Proposal for graduation project (2024-2025)

Project Title: Smart Greenhouse

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Abstract:

The agricultural sector in Egypt faces significant challenges, including water scarcity, extreme weather conditions, and the need for increased food production to support a growing population. We think the solution to this problem lies in smart greenhouses which, according to recent studies made by Blue Weave Consulting - a leading strategic consulting and market research firm: "The smart greenhouse market size in Middle East & Africa will grow at a CAGR of 8.4% during the forecast period between 2023 and 2029". The proposed project is a smart greenhouse made with the intention of making full use of Egypt's' rich soil and having in mind its specific climatic and agricultural needs. The proposed smart greenhouse integrates advanced technologies such as the Internet of Things (IoT), automated climate control, and renewable energy sources. The proposed smart greenhouse will optimize resource use, enhance crop yields, and ensure sustainable agricultural practices. The sensors in the greenhouse will enable it to monitor and regulate temperature, humidity, soil moisture, and light levels in real-time. The sensors will be connected to a central control system that will allow us not only to store data but also use this date with machine learning algorithms to make precise adjustments, ensuring optimal growing conditions for all the crops grown. Additionally, the system will incorporate solar panels and rainwater harvesting to reduce reliance on external energy and water sources, promoting environmental sustainability. This project will contribute to food security in Egypt but and serve as a model for modernizing agriculture in arid regions.

Project detail:

1. Study of Smart Greenhouse Technologies.
2. Greenhouse Structure and Components.
3. Irrigation and Nutrient Delivery Systems.
4. IoT Integration and Remote Monitoring.
5. Energy Efficiency and Sustainability.
6. Implementation and Simulation.
7. Environmental and Economic Benefits.