Multi-agent autonomous agriculture for precision farming

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Introduction:

Precision farming, enabled by advancements in technology, holds the key to optimizing agricultural practices for increased efficiency and sustainability. This project aims to implement a Multi-Agent Autonomous Agriculture system, leveraging a combination of drones and ground-based agents to enhance various aspects of precision farming

Code Structure: The code is well-organized and follows a modular structure, with classes defined for crops, weeds, and drones. It utilizes the **Pygame** library for graphics and user input handling.

Simulation Elements: The code simulates the growth of crops and weeds over time. The growth of crops is based on a growth rate, and they mature when their scale reaches a certain threshold. Weeds grow over time and are removed when they exceed a specified scale. The simulation includes a drone for tasks like watering and monitoring crops, a tractor for harvesting crops, and the ability to remove weeds.

Graphics: Custom shapes are used to represent crops, drones, and tractors, enhancing the visual appeal of the simulation. Crop shapes resemble trees, drones are represented as cars, and tractors are depicted with a distinct tractor shape.

User Interaction: Users can interact with the simulation using keyboard inputs:

Up and Down arrow keys adjust the time of day, influencing the background colour.

'W' assigns a watering task to the drone.

'M' assigns a monitoring task to the drone.

'H' assigns a harvesting task to the tractor.

Simulation Logic: The time of day progresses cyclically, affecting the background colour and temperature. **c**rop growth is influenced by the temperature. Weeds are removed by the tractor when they exceed a specified scale. Drones follow a predefined path, performing tasks such as watering and monitoring crops.

User Interface (UI):UI text displays the current time of day and temperature, providing essential information to the user.

conclusion: This project provides a foundation for a crop simulation with interactive elements and visual representation. With further enhancements and refinements, it has the potential to evolve into a more comprehensive and engaging simulation.