

IMPLEMENTATION OF TRANSISTOR 2N2222 AND L298 MODULE AS DC MOTOR DRIVERS IN LINE FOLLOWER ROBOTS

Abstract

A line follower robot is a type of robot that is designed to follow a specific path by using sensors and a motor control system. The proper use of motor drivers is essential to ensure the stability and efficiency of the robot's performance. The two commonly used components for DC motor drivers are the 2N2222 transistor and the L298 module, each of which has different characteristics in terms of motor control and power consumption. This study aims to evaluate the performance of the two motorcycle drivers on the line follower robot without using a microcontroller. This study aims to analyze and compare the performance of the 2N2222 transistor and the L298 module as DC motor drivers in the line follower robot, focusing on the speed, power consumption, and stability of the robot's motion in following an oval-shaped path. The method used is a quantitative experiment in the laboratory, by conducting direct tests on the robot equipped with the 2N2222 transistor motor driver and the L298 module. Data was collected based on the robot's average speed, current consumption, and path error rate during experiments with a 4-meter-long oval-shaped path. The test results showed that the robot with the L298 module had an average speed of 0.42 m/s, while with the 2N2222 transistor it was only 0.31 m/s. The current consumption in a system with L298 is 480– 520 mA, while with a 2N2222 transistor it is only 290–340 mA. Robots with L298 only experienced 1 path error out of 5 attempts, while robots with 2N2222 experienced 3 errors. The selection of motorcycle drivers greatly affects the performance of the line follower robot. The L298 module provides better stability in controlling the motor, albeit with higher power consumption. On the other hand, the 2N2222 transistor is more efficient in power usage, but it has less stable performance. Further research can study the combined use of both motor drivers to achieve a balance between power efficiency and control stability.