"FUTURE OF FARMING: IoT-POWERED SMART AGRICULTURE SYSTEM."

P. Vishnu Vardhan Reddy, Samarjeet Kumar, Ravindra Ganni
Supervisor : Dr: Subhashish Tiwari

Abstract

IoT technology is transforming agriculture by enabling real-time monitoring of environmental conditions, soil health, and crop growth. Key innovations include microclimate-specific farming, dynamic plant bio-response monitoring, and blockchain integration for transparent supply chains. Autonomous crop breeding and decentralized farming platforms further enhance productivity. This IoT-powered system addresses global challenges like food security and climate resilience, fostering sustainable farming practices and efficient resource use.

Background

Agriculture has always been the backbone of human civilization, evolving from traditional practices to modern mechanized farming. With growing global challenges such as climate change, food security, and resource scarcity, technology has become essential in optimizing agricultural efficiency. The integration of IoT, AI, and blockchain has revolutionized farming by enabling real-time monitoring, precision agriculture, and data-driven decision-making. These advancements help farmers enhance productivity, reduce resource wastage, and ensure sustainable practices, paving the way for a smarter and more resilient agricultural ecosystem.

Methods

IoT-powered smart agriculture systems revolutionize farming by enabling **real-time monitoring** of environmental conditions, soil health, and crop growth. These systems include **microclimate-specific farming** for precise resource allocation, **dynamic plant bio-response monitoring** for adaptive interventions, and **blockchain integration** for transparent supply chains. Additionally, **autonomous crop breeding** automates the development of climate-resilient crops, **and decentralized farming platforms** empower small-scale farmers with shared infrastructure and real-time data. These innovations enhance productivity, ensure sustainable farming, and address global challenges like food security and climate resilience.

Results
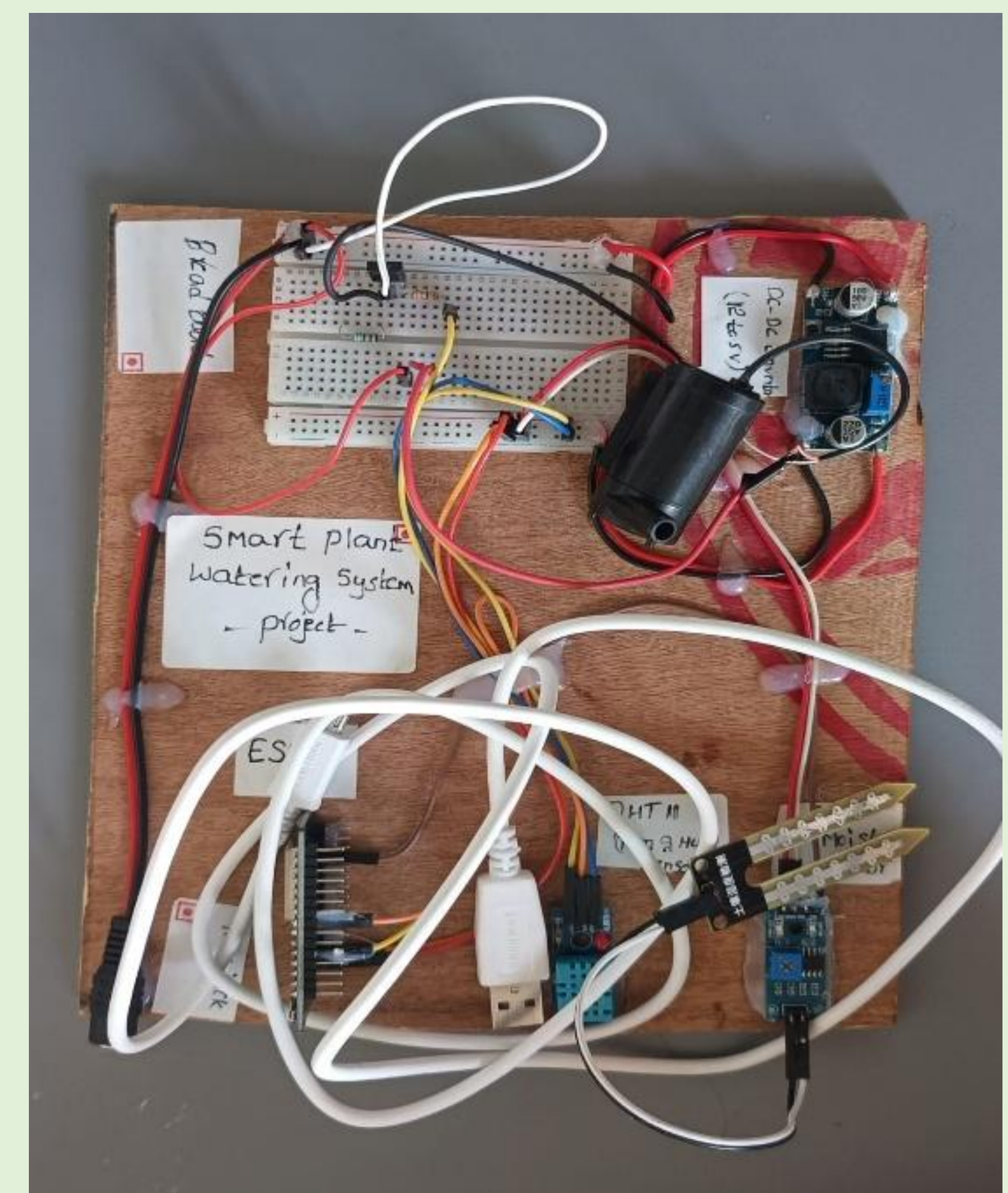
Conclusion

IoT-powered agriculture enhances productivity, sustainability, and transparency by integrating real-time monitoring, blockchain security, and AI-driven innovations. It optimizes resource use, empowers farmers, and addresses global challenges like food security and climate resilience, ensuring a smarter and more efficient farming future.

Future Perspectives

The future of IoT-powered agriculture lies in AI-driven automation, predictive analytics, and enhanced supply chain transparency. Advanced sensors and blockchain will optimize resource use, improve yields, and ensure food safety. Decentralized platforms will empower small-scale farmers, fostering sustainable and climate-resilient farming.

Impact on Society

IoT-powered agriculture enhances food security, sustainability, and economic growth by optimizing resource use and improving productivity. It empowers farmers with data-driven insights, ensures transparent supply chains, and fosters a more resilient global food system.

To know more

GitHub link: https://github.com/VishnuP347/Capstone-project
Video link: