

ANALISIS KOMPARATIF IMPLEMENTASI ROBOT LINE FOLLOWER: STUDI LITERATUR PERBANDINGAN SISTEM BERBASIS MIKROKONTROLER ARDUINO DAN SISTEM ANALOG TANPA MIKROKONTROLER

Abstract

This study aims to compare the implementation of line follower robots using two system approaches, namely Arduino microcontroller-based and analog systems without microcontrollers. The study was conducted through a literature review using a qualitative descriptive approach, utilizing various reputable scientific publications published between 2018 and 2025. The analysis focused on technical aspects, including sensor configuration, control algorithm implementation—particularly PID—power usage efficiency, as well as the flexibility and operational stability of each system. The results show that Arduino-based systems have advantages in programming flexibility, dual sensor integration capabilities, and ease of algorithm modification. However, these systems are relatively more energyintensive and have higher processing latency. Conversely, analog systems excel in response speed and power consumption efficiency, but are less adaptive to dynamic environmental changes. Thus, this study provides a conceptual framework for selecting a line follower robot system approach according to application needs, whether for industrial, educational, or research purposes. The implications of these findings are expected to serve as a strategic reference in the development of precise, efficient, and contextual robotics systems