# ABSTRACT

The design objective is to develop an agricultural robot that is automated, versatile, and easy to operate and maintain. It aims to design a multifunctional farming robot that automates multiple agricultural tasks efficiently. The core of the machine integrates several modules — a grass cutting system driven by a DC motor, a cultivation mechanism actuated by a servo motor, a seed sowing unit powered by a DC motor, and a water spraying system operated by a water pump motor. All modules are centrally controlled using an ESP32 microcontroller and relay modules to automate task switching.

The motion of the robot and drive system is powered by DC motors interfaced with an L298N motor driver module, ensuring reliable maneuverability. To optimize power management, a buck converter is employed to step down the voltage from 12V to 5V where required. The robot is further equipped with environmental sensors such as a rain sensor and a soil moisture sensor to enable adaptive operation based on real-time field conditions.

This multipurpose robot is designed to minimize manual labor and enhance precision in agricultural activities. By automating tasks such as grass cutting, seed sowing, cultivation, and irrigation, the robot provides a comprehensive solution for small and medium-scale farmers. The integration of sensors and modular control aims to ensure consistent field performance and reduce operational complexity. Future enhancements may consider the integration of solar panels to enable sustainable charging for remote agricultural environments.