Automatic Greenhouse Roofing System by Using IoT

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Abstract- *Presently a days, throughout the mid year seasons the developed harvests gets influenced because of the overwhelming daylight force and temperature. The principle topic of this task is that to keep the yields from the overwhelming daylight, temperature and spare harvests . The Temperature sensor is utilized for the working of programmed roof top and Humidity sensor is utilized to keep up and make great condition control on nursery by utilizing ventilation fan and water sprayer in 180o and afterward ultrasonic sensor is utilized to consequently control the entryway framework.*

Keywords- Temperature sensor, Humidity sensor, Ultrasonic sensor and Automatic roof.

I. INTRODUCTION

The framework depends on Arduino microcontroller, programmed work, Ultrasonic sensor, Temperature sensor and Humidity sensor. This framework utilizes battery-powered force putting away sources as 12V battery that is energized from AC current. At that point AC current is put away in 12V DC battery. During summer season, part of harvests are high influenced by substantial daylight, temperature and warmth. Primary goal of our venture is to keep crops from high daylight force, temperature and warmth during summer season and make positive condition are keep up consequently.

Temperature sensor is utilized to gauge daylight power, warmth and temperature esteem from external site of nursery. When to arrived at high warmth and temperature esteem, this framework is consequently shut rooftop in nursery for lessening effect of high daylight force. Dampness sensor is utilized to gauge temperature estimation of within nursery during high daylight force season like April and May and ventilation fan and water sprayer is utilized to evacuate heat and to keep up ideal condition in nursery.

Ultrasonic sensor is put front of the nursery rooftop. It is utilized to distinguish any specialist or human will enter the nursery and consequently open and close the entryway framework. Fundamental point of our task is make full and full programmed nursery framework for decreasing human work adequacy, working time and any wastage of vitality or force.

II. OBJECTIVE

The fundamental goal is to build up the cost effective computerized framework, which requires less upkeep work. The nursery i.e., Automatically identify temperature and moistness condition in nursery and consequently control rooftop framework, ventilation fan, water sprayer and afterward entryway framework.

- To keep harvests and plants from the high daylight force, warmth and temperature.
- To make ideal condition for plants development.
- To control daylight force, warmth and temperature Inside the nursery.
- Full and full computerization frame work keep up in nursery**.**

III. SYSTEM ARCHITURE

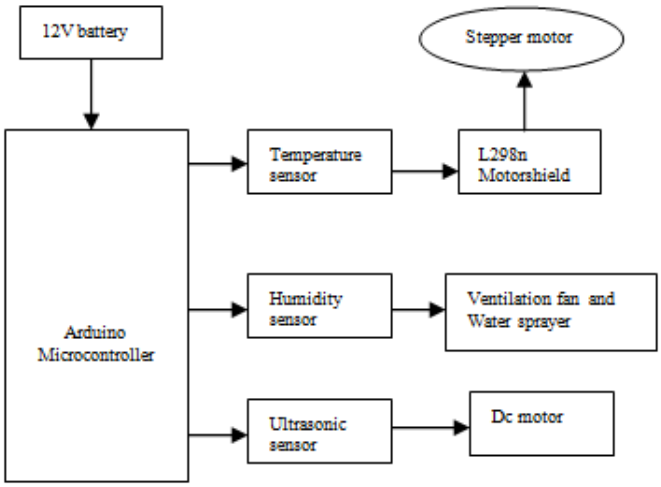

Fig. 1 System block diagram

IV. HARDWARE AND SOFTWARE USED

Hardware used:

1. Arduino UNO
2. Temperature sensor
3. Humidity sensor
4. Ultrasonic sensor
5. L298N motor drive
6. Stepper motor

7. DC motor
8. 12V DC battery

Software used:

1. Arduino IDE

HARDWARE DESCRIPTION

1. Arduino UNO:

The Arduino UNO is an open-source microcontroller board dependent on the MicrochipATmega328P microcontroller and created by Arduino. The board is furnished with sets of advanced and simple info/yield (I/O) sticks that might be interfaced to different development sheets (shields) and different circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) by means of a kind B USB link. It very well may be controlled by the USB link or by an outer 9-voltbattery, however it acknowledges voltages somewhere in the range of 7 and 20 volts. It is additionally like the Arduino Nano and Leonardo.

Fig 2: Arduino UNO board

Properties of Arduino-UNO

- Microcontroller: Microchip AT mega328P.
- Operating Voltage: 5Volts.
- Input Voltage: 7 to 20Volts.
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6

2. Temperature sensor:

The DS18B20 Stainless Steel Temperature Sensor is a pre-wired and waterproofed form of the DS18B20 sensor. Its interesting 1-wire interface makes it simple to speak with gadgets. It can changes over temperature to a 12-piece advanced word in 750ms(max). Also, it can measures temperatures from - 55°C to +125°C (- 67F to +257F). Likewise, this thermo test doesn't require any outside force supply since it draws power from information line. Its hardened steel test head makes it reasonable for any wet or brutal condition. The working standard of DS18B20 Stainless Steel Temperature Sensor and DS18B20 Temperature Sensor is same however the main distinction is that the temperature sensor is put inside the treated steel test.

Fig 3: Temperature sensor

3. Humidity sensor:

A mugginess sensor detects, measures and routinely reports the relative stickiness noticeable all around. It estimates both dampness and air temperature.

Relative stickiness, communicated as a percent, is the proportion of real dampness noticeable all around to the most noteworthy measure of dampness air at that temperature can hold. The hotter the air is, the more dampness it can hold, so relative moistness changes with vacillations in temperature. Moistness sensors recognize the overall dampness of the prompt situations wherein they are set. They measure both the dampness and temperature noticeable all around and express relative stickiness as a level of the proportion of dampness noticeable all around to the most extreme sum that can be held noticeable all around at the present temperature.

Fig 4: Humidity sensor

4. Ultrasonic sensor:

The ultrasonic sensor comprises of a multi vibrator, which fixed at its base. The multi vibrator is mix of a resonator and vibrator. The ultrasonic waves created by the vibration are conveys to the resonator. Ultrasonic sensor really comprises of two sections: the producer which delivers a 40 kHz sound wave and indicator which recognizes 40 kHz sound wave and imparts electrical sign back to the microcontroller. In our venture, we are utilizing HC-SR04 ultrasonic sensors which comprise of 4 pins VCC, Trigger, Echo and GND.

Fig 5: Ultrasonic sensor

5. L298N Motor drive:

The L298N H-connect module can be utilized with engines that have a voltage of somewhere in the range of 5 and 35v dc. With the module utilized right now, is likewise a locally available 5V controller, so if your stock voltage is up to 12V you can likewise source 5V from the board.

Fig 6: L298N Motor shield

6. Stepper motor:

A stepper engine, otherwise called step engine or venturing engine, is a brushless DC electric engine that partitions a full pivot into various equivalent advances. The engine's position would then be able to be directed to move and hold at one of these means with no position sensor for input (an open-circle controller), as long as the engine is painstakingly estimated to the application in regard to torque and speed. Exchanged hesitance engines are extremely enormous venturing engines with a diminished shaft check, and for the most part are shut circle commutated. Brushed DC engines turn constantly when DC voltage is applied to their terminals

Fig 7: Stepper Motor

7. DC motor:

A DC engine is any of a class of rotational electrical machines that changes over direct flow electrical vitality into mechanical vitality. The most widely recognized sorts depend on the powers created by attractive fields. Almost a wide range of DC engines have some interior system, either electromechanical or electronic, to intermittently alter the course of current stream in part of the engine.

Fig 8: DC Gear Motor

8. Ventilation fan:

An Exhaust fan is any fan inside, or connected to, a structure or nursery base utilized for dynamic cooling. Fans are utilized to bring cooler air into the case all things considered, remove warm air from inside and move air over a warmth sink to cool a specific segment. Both hub and in some cases divergent (blower/squirrel-confine) fans are utilized in PCs. PC fans regularly come in standard sizes, and are fueled and controlled utilizing 3-pin or 4-pin fan connectors.

Fig 9: Ventilation fan

9. 12V DC battery:

A 12 V Battery is utilized to store the charge or store the force from AC current. These force supply is utilized to control the entire framework unit, for example, Arduino microcontroller, DC engine, stepper engine, ventilation fan and all sensors and so forth.

SOFTWARE DISCRIPTION

1. Arduino IDE:

The Arduino integrated development environment (IDE) is a cross-platform application (for Windows, Mac OS,

Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2.The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub *main()* into an executable cyclic executive program with the GNU tool chain, also include with the IDE distribution.

The Arduino IDE employs the program *avrdude*to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

Fig 10: Arduino IDE program

V. ALGORITHM

i. Start

ii. Check roof is open or closed condition.

iii. Measure temperature range.

iv. T<28^{o}C to maintain roof is open condition.

v. T>28^{o}C to closed roof until reducing temperature range.

vi. Measure humidity range in greenhouse.

vii. H= 30 – 50 % , this condition don't run any components.

viii. H>50 % , this condition to run ventilation fan and water sprayer.

ix. Then again to check step vi.

x. Detect any source cross in ultrasonic waves flow.

xi. Cross any source open the door automatically, then close the door.

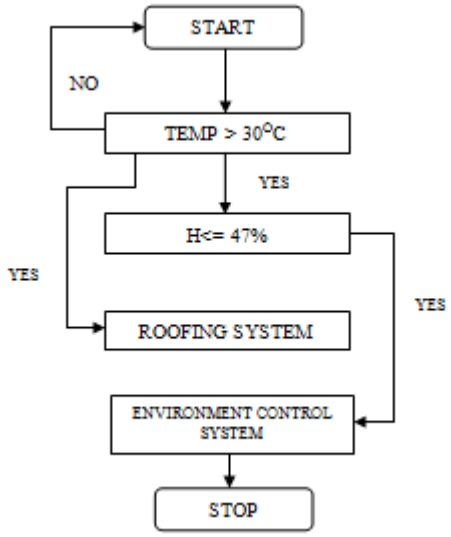

Fig 11: Flowchart of operation

VI. RESULT AND DISCUSSION

As give 5V or 12V capacity to Arduino and Stepper engine and afterward stepper belt and key is associated with stepper engine in upper side of nursery. The polyethene film rooftop is associated with stepper belt for minute and afterward ventilation fan and submerged siphon with pipe line, water sprayer is associated with lower side of nursery rooftop. At the point when 5V capacity to give ventilation fan and Submersible siphon continually. So when a temperature range to arrive at more than 28^{o}C to naturally close the rooftop for lessening heat impact on plants at that point diminishing temperature go is under 28^{o}C to open the rooftop. Simultaneously to gauge stickiness go in inside the nursery and expanding air temperature run is naturally run ventilation fan and splashed water for diminishing impact of warmth. It is

a procedure are persistently work with assistance of intensity source.

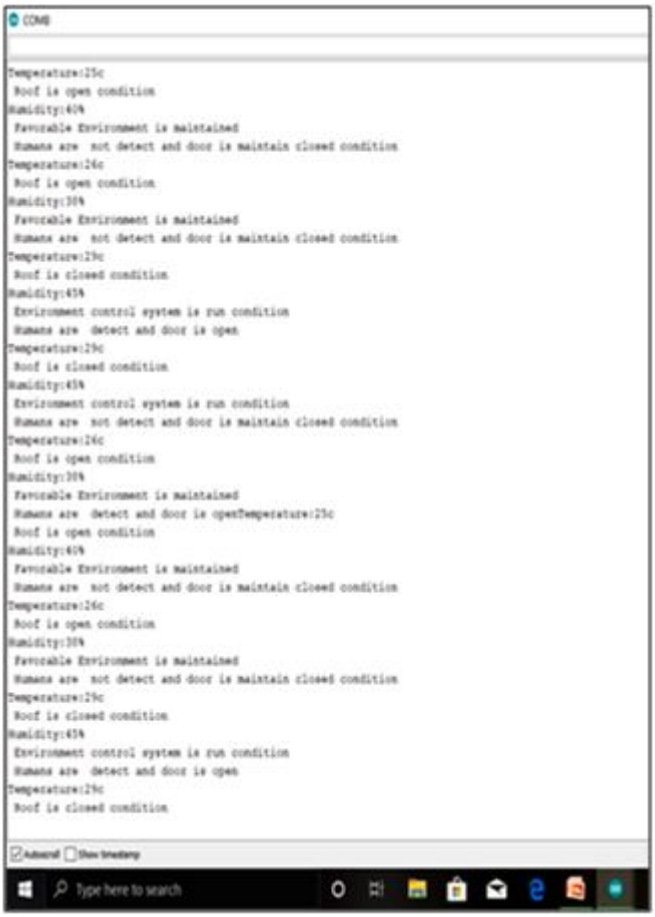

Fig 12: Program output in Arduino IDE

VII. CONCLUSION

This undertaking built up the Automatic rooftop and natural condition control framework with assistance of electronic segments. This undertakings are chiefly used to decreasing effect of temperature and to shielding plants from the sicknesses, tourist and a few times it is structure are utilized to against of irritation and creepy crawlies assault. This model is working of consequently, so any human not interface to control or kept up the conditions inside the nursery. This undertaking acquire two sorts of development framework, for example, first is open development framework another is ensured development framework. This techniques is accustomed to expanding crop development rate and horticulture profitability. It isn't make any contamination, low force utilization, low practical and eco-accommodating. This strategy is for the most part appropriate to cultivation and floor planting framework.

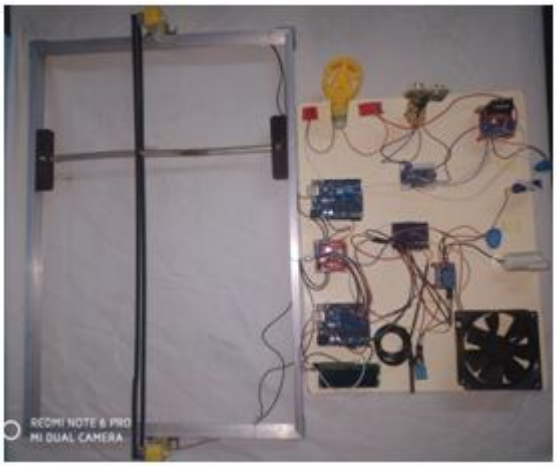

Fig 13: Automatic Roofing system kit

VIII. ACKNOWLEDGEMENT

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