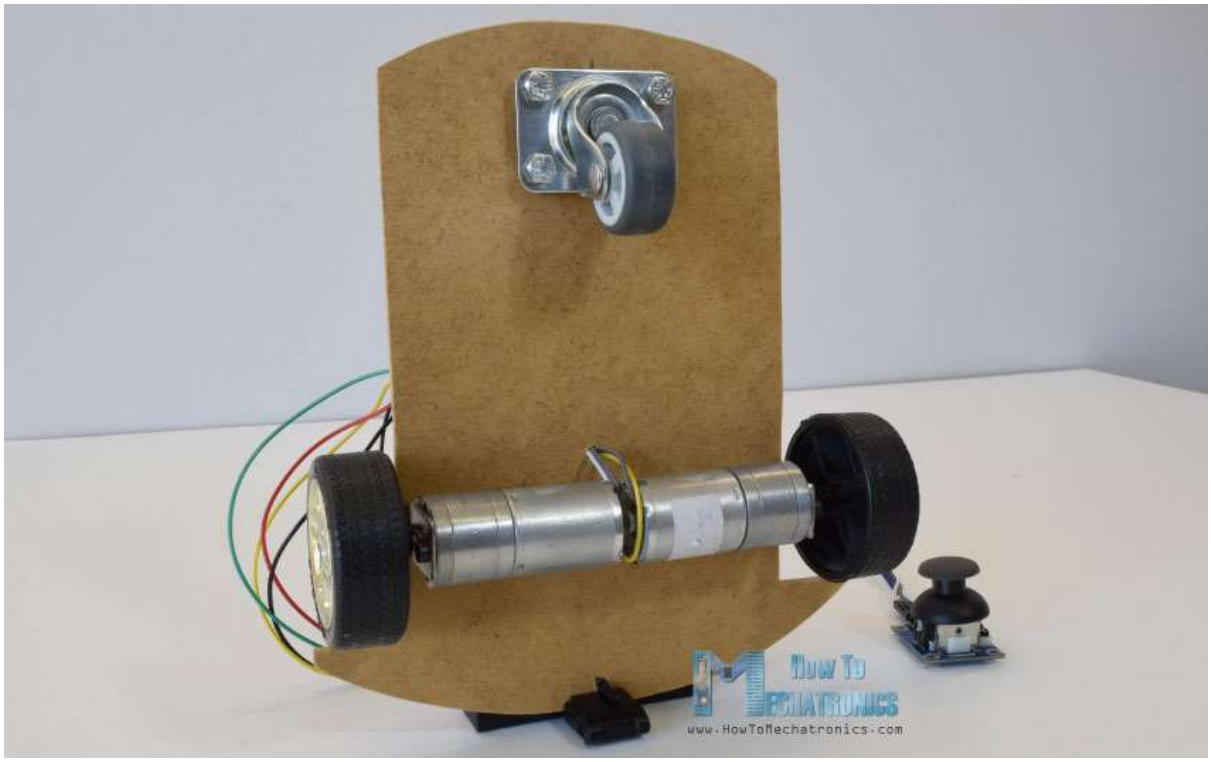
Circuit Diagram

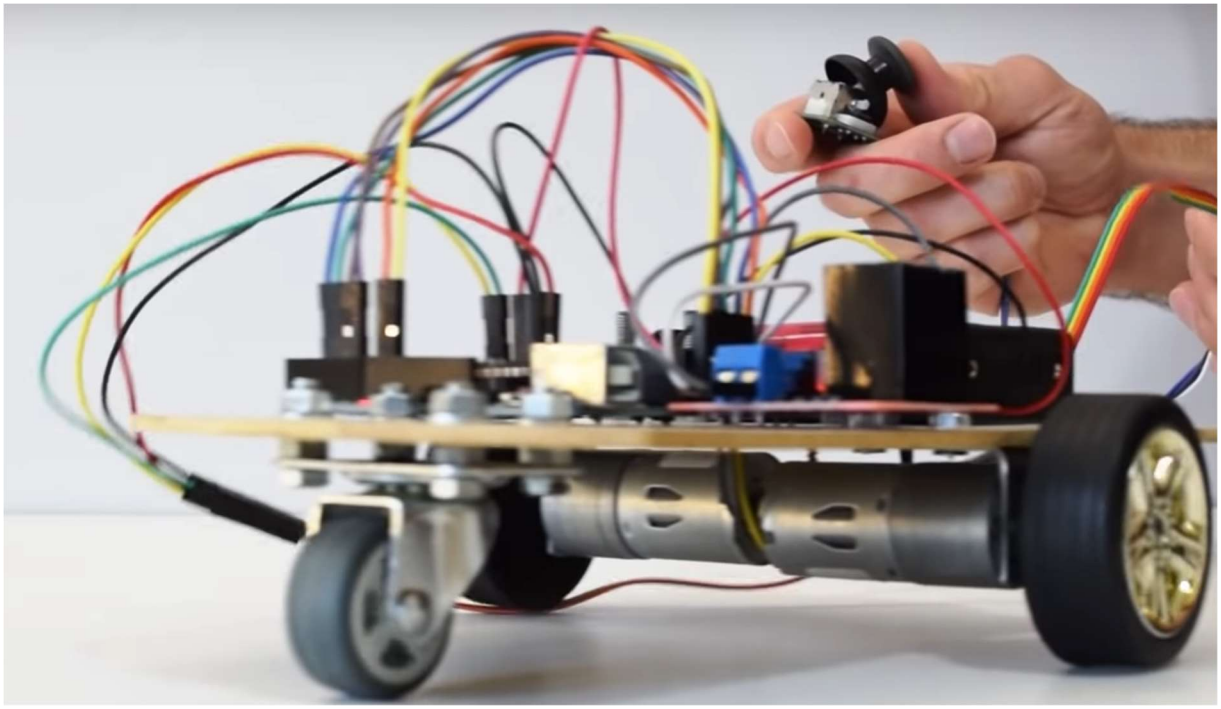


Proposed Design




Motor with encoder





Source: https://howtomechatronics.com/tutorials/arduino/arduino-dc-motor-control-tutorial-l298n-pwm-h-bridge/