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Atmospheric Water Generation Sustainable Water Harvesting Technique

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ABSTRACT

In the world, several countries are facing the problem of finding water resources for irrigation, etc., especially in arid areas. The lack of rainfall is causing water insufficiency around the world. If we consider a coastal area, we can find the sea or ocean, but there is the problem of drinking water, and such regions have high moisture air. The project involved the development of a device that could produce water by compressing moisture in the water with the help of a mini thermoelectric device. The device mainly consists of a condensing block for condensing the moisture air and inlet fans for sucking air into the system's external supply to drive the system and be used for smart irrigation. The smart irrigation system has a wide scope to automate the complete irrigation system. The ESP8266 Wi-Fi module is used to send the information to the concerned smartphone. The information contains the soil condition (wet or dry) and climate conditions (temperature and humidity). The main processing unit will be constructed using an Arduino Uno board, and with the help of an LCD interfaced with this processor, said information can be displayed, and the same information will be transmitted through the Wi-Fi module. very little quantity of water, but for real-time applications, plenty of big-size TED devices can be used to deliver sufficient water. This system is handy in drought-prone areas like deserts.

Keywords: Thermoelectric Device, Heat Sink

1. INTRODUCTION

The search for a consistent supply of water for irrigation and other necessities is still a pressing problem in dry areas of the world. There is a serious lack of water in these places due to the scarcity of rainfall, which affects agricultural output and the livelihoods of many families. But there is light at the end of the tunnel thanks to cutting-edge technology that can capture the surplus moisture in the air—especially near the coast—and turn it into a necessary resource. This revolutionary approach entails creating a brand-new apparatus that, with the help of tiny thermoelectric devices, can compress humid air and draw water out of the atmosphere.

The fundamental elements of this innovative system consist of an effective condensing unit that extracts moisture from the air and inlet fans that pull in outside air. This cutting-edge technology runs on an external source, which makes it possible for everything to function properly. This innovative creation integrates a sophisticated irrigation system in addition to meeting the pressing need for drinking water. Utilizing state-of-the-art technologies, such the ESP8266 Wi-Fi module, the gadget sends important data to customers' smartphones. Real-time information on temperature, humidity, and soil conditions is included in this data, all of which are critical for the best possible agricultural techniques. An Arduino Uno board, which functions as the primary processing unit, lies at the heart of this intelligent irrigation system. Affixed to a liquid crystal panel, it offers a user-friendly interface for accessing and interpreting the data that has been delivered. For those suffering from a lack of water, particularly in arid environments like deserts, this ground-breaking method holds out hope as it has the potential to completely transform how people obtain and utilize their water supplies. This gadget provides a sustainable answer to one of the most important problems facing the world today—ensuring that everyone has access to clean water in the face of shifting climatic trends and increasing water scarcity—by combining science and technology.

2. PROPOSED SYSTEM

This creative method uses tiny thermoelectric devices to capture moisture from the air, addressing the problem of water scarcity in coastal and dry areas. Via a condensing block, it effectively transforms ambient moisture into pure water. It also incorporates smart irrigation features made possible by an ESP8266 Wi-Fi module. With the help of this module, users may make educated decisions for sustainable agriculture by receiving real-time data on temperature, humidity, and soil conditions on their mobiles. The Arduino Uno board powers the device, which has an LCD display for easy-to-use interactivity. It is a major step forward in solving the shortage of water and giving underprivileged areas support for agriculture and other necessities.

The main component of this project is an Arduino UNO board, which is accompanied by sensors such a soil moisture sensor and the DHT11 temperature and humidity sensor as shown in Fig 2.1. The Arduino UNO board is linked to an ESP8266 Wi-Fi module. Heat Sink, which is essential for drawing air out of dampness, is the main apparatus.

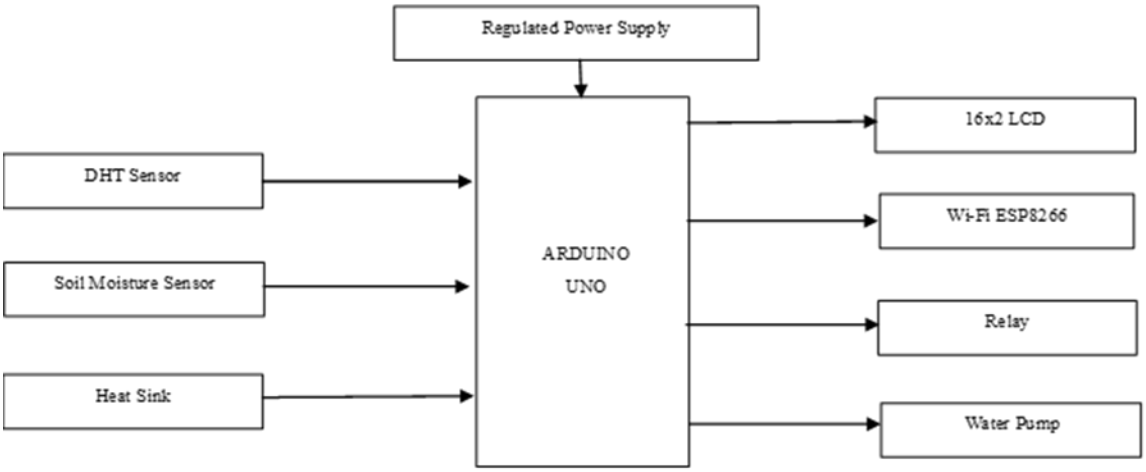

Fig. 2.1. Block Diagram of the Proposed System

The gadget uses inlet fans to pull humid air from coastal areas and directs it into a condensing block that has a small thermoelectric cooling component. Moisture condenses into water droplets as the air cools, and these droplets are gathered and stored. Soil and climate conditions are tracked by sensors and are powered externally for continuous operation. An Arduino Uno processes the data and displays it on an LCD screen. A smartphone and an ESP8266 Wi-Fi module may communicate, sending real-time data for remote monitoring. Based on these statistics, irrigation decisions are made, and water is provided from reserves that have been stored. A smartphone app allows users to remotely control and monitor the system, providing a sustainable solution for water scarcity, especially in dry and drought-prone locations.

Output 1: The amount of temperature and humidity present in the atmosphere

Based upon the circuit we have developed, the DHT11 sensor detects the surrounding environment and determines the readings of temperature and humidity in the 16x2 LCD as shown in fig 2.2. The humidity percentage should be more than 80% so that water can be extracted through heat sink.

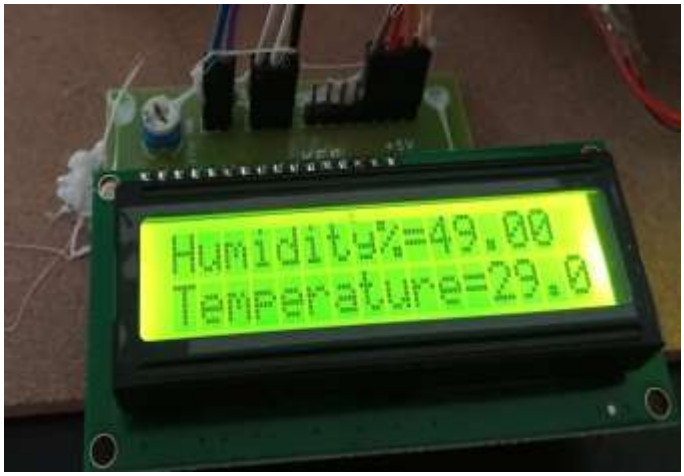

Fig. 2.2 Readings of Temperature and Humidity

Output 2- The amount of wet present in the atmosphere

Based upon the circuit we have developed, the soil moisture sensor determines the amount of wet percentage that is present as shown in fig 2.3 and it should be in positive range to extract water from the air through heat sink.

Fig. 2.3 Reading of Wet percentage

3. CONCLUSION

An important milestone is reaching the end of the software development phase, which involves writing sophisticated algorithms and thorough testing. Features for data visualization and logging let users monitor more effectively.

Simultaneously, real progress has been made with the successful development of a hardware prototype for water extraction. These accomplishments provide a strong basis for a comprehensive system with cutting-edge software features and effective water extraction capabilities.

4. REFERENCES

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