Envirotrack: Revolutionizing Monitoring

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Abstract :—
This proposed system is an advanced solution for monitoring and live reporting the temperature and humidity at different points and if temperature will be high it will start the cooling system for maintaining the temperature. It will also protect crops by covering the polyhouse with tarpaulin during excessive rain and it will be useful in some parts of India and different parts of the world where farmers have to suffer due to excessive rain. Soil sensor used here will give real time data of minerals present in the soil.
The main characteristics of this proposed system is low cost, low power consumption because of self-powered device, high accuracy and user friendly.

Keywords— **Arduino UNO, DHT22, Rain Sensor, Soil sensor, LCD display Proposed System Architecture**

INTRODUCTION

Envirotrack integrates IoT with Arduino technology, transforming the way we monitor temperature and humidity and rain in various environments. This system provides real-time data, enabling users to make informed decisions based on accurate environmental conditions. With the rise of IoT, solutions like Envirotrack are crucial for enhancing efficiency in diverse applications (like polyhouses) . Experience the future of climate monitoring with this innovative approach that combines technology and practicality.

EASE OF USE

Envirotrack provides real-time updates on temperature and humidity levels, allowing users to respond swiftly to changes. This feature is particularly critical in environments sensitive to climate, such as polyhouses or greenhouses. Real-time monitoring fosters a proactive approach, preventing potential issues before they escalate. Stay ahead of the curve with immediate insights into your environmental conditions. Envirotrack boasts a user-friendly interface that simplifies the monitoring, process making it accessible for all users. Clear displays and intuitive controls mean anyone can leverage the system without extensive training. Prioritize efficiency and ease-of-use for effective temperature, humidity and excessive rain management. Experience seamless control with Envirotrack's intuitive design from agriculture to manufacturing, Envirotrack suits a wide range of industries needing climate monitoring. Agricultural sectors can optimize crop growth by ensuring optimal conditions, enhancing yield and quality.

In manufacturing, maintaining specific environmental conditions are vital for product quality and safety. Discover the potential applications of Envirotrack across various sectors. Envirotrack contributes to energy efficiency by enabling precise climate control, reducing waste and costs. Optimize HVAC systems by monitoring real-time data, ensuring they operate only when necessary. Focus on sustainability and cost savings with smart monitoring solutions in various environments. Embrace energy efficiency with the intelligent monitoring capabilities of Envirotrack The modular design of Envirotrack allows for scaling up as needs grow, accommodating additional sensors and devices easily.

This ensures that users can expand their monitoring capabilities without overhauling existing systems. Scalability supports long-term planning and investment in monitoring technology. Adapt to changing needs with the scalable features of Envirotrack . Envirotrack presents a cost-effective solution for climate monitoring, minimizing overhead while maximizing benefits. Investing in this system can lead to long-term savings through improved efficiency and reduced waste. Flexibility in deployment options keeps the initial costs manageable for users. Smart investment for smart monitoring, that's Envirotrack.

MATERIALS REQUIRED

Arduino UNO, DHT22, Soil Sensor, Rain detector, LCD display, Breadboard, DC motors, and Water pump etc.

Arduino UNO :-

Arduino is a new open-source hardware and software system. It has to take attention of a large technology design and community at affordable cost, which increases its use with advanced technology. Arduino hardware is a motherboard for making interaction between objects and suitable computer programming IDE (Integrated Development Environment)

DHT22:-

DHT22 output calibrated digital signal. It utilizes exclusive digital-signal-collecting-technique and humidity sensing technology, assuring its reliability and stability ability. Its sensing elements is connected with 8-bit single-chip computer. Every sensor of this model is temperature compensated and calibrated in accurate calibration chamber and the calibration-coefficient is saved in type of programe in OTP memory, when the sensor is detecting, it will cite coefficient from memory.
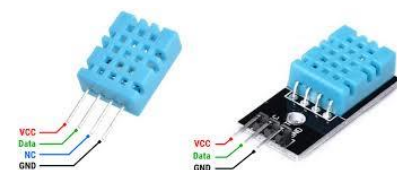

Lcd Display:-

The LCD (Liquid Crystal Display) is a type of display that uses the liquid crystals for its operation. Here, we will accept the serial input from the computer and upload the sketch to the Arduino. The characters will be displayed on the LCD.
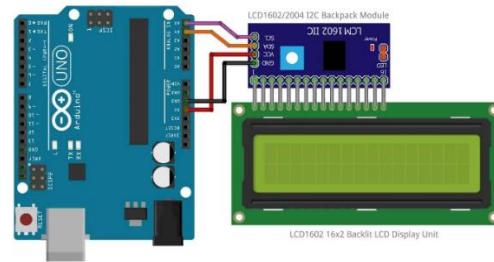

Relays:-

Relays allow low-power microcontrollers to handle circuits that uses much higher power than what the board can handle directly. They are typically used in industrial applications to control high power circuits, but it is also used in cars, homes and other electric applications.
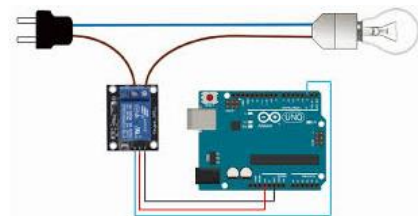

DC Motor:-

A DC motor is an electrical motor that uses direct current (DC) to produce mechanical force. The most common types rely on magnetic forces produced by currents in the coils. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor.
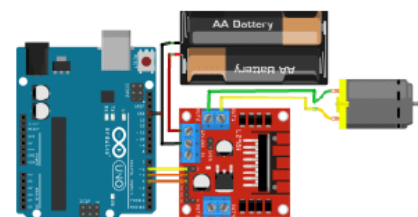
Soil Moisture Sensor Module:-

A soil moisture sensor is used to measure the moisture content in soil and send it as output, so that the required steps can be taken after that accordingly. It is used widely in today's world and serves its purpose pretty well. A soil moisture sensor module has 2 probes, a cable connecting them to the board, a comparator, an output LED, a power LED, potentiometer and 4 pins.
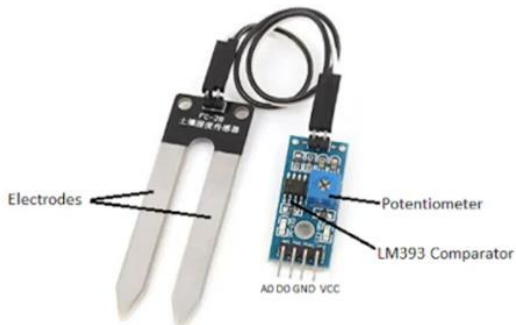
Rain Drop Sensor Module:-

It is made up of exposed copper particles on both sides. It acts as a variable resistor. This resistance value varies according to the amount of water falling on it. That resistance value is inversely proportional to the amount of water. Good conductivity occurs when more water flows over the sensor surface. Then there is less resistance. Also, when a small amount of water flows over this surface, it has poor conductivity, thereby increasing the resistance. Because of this concept, we can get an output voltage through this.

Raindrop sensor is a board on which nickel is coated in the form of lines. It works on the principle of resistance. The rain Sensor module allows measuring moisture via analog output pins and it provides a digital output when a threshold of moisture exceeds. A rain drop sensor has 4 pins, a sensing pad and connectors. The pins are as follows: -
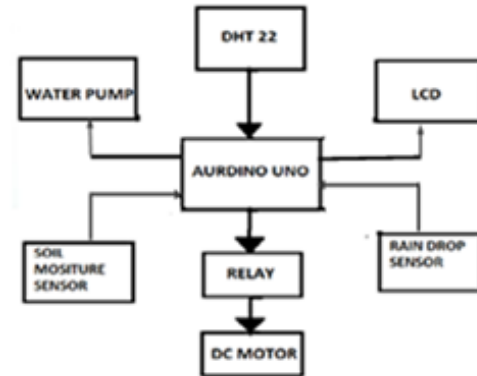
VCC: Connects supply voltage- 5V

GND: Connected to ground

D0: Digital pin to get digital output

A0: Analog pin to get analog output
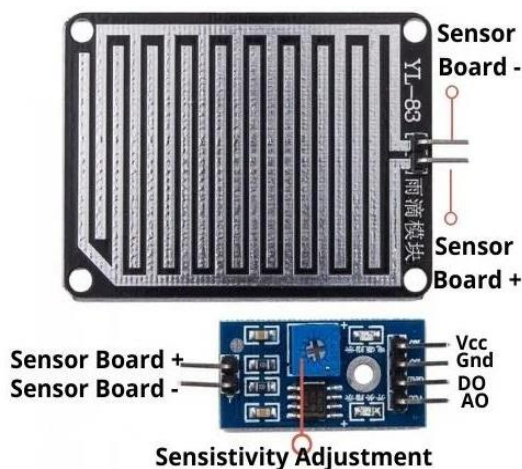
BLOCK DIAGRAM

USES

- High-tech Agriculture

- Protected agriculture

- Tissue Culture nurseries

- Intensive Care Units

- Food Processing Industry

- Warehousing

- Weather Monitoring

- Predicting Calamities

- Agroforestry

- Forestry

- Biotechnology and Microbiology

WORKING MODEL

This is our project, Envirotrack. helps with environmental monitoring and supports various applications. In this project, we use a DHT22 sensor to measure humidity and temperature. If the temperature exceeds 36°C, a fan and water pump are activated to cool the environment. Once the temperature drops below 36°C, the system automatically turns off, protecting plants from heat damage. We also have a rain detector sensor that activates when it detects rainfall. It sends a signal to the motor driver, causing the polyhouse to be covered with polythene. This protects the plants from excessive rain, preventing damage.

Additionally, we use a soil moisture sensor to monitor the current moisture levels in the soil. This helps determine when watering is needed. These features collectively enable protective tissue culture in the polyhouse. The system can also be applied in various other settings, such as food processing units, warehouses, and more.

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FLOW CHART