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Automated System for Precision Fisheries & Vegetation Monitoring With Real Time Analysis.

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Abstract: **-- Hydroponics is the system of hardware and software designed to control and monitor hydroponic gardens. The goal of such a system is to create a precisely controlled automated hydroponic garden. The benefit of such a garden would be autonomous food production, self-sustainability, and conserve water as a resource. The system consists of custom electronics and software. The hardware consists of the Hydroponics modules. The Hydroponics modules are used for wireless plant and environmental sensing.**

Keywords—Hydroponics, Ph,Sensor,aquaponics

I. INTRODUCTION

Hydroponics monitoring system was started with the idea of creating an autonomous hydroponic garden. The purpose of such a garden would be for the autonomous and ultra-efficient production of healthy food produce. Modern human beings have busy schedules, may lack the expertise for agriculture, or be in a location that makes it difficult. Hydroponics monitoring system aims to be a complete open source autonomous hydroponics garden using real time operations for timely yields and conserve resources. Developing nations could possibly make use of such a system to maximize food production and save huge on fresh water, a scare resource in some nations.

Additionally, the basic components of the system are designed from parts easily Source able at hardware stores aside from the electronics. The need for such a system is a driving force behind the making of this system. The current situation on ground and changing geographical conditions is an important factor behind the motivation of this system. Another motivation is, presenting a fully functional and efficient system which would help in saving one's time and resources at an affordable cost. It will also help in spreading the awareness of how this technology can play an important part in helping conserve water and yet derive yields of unimaginable magnitudes.

SYSTEM DEVELOPMENT

The system shown in Figure 2.1 consists of various sensors

Outputs of these sensors are shown on the wireless display.

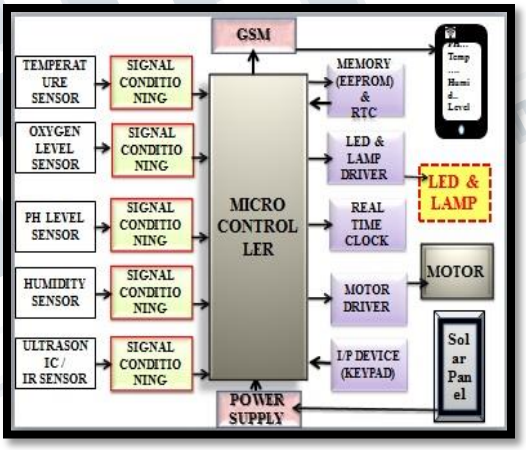

Fig 2.1 Block Diagram

A] Temperature Sensor

The temperature sensor is used for sensing the room temperature. This sensor is used for minimizing the Cold Junction Compensation. The sensor output temperature (in digital form) and this temperature is given to the microcontroller.

B] pH level sensor

pH level sensor is used for measuring the pH level of the solution.

C] Microcontroller

The microcontroller is used to do all the logical operations needed and acts as a communication medium between input and output components.

D] Power Supply

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Battery charging facility which makes the device portable and enables recharging whenever required.

E] RTC

To provide more accurate date and time as compared to the on chip RTC.

F] EEPROM

It is used to store the readings along with the date and time

of recording. It can store the data for a couple of months.

G] KEYPAD

They work as a user interface. They will solve the purpose of navigating through the menu.

III. WORKING

Working of system is as follows:

- First, the temperature and moisture sensor provide the mV readings corresponding to the temperature and moisture in the system.
- These readings area given as an input to the ADC. The ADC generates the count which is sent to the microcontroller.
- Further, the temperature values are displayed on the LCD.
- If the temperature is above threshold value, then cooling fan which is connected to the microcontroller will start rotating. It will stop when temperature drops below threshold.
- Array of blue and red LEDs are used along with white fluorescent light source to provide photosynthesis required for plants growth.
- These LEDs are controlled by microcontroller.
- The RTC provides with the date and time update to ensure proper ordered set of readings.
- The GSM module is used to send the readings on a distant wireless display.

IV.HARDWARE SPECIFICATIONS

A] INPUTS AND OUTPUTS

- Inputs – ADC, RTC, temperature sensor, oxygen sensor, humidity sensor, ultrasonic sensor, keypad
- Output – Voltage in mV, LED, LCD.

B] PROGRAMMING

- Conversion of ADC output to corresponding counts.
- Coding related to different communication protocols.

C] COMMUNICATION

- I2C
- UART
- GSM

D] DEVELOPMENT TOOLS:

- AvrStudio for PIC programming
- PROTEUS for Schematic

E] POWER SUPPLY

- 12V power supply

F] PRODUCT SPECIFICATION

- pH value: 5.5-6.
- Temperature :24-30 `C
- Relative Humidity: 50-70%
- Dissolved Oxygen: 7 mg/L

Pic 5.1 System Implementation of System

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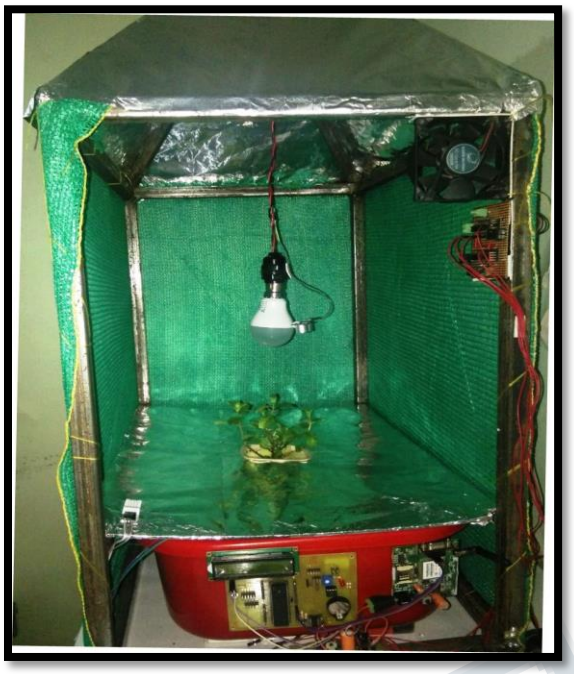
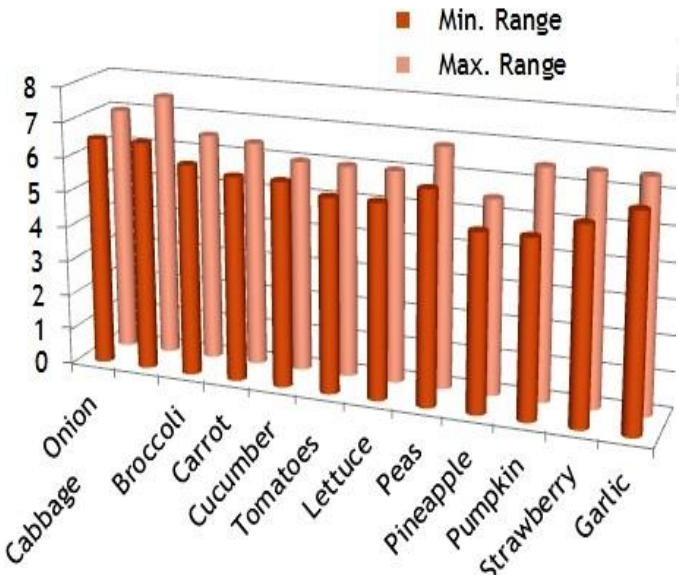


Pic 5.2 LAB Prototype

V. PERFORMANCE EVALUATION



Graph 6.1 pH values of different crops.

VI. OBSERVATIONS

Effect of artificial light on vegetation:

- CFL White - As shown growth is good but due to high intensity of white light, temperature rises and burns can be observed.
- Blue LED - Growth comparatively is good enough but root development is weak and elongation is less. It has Good mass
- Red-Blue LED (Violet) - Although root development is good, growth of the plant is not as good as other one in blue light.
- Red LED - Growth is good but excess elongation also leads to weak structure and leaf bleaching, yet it has a good root structure.

VII. CONCLUSION

Thus Real time data of any plant with its essential environmental conditions can be monitored, saved and controlled for greater yield of plants in agriculture.

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REFERRENCES

1) Dr.Melissa Brechner," Controlled Environment", Cornell University.
http://ieeexplore.ieee.org/document/7298353
2) M.F. Saaid, A. Sanuddin, Megat Ali, "Automated pH controller system"
3) IST, Chapter 1—Introduction International Sensor Technology.
4) "Trade of Motor Mechanic" Module 5; Unit 2 Electronic Fuel injection; Phase 2 by FÁS Learning Innovation Unit with Martin McMahon & CDX Global; Curriculum Revision 2.2 16-01-07.
http://www.cornellcea.com/resourcesPublications/growersHandbooks/index.html
5) George F. Fine, Leon M. Cavanagh, Ayo Afonja and Russell Binions "Metal Oxide Semi-Conductor Gas Sensors in

https://www.ijareeie.com/upload/2015/august/16_Design.pdf
Environmental Monitoring", 2010.
6) Datasheets
Atmega16, Ds1307, Dht22, Lm35.
[1] http://www.atmel.com/images/doc2466.pdf