

Project Proposal: Innovative Hydroponics Automation System

- Varad Chaskar

I hope this proposal finds you well. I am glad to present our Hydroponics Automation Project, which I believe is truly innovative and has several unique features that set it apart from existing hydroponics automation systems. In this document, I will try to elaborate on the key aspects that make our project stand out.

1. Energy Efficiency, DC power:

Our hydroponics system operates entirely on DC power, including UV lights, air pumps, water pumps, and fans. This unique feature significantly reduces power consumption, making our system highly energy-efficient. This is a crucial factor in today's world with a growing focus on sustainability and reducing energy consumption.

2. Low Voltage Requirement, 10W only:

Unlike many other hydroponics automation systems that require higher voltage inputs, our project operates on a low voltage of only 5V 2A. This low voltage requirement not only enhances safety but also reduces the cost and complexity of power supply components.

3. Mobile Power Bank Compatibility:

The 5V 2A power requirement allows us to easily use mobile power banks as a backup power source. This feature creates an **uninterrupted power supply (UPS)** system, ensuring that our hydroponics system can continue functioning even during power outages. A 10,000 mAh power bank can provide approximately 5 hours of backup, enhancing the system's reliability.

4. Internet-Controlled UV Light Intensity:

Our system allows for remote control of UV light intensity through the internet. This feature provides flexibility in optimizing light conditions for plant growth and allows for real-time adjustments based on plant requirements.

5. Peristaltic Water Pump:

To address common issues with submersible or non-submersible water pumps, we have opted for a peristaltic water pump. This choice minimizes the risk of pump-related faults, ensuring a more reliable and consistent water supply to the hydroponic system.

6. Soil Moisture to TDS Conversion:

We aim to innovate by attempting to convert a standard soil moisture sensor into a Total Dissolved Solids (TDS) sensor. This cost-effective approach enhances the system's functionality by monitoring nutrient levels in the water more efficiently.

7. Real-Time Clock (RTC) Integration:

To ensure the system's reliability in the absence of an internet connection, we are integrating a Real-Time Clock (RTC). This feature allows for precise scheduling and control, even in offline scenarios.

8. Firebase Gateway to Google Cloud:

Our project leverages Firebase as a gateway to the Google Cloud platform. This connection offers numerous advantages, including scalability, robust data collection, and analytics capabilities, as well as secure and separate cloud databases for different users or projects.

9. M2M (Machine-to-Machine) Concept:

We will implement the M2M concept to strategically place sensors and actuator controllers throughout the hydroponic system. This ensures optimal data collection and automation control, enhancing overall efficiency.

10. Custom User Interface (UI):

We are creating a separate local website with a custom UI designed using Figma. This UI will provide an intuitive and user-friendly platform for monitoring and controlling the hydroponics system.

11. Global Monitoring via Hosting:

We will secure hosting for our website, allowing users to monitor and control the hydroponic system from anywhere in the world. This global accessibility enhances the system's usability and convenience.

12. Flexible Wi-Fi Credential Management:

Our project includes a feature that allows for the external change of Wi-Fi credentials multiple times. This ensures adaptability to changing network configurations and simplifies setup and maintenance.

13. Scalability with Two-Stack System:

Our project aims to scale up hydroponic farming by implementing a two-stack system, optimizing space, and increasing plant capacity.

14. Diverse Crop Selection:

We'll try to showcase hydroponics' versatility by growing rice and tomatoes, sharing images of their progress. Additionally, we'll cultivate strawberries, mint, coriander, and more, highlighting the system's adaptability and crop diversity.

In conclusion, our Hydroponics Automation Project offers a unique blend of energy efficiency, low voltage operation, remote control, reliability enhancements, innovative sensor capabilities, cloud integration, user-friendly interfaces, and global accessibility. We believe that these distinctive features make our project a truly innovative and valuable contribution to the field of hydroponics automation.

looking forward to your feedback and guidance.

Sincerely,
Varad Chaskar

Water Pollution in India

Scaring Figures of How Much Water is Polluted in India

- 70% of India's surface water is polluted and unfit for human consumption. (Source: World Resources Institute, 2023)
- Only 30% of India's sewage is treated, and the rest is discharged directly into rivers and lakes. (Source: Central Pollution Control Board, 2023)
- India is the world's largest polluter of groundwater, with over 60% of its groundwater aquifers contaminated with arsenic, fluoride, or other pollutants. (Source: WaterAid, 2023)

How Much Waste Companies Dump in the River in India

- Over 250 million liters of industrial waste is discharged into Indian rivers every day. (Source: Central Pollution Control Board, 2023)
- The most common industrial pollutants discharged into Indian rivers are heavy metals, such as lead, mercury, and chromium, as well as organic pollutants, such as pesticides and herbicides. (Source: Central Pollution Control Board, 2023)
- Some of the most polluted rivers in India include the Ganges, Yamuna, and Gomti. (Source: Central Pollution Control Board, 2023)

How Much Fertile Land We Have Lost Due to Water Pollution in India

- Water pollution is a major cause of soil salinization and waterlogging in India, which has led to the loss of over 7 million hectares of fertile land. (Source: Ministry of Agriculture & Farmers Welfare, 2023)
- Water pollution also contaminates food crops, which can lead to health problems for consumers. (Source: World Health Organization, 2023)

Latest News Articles

- September 2023: NGT Slaps ₹35 Cr Penalty on J&K Admin For Doodh Ganga Pollution

The National Green Tribunal (NGT) has imposed a fine of ₹35 crore on the Jammu and Kashmir administration for failing to prevent the pollution of the Doodh Ganga river. The NGT found that the administration had failed to take adequate steps to control the discharge of untreated sewage and industrial waste into the river.

- August 2023: Large-scale Fish Deaths in Dal Lake Raise Alarm Among Residents

Large-scale fish deaths have been reported in Dal Lake, one of the most popular tourist destinations in Kashmir. Residents have raised concerns about the pollution of the lake, which they say is caused by the discharge of untreated sewage and waste from hotels and restaurants.

- July 2023: Bengaluru Lakes: Once a Cesspool, Veerasandra Lake is Now a Pristine Waterbody

Veerasandra lake in Bengaluru, which was once a cesspool of sewage and garbage, has been transformed into a pristine waterbody thanks to the efforts of local residents and environmental groups. The lake is now home to a variety of fish and bird species, and is a popular spot for recreation.

Conclusion

Water pollution is a major problem in India, with over 70% of the country's surface water being unfit for human consumption. The main sources of water pollution in India are untreated sewage, industrial waste, and agricultural runoff. Water pollution has a devastating impact on human health, the environment, and the economy.

The Indian government has taken a number of steps to address water pollution, including the National River Conservation Plan and the National Water Quality Management Strategy. However, more needs to be done to reduce the discharge of pollutants into water bodies and to improve the treatment of sewage and industrial waste.