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# Project Specification & Proof of Concept: AI-Powered Gardening Hub

Overview

My project explores how generative artificial intelligence could help people grow food more efficiently by acting as an integrated hub for garden management. The hub would analyze environmental factors like weather, soil density, nutrient levels, water pH, sunlight, and air quality. It would provide personalized guidance for planting, watering, fertilizing, and garden layout. The hub concept means different devices—sensors, solar panels, smart shade systems, or cameras—could “talk” to one another and automatically share data with the AI to optimize the garden.

Users will input basic garden information, such as location, crop types, and soil characteristics. They could also connect smart devices or sensors to the hub, allowing the system to automatically collect data. The user’s role is to receive guidance from the AI hub, view visual layouts, and act on recommendations.

Interaction occurs through a central software interface on a web or mobile device. Users can navigate menus, press buttons, or view visual outputs. The system could also deliver alerts or instructions through voice notifications or app messages. Users may check real-time updates from sensors or review AI-generated recommendations for next steps.

The system is designed as a web and mobile-based hub that connects to external devices like sensors, smart shade systems, and solar panels. This approach keeps it accessible while allowing automation and device integration similar to smart home systems like Amazon Alexa and Echo.

Summary

Date 09/22/2025

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| Semester's Main Areas of Focus | • Researching AI models for environmental analysis and generative guidance.<br>• Designing an intuitive hub interface with menus, dashboards, and visual outputs.<br>• Creating sample outputs, such as AI-generated instructions, alerts, or mock-up garden layouts.<br>• Exploring how autonomous integration with devices could optimize the garden while maintaining user control.<br>• Considering accessibility, inclusivity, and ethical design issues, such as bias or over-reliance on AI. |
| Proof of Concept | • Wireframes illustrate the hub interface with input sections, dashboards, and device integration panels.<br>• Flow diagrams showing how sensors and smart systems communicate with the AI hub.<br>• Sample AI outputs, such as text instructions or garden layout visualizations.<br>• This proof of concept will demonstrate the hub's functionality and potential user experience without requiring a fully working system. |

Concepts (AI vs Sketch) - The GFN below was generated using Gemini 2.5 Flash.