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Monitor and Control of Green House Effect using multiple sensors using IOT

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Abstract : For many years, automation has advanced significantly worldwide. Agriculture is one field where automation is used extensively. Farmers in rural areas will benefit from greenhouse technology, which replaces human direct supervision with automatic monitoring and control of the greenhouse environment. The generic architecture that can be used for many other automation applications is the paper's main focus. Crop growth is essential given technological advancements. A greenhouse is a climate-controlled building with walls, roofing, and other design features for off-season plant growth. One of the most recent developments in information and communication technology is the internet of things, which enables worldwide connectivity and information management for users and sensor devices. In order to ensure that the crops have the best possible circumstances for growth and yield, temperature/humidity sensors, moisture sensors, and light sensors are used effectively inside the greenhouse to activate cooling fans, LED lights, and motors, respectively.

Keywords: IoT, Greenhouse, Arduino, PH Sensor, Automated Control, Real Time Monitoring, Climate Control, Water Management.

1.Introduction :

India still practises traditional agriculture and is behind the world in incorporating new technologies. Roughly 55% of Indians work in agriculture and related industries, yet these industries only account for 15% of the country's GDP. As a result, it is vital for all parties concerned to abandon traditional agricultural methods and modernise agriculture with the use of technology. While a significant number of people continue to labour in the agricultural sector, the economic value that agriculture contributes to India's GDP is continuously diminishing along with the country's overall economic growth. As a result, there is an urgent need to upgrade the system so that it can enhance productivity and create nutritious organic food.[1]

The requirement for human intervention can be avoided by automating the greenhouse climate and making its parameters accessible for remote monitoring through open source cloud platforms, giving the crop autonomy over its life. A green house is an artificial structure that protects the plants inside from harsh environmental conditions like strong winds, pests, toxic gases, etc.[4] Consequently, it is clear that the greenhouse system contributes to increased farming productivity and profitability. The novel architecture that is being shown here can carry out the monitoring and control function from a distance via IoT.

2.Literature Survey:

Somnath D. Bhagwat, Akash I.Hulloli, Suraj B.Patil, Abulkalam.A.Khan, and Mr. A.S.Kamble published their article titled "SMART GREENHOUSE USING IOT AND CLOUD COMPUTING" in the International Research Journal of Engineering and Technology's Volume 5, Issue 3 in March 2018. They explain the smart greenhouse farm combining IOT and cloud computing in this paper. Because they can be used to grow plants under controlled climatic conditions, greenhouses continuously play a significant role in the agriculture and gardening industries. The farm is managed using a number of sensors, such as temperature, soil moisture, and sunlight. . These sensors are often used in conjunction with an analogue to digital converter, a microcontroller, and actuators. When the defined climatic factors have reached that stage, the sensors first notice the change. The data is read by the microcontroller at its input terminals after being converted to digital form by the ADC. The system's beating centre is a microcontroller. Utilizing cloud services, on-going alert messages are transmitted to the user. This message that is being viewed is located in "the cloud," therefore accessing it is not location-dependent. The farmers may easily keep an eye on the greenhouse farm with the use of this information. It is possible to monitor the fan, water pump, buzzer, and lights even when no manual actions are required. By trying to minimise human involvement to the fullest extent practicable, this scheme is being used to eliminate the system's challenges.

Volume 5, Issue 2, March 2017, International Journal of Innovative Research in Computer Science and Technology (IJIRCST) This article by Punam Kamble, Ashwini Kopla, Rohini Mane, Professor D.O. Shirsath, and Professor R.S. More describes a project for the automation of smart greenhouses using IOT and Arduino. They utilised a Smartphone and Internet - of - things to perform the green roof. One of them is the Global System for Mobile Communication (GSM), which is used to deliver notifications to smartphones. The major drawback of this is that users had to manually input messages, which took some time. This particular Arduino is an ATmega328 microcontroller board. It has 14 digital input and output pins, with analogue input in this caseThey used soil moisture sensors, which are atmospheric sensors, to ascertain the specific soil's moisture content. When there is little natural light, a light sensor (LDR) is employed. A humidity sensor is used to detect airborne vapours. Temperature sensor (LM35): control the fan to reduce the temperature when it is too high. The Arduino Uno IDE is used to programme software implementation and software components. C and C++ are supported.

3 . Methodology :

3.1 Existing Methodology :

Earlier this year, I was able to get my hands on a copy of the book, and I was really pleased with the quality. The user can monitor sensor data and manually operate the devices. This process takes a long time, and the system's effectiveness was lower than the suggested system's.

3.2 Proposed Methodology :

The proposed scheme uses sensors to measure temperature, humidity, water content, and illumination. The sensors are attached to the Arduino's input ports, and the Arduino's outcome is delivered to motor drives and repeaters to regulate the flow of the climate patterns. In accordance with the threshold values established for temperature, moisture, humidity, and light, the Arduino manages the driver circuit to regulate the air flow and temperature. Due to the cloud's Wi-Fi connectivity, the data collected from the sensors can be sent there and stored there. The proposed flow chart is depicted in fig 3.1

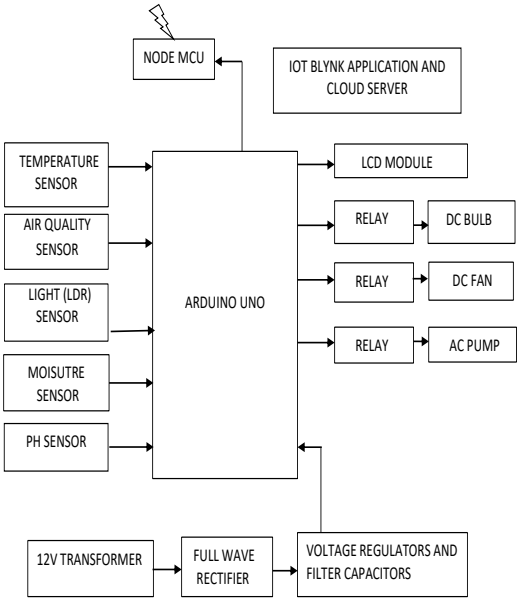

Fig 3.1 Proposed Methodology

4.Hardware Requirements :

- Arduino UNO
- LCD Module
- Node MCU
- Temperature Sensor
- Light Sensor
- Soil Moisture Sensor
- pH Sensor
- 12V Transformer
- Voltage Regulators
- Filter Capacitors
- 12V Relay
- DC Bulb
- DC Fan
- AC Pump

5.Software Implementation :

Once the Arduino software from Arduino.cc has been downloaded, set up, and tested, click the Download link towards the top of the page. The Arduino IDE, or Integrated Development Environment, is the name of this application. Make sure you have all the necessary equipment before navigating to the operating system page. The programming environment recommended for your DuinoKit is the one described in this paper, which is offered free of charge by Arduino.cc.

What you'll require is:

• An Arduino-compatible microcontroller (DuinoKits use Arduino NANO with ATmega328 chip);

• A computer (Windows, Mac, or Linux);

• A USB cable is needed to connect the NANO microprocessor to your computer for programming.

6.Result and Discussion :

The Smart Greenhouse can be improved in many ways and is suitable for a variety of agricultural uses. It can be used in any environment and under any set of conditions to grow any form of plant. The autonomous greenhouse equipment is powered by non-conventional energy sources like solar panels, wind turbines, and Peltier effect for cooling. [1] It is possible to farm without using soil to further increase the nutritional content. IoT integration in farming can significantly increase its productivity and profitability. The agricultural sector has a bright future for Smart Greenhouse, which will revolutionise how India practises agriculture.

7.Conclusion and Future Scope :

The suggested IOT-based greenhouse monitoring system is an integrated system made to track and manage the environmental conditions inside a greenhouse. The conventional method of greenhouse monitoring is labor- and time-intensive. The suggested solution reduces costs, human labour, and time. It gives the plants a safe environment to grow in, preventing harm and boosting total production. Inside the greenhouse, we can regulate and keep an eye on the soil moisture, humidity, and temperature. Any type of crop can be grown because this form of greenhouse can maintain any climate condition.

A GSM-based notification or SMS alert system can be added to this system in order to expand it further. The user will additionally receive an SMS notification if any control devices are turned on or off when using this.

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