



AGRIBOT: AN INTELLIGENT AUTONOMOUS SYSTEM FOR SMART AGRICULTURE

ABSTRACT

In the evolving landscape of Smart Agriculture, robotics has emerged as a key enabler for addressing critical challenges such as labour shortages, climatic uncertainties, and the need for increased agricultural productivity. The transition from manual labour to automation is driven by the demand for time-efficient, energy-saving, and scalable solutions to meet the needs of modern farming. Robotic systems not only enhance efficiency but also minimize repetitive labour-intensive tasks, ensuring consistent and precise agricultural operations. These advancements contribute significantly to improving crop yield, aligning with the goals of sustainable farming and food security.

A fundamental aspect of successful crop production is the automation of essential farming processes, which directly impacts yield, efficiency, and sustainability. Precision in seed placement, irrigation, pesticide spraying, ploughing, digging is crucial for optimizing plant growth, conserving resources, and improving productivity. In this project, a multi-purpose agricultural robot has been developed to automate these tasks, reducing human labour while enhancing farming precision.

This robotic system is powered by an Arduino microcontroller and operates via Bluetooth, RF, or IoT-based communication, ensuring wireless and remote-control capabilities. The integration of sensors (soil moisture, temperature, humidity, and pH) enables the system to adapt to varying climatic conditions and soil types, making it suitable for diverse agricultural environments. The robot efficiently performs seed sowing, smart irrigation, pesticide spraying, ploughing, ensuring uniformity, precision, and optimal field coverage.

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