



Project ID: 11

Category of Project: Application

PROJECT TITLE: HYDROPONICS BASED PRECISION FARMING WITH FEATURE OPTIMIZATION

1. OBJECTIVES:

1. To integrate adjustable Violet lights to provide partial or full light exposure based on plant requirements.
2. To reduce water consumption as compared to traditional farming.
3. To introduce flexibility to monitor and control the system globally.
4. To eliminate the usage of pesticides through a controlled environment.
5. To reduce hardware costs of the hydroponic setup.

2. DESCRIPTION:

-Introduction:

With the global population expected to reach 9.8 billion by 2050, agriculture must double its output, prompting a need for automation to optimize production. Hydroponics, a soilless cultivation method, offers efficiency and sustainability benefits, especially in addressing land scarcity and climate variability. By delivering nutrients directly to plants in water, hydroponic systems enable precise control over growing conditions. Automating hydroponics through technology enhances its potential by monitoring and adjusting key parameters in real time, reducing labor needs, and improving crop yields. This approach promotes sustainable farming practices and ensures food security for a growing population while conserving natural resources.

-Methodology:

1. Hydroponic automation: LED violet lights, air & water pumps, fan controlled by sensors & actuators with UPS module for uninterrupted power.
2. Consistent light, aeration, hydration ensured through precise environmental control.
3. Scheduled activation of violet light & air pump enhances growth conditions.
4. Easily configure Wi-Fi credentials with softAP technology for seamless network integration.
5. User-friendly control panel for remote monitoring & adjustment, ensuring real-time data sync.
6. Convenient scheduling, automatic reaction to changes, email alerts for timely intervention. Enhances user convenience & system efficiency.

-Application:

1. Hydroponics allows year-round fresh produce cultivation in small spaces for home gardeners.
2. Hydroponics in commercial agriculture enhances efficiency, yielding higher crop production with less water and space.
3. Urban farming benefits from NFT hydroponics, utilizing rooftops and indoor spaces for sustainable produce cultivation.



3. RESULT:

The indoor hydroponics project demonstrated successful automation of plant cultivation, achieving optimal growth conditions through precise control of environmental factors. With streamlined management, real-time monitoring, and remote accessibility, the system maximized efficiency and yield while fostering sustainable farming practices.

4. PHOTOGRAPH:



Photograph of project model



Photograph of project along with students

5. WORKING PROJECT Google Drive LINK:

https://drive.google.com/file/d/1WCP7O37hioYwiQFA_4CmCJKehcjvG9OP/view?usp=drivesdk

Names of the Students

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Name of the Project Guide

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