A MOBILE GREENHOUSE ENVIRONMENT MONITORING SYSTEM ON THE INTERNET OF THINGS

Vijaya Uttamrao Sasemahal [1], **Dr. U. B. Shinde**[2], **Prof A. T. Jadhav**[3]

[1,2,3] *Department of Electronics and Telecommunication CSMSS's CHH. Shahu College of Engineering, Aurangabad, India.*

Abstract*: The system proposed in this paper is an advanced result for covering the downfall conditions at a particular place and make the information visible anywhere in the world. The technology behind this is Internet of Goods (IoT), which is an advanced and effective result for connecting the goods to the internet and to connect the entire world of goods in a network. Also goods might be whatever like electronic contraptions, sensors and automotive electronic outfit. The system deals with monitoring and controlling the environmental conditions like temperature, relative humidity and CO position with sensors and shoot the information to the web runner and also compass the sensor data as graphical statistics. The data streamlined from the enforced system can be accessible in the internet from anywhere in the world.

Keywords: Arduino, Internet of Effects (IoT) Bedded Computing System; Arduino Software, ESP8266, lux detector, dht 11, air detector.

I. INTRODUCTION

IOT and Arduino grounded Greenhouse Environment Monitoring and controlling design use four detectors to descry the Temperature, Light, Moisture and in the Greenhouse. Temperature Detector is used to descry the temperature inside the hothouse. Reading from the detector is transferred to the microcontroller. The microcontroller is connected to different relays. One of the relays is connected to a blower. However, the microcontroller would shoot signals to turn ON the Addict, If the temperature is above or below the threshold value.

Light Detector is used to descry the quantum of sun inside the hothouse. Reading from the detector is transferred to the microcontroller. However, the microcontroller would shoot signals to turn ON the relay which would, in real- time, If the Sun is above the threshold value. For rally purposes, we've connected a DC motor to replicate a Shade. Also, the Moisture detector is used to descry the moisture value and the Soil humidity detector (two examinations dug in the soil) is used to descry the soil moisture. However, the microcontroller would turn on the cracker to drop the moisture and will open the water outlet to increase the humidity in the soil, if the moisture value detected by the detector is above the threshold value OR if the soil humidity reduces. For rally purposes, we've connected a DC motor in place of cracker and water outlet. At the same time, data regarding these parameters are transferred to the IOT module (ESP8266). The data transferred to the IOT is transferred at regular intervals irrespective of any threshold mismatch plant. ESP8266 is a chip used for connecting micro-controllers to the Wi-Fi network and make TCP/ IP connections and shoot data. Data, which is tasted by these detectors, is also transferred to the IOT.

There-requisite for this design is that the Wi-Fi module should be connected to a Wi-Fi zone or a hotspot.

This design is also enforced without the IOT module.

II. LITERATURE SURVEY

The temperature foretelling model espoused the discrimination time series model to break the influence of seasonal periodicity in the temperature vaticination process. The data analysis showed that the system effectively realized the feather- light and mobility of the data accession outstation. The relative error of temperature monitoring was lower than4.96, and the relative error of temperature vaticination was lower than 3 (5). The methodology proposed in the paper applies artificial intelligence (AI) ways to the modeling and control of some climate variables within a hothouse. The nonlinear physical sensations governing the dynamics of temperature and moisture in similar systems are, in fact, delicate to model and control using traditional ways. The paper proposes a frame for the development of soft computing-rested regulators in ultramodern glasshouses (6).

In recent times, a wireless detector network (WSN) fashion was vastly applied in the field of husbandry, which detects, senses, and collects information of colorful surroundings or objects in the network area, and at the same time sends and receives data through wireless and tone-organizingmulti- hop routing links. Due to the complexity of the agrarian terrain and colorful factors like walls, downfall condition, structure, accouterments, and the layout of installation husbandry that all affect the WSN communication quality, wireless detector networks acclimatize diversely to the agrarian terrain. Therefore, how to achieve voguish networking to different agrarian terrain conditions, minimize the cost and energy consumption, and ameliorate the performance of the network transmission turn out to be the vital issue in the studying of agrarian wireless detector networks (7).

The work is executed for remote monitoring and control of hothouse parameters with the help of detectors and GSM communication. It overcomes the disadvantages of wired and wireless constraints similar to complicated wiring, delicate conservation, and distance, to cover and control the operations. The operation will have bedded system which consists of an ARM7 microcontroller, a real- time operating system, detectors, a GSM modem, and control bias to cover the environmental parameters condition videlicet temperature, moisture, CO 2 attention, and light intensity in hothouse (8).

By this, environmental parameters in hothouse can be covered and controlled manually as well as ever. The attack and software modules of the operating system are mooted in detail. This bedded operation is executed and tested for its correct functionality. The experimental results show that the developed monitoring system has the following features, similar as simple structure, high responsibility, good extensibility, and flexible configuration (9).

I. BLOCK DIAGRAM

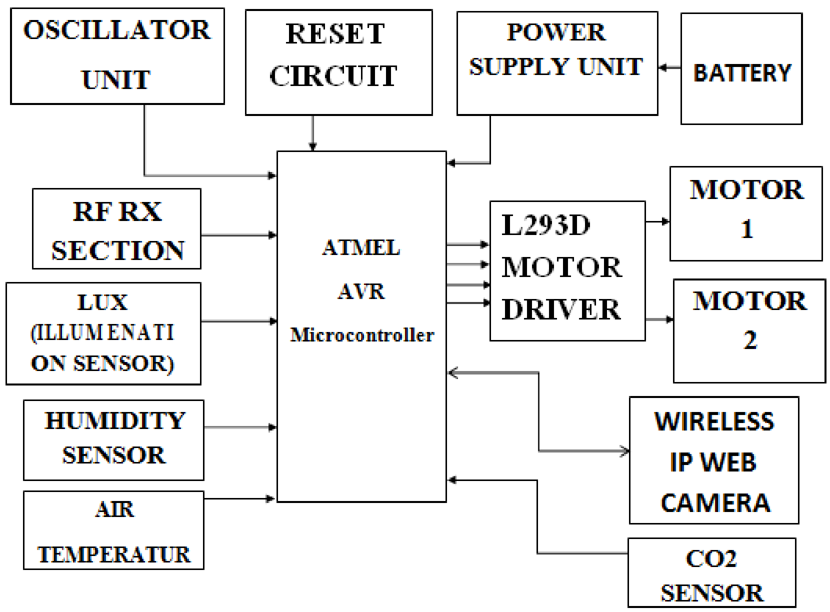

Fig 1: Block Diagram

II. PROPOSED SYSTEM

To always sustain a suitable climate inside the hothouse and to retain applicable humidity content in the air we have designed an automatic temperature control and humidity system by covering the parameters temperature and humidity content using the temperature & moisture detectors (DHT11) and humidity detectors (YL69). To overcome the downsides in the being system, the proffered system uses detectors to cover the temperature, moisture, humidity, and light, the detectors are connected to the input legs of the Wi-Fi, and the affair from the pall is given to the motors and the relays to regulate the flux of the climatic condition. The Whole Area inside the hothouse is divided into multiple sections and one humidity detector is placed in each section. The Affair of these humidity detectors is given to GPIO legs 2, 3, 4 of Jeer PI. The affair from PI is given to the motorist IC which in turn operates the motor ON or OFF.

To the GPIO pin 17 of Jeer PI, the journal affair of the DHT11 detector is connected. We've calculated a threshold value by the formula given below. Still, also the cooling addict and sliding windows which are connected to l293d IC are automatically turned ON, thereby maintaining the moisture and temperature in the unrestricted Leafage. If the temperature and moisture value exceeds the threshold value. House system. The collected temperature and moisture data's are transferred to a through Wi-Fi connectivity.

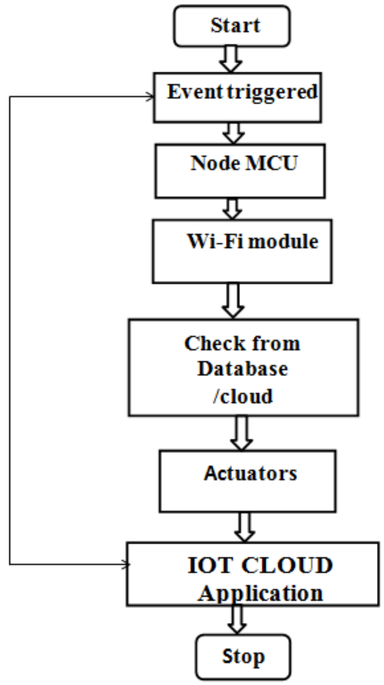

Fig.2: Flow Chart

- The IOT hothouse monitoring system employs a PC or phone base system for keeping the proprietor continuously informed.
- This is a microcontroller- grounded circuit that monitors announcement records the values of temperature, moisture, soil humidity, and sun of the natural terrain that are continuously streamlined as a log in order to optimize them to achieve maximum factory growth and yield.
- The system constantly monitors the digitized parameters of the colorful detectors. Monitoring and controlling a hothouse terrain involve seeing the changes being inside it which can impact the rate of growth in shops.
- The important parameters are the temperature inside the hothouse which affects the photosynthetic and transpiration process, moisture, humidity content in the soil, illumination, etc.

III. IMPLEMENTATION

This project can be implemented in a mobile greenhouse monitoring system on the Internet of things it checks real time parameters like temperature, humidity and carbon dioxide, which can be of export quality. The system will take care of automatic control and various parameters of the greenhouse can be monitored like Temperature, Humidity and Soil Moisture. The Android Application will form the user interface and to record the parameter details we use an application server module. This record data can be used for analysis and help in taking decisions.

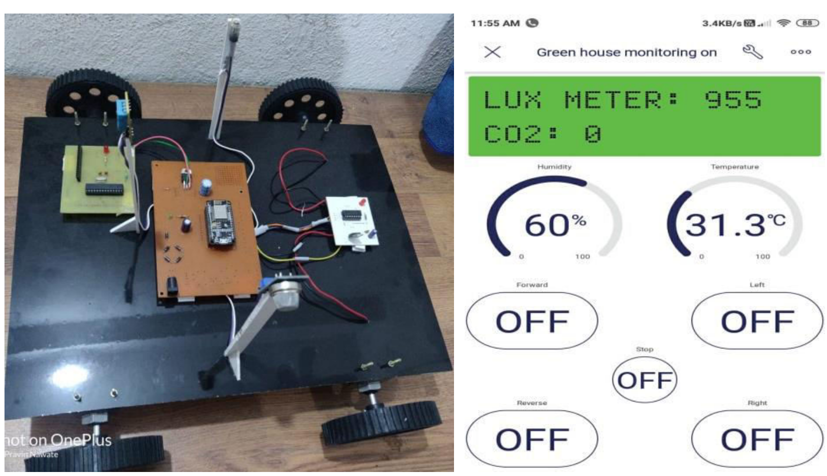

Fig.3: Project demo

IV. RESULT

After seeing the data from different detector biases, which are placed in a particular area of interest. The tasted data will be automatically transferred to the web garçon when a proper connection is established with ramify device. The web garçon runner will allow us to cover and control the system. The web runner gives information about the temperature, moisture, and CO2 position variations in that particular region, where the bedded monitoring system is placed. The tasted data will be stored in blynk console(Google Spread Wastes). The data stored in pall can be used for the analysis of the parameter and nonstop monitoring purpose. The temperature and moisture situations and CO2 situations in air at regular time intervals. All the below information will be stored in the pall, so that we can give trending of temperature and moisture situations and CO situations in a particular area at any point in time.

Fig.4: lux meter and co2 sensor

It utilizes a capacitive humidity detector and a temperature to gauge the girding air, and releases a digital data on the data leg (no analog information legs needed). The main genuine debit of this detector is you can just get new information from it formerly every 2 seconds, so when exercising our library, detector readings can be over to 2 seconds old. It works on 3 to 5V power force. Good for 20-80 moisture readings with 5 delicacy and for 0-50Â °C temperature readings Â ± 2Â °C delicacy

Fig.5: Humidity and temperature reading

The first mode is wireless control and the alternate mode is for handicap avoidance. When the auto is operated in mode I, the only. System for controlling the auto is by operation from the smartphone via Wi-Fi. The abecedarian functions are forward, left, right, and rear movements as well as a stop, pick, and drop conduct grounded on the touching of arrows in the stoner interface. In mode 2, the auto keeps going forward until .an handicap appears within a defined threshold distance. After exploring the barri it will stop and wait for the command from the user.

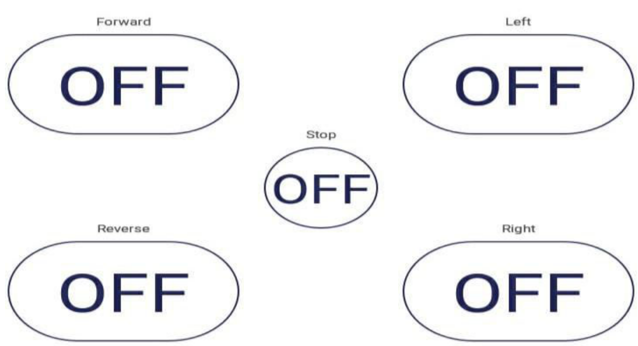

Fig.6: Motor controller

V. CONCLUSION

A mobile greenhouse monitoring system on the internet of things was designed and experimentally vindicated at a laboratory scale. The mobile greenhouse monitoring system on the internet of things prototype was equipped with a smart monitoring system suitable to control and ever cover greenhouse parameters. The greenhouse was supplied by a free source of energy, a small-scale independent PV system, which was principally used to supply the main factors of the hothouse similar as detectors, electronic boards, water pumps, LED lights, suckers, servomotors, and relays. Therefore, an artificial climate inside the hothouse was created, with applicable control of air temperature, relative moisture, and soil humidity, and CO2 attention, light intensity, by means of precise ventilation, lighting, and irrigation. Druggies could be also notified by an SMS about the state of the shops before the outbreak of the complaint. The combination of the Internet of Effects and deep literacy has shown their capability to cover the health of the factory delved in this study. Discovery and bracket of factory conditions can help growers to cover shops growth efficiently for better crops products.

REFERENCES

[1]"An IoT-based greenhouse monitoring system with Micaz motes ", International Workshop on IoT, M2M and Healthcare (IMH 2017), Mustafa Alper Akkaşa, Radosveta Sokullub

[2] "Automated Greenhouse Monitoring System", International Journal of Engineering and Innovative Technology (IJEIT) Volume 3, Issue 10, April 2014.

[3] "Design and Realization of Low Cost Control for Greenhouse Environment with Remote Control", Center for Basic and Applied Research, Faculty of Informatics and Management, University of Hradec Kralove.

[4] "Greenhouse Monitoring and Automation System Using Microcontroller", International Journal of Engineering Trends and Technology (IJETT) – Volume45 Number 5– March 2017. V. Dan, Liu, et al. "Intelligent Agriculture Greenhouse Environment Monitoring System Based on IOT Technology." Intelligent Transportation, Big Data and Smart City (ICITBS), 2015 International Conference on. IEEE, 2015.

[5] Han, Kun, et al. "Hydrological monitoring system design and implementation based on IOT." Physics Procedia 33 (2012): 449- 454.

[6] Olakunle Elijah, Igbafe Orikumhi, Tharek Abd Rahman and Chee Yen Leow, "An Overview of Internet of Things and Data Analytics in Agriculture: Benefits and Challenges," IEEE Internet of Things Journal, 2327-4662 (c), June 2018.

[7] Mrs.T.Vineela, J.NagaHarini, Ch.Kiranmai, G.Harshitha and B.AdiLakshmi, "IoT Based Agriculture Monitoring and Smart Irrigation System Using Raspberry Pi," International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 01, Jan 2018.

[8] Nikesh Gondchawar and Prof. Dr. R.S.Kawitkar, "IoT Based Smart Agriculture," International Journal of Advanced Research in Computer and Communication Engineering, Vol. 5, Issue 6, June 2016.

[9] Ranjitha K, "Smart Farm Management using Raspberry-Pi and Internet Of Things (IoT)," International Journal of Innovative Research in Computer and Communication Engineering, Vol. 6, Issue 6, June 2018.

[10] Q. Bai and C. Jin, "The Remote Monitoring System of Vegetable Greenhouse," 10th International Symposium on Computational Intelligence and Design (ISCID), Hangzhou, 2017, pp. 64-67

[11] G. Marques and R. Pitarma, "Agricultural environment monitoring system using wireless sensor networks and IoT," 2018 13th Iberian Conference on Information Systems and Technologies (CISTI), Caceres, 2018, pp. 1-6

[12] Xia Geng, Shandong Agricultural University Qinglei Zhang A Mobile Greenhouse Environment Monitoring System Based on the Internet of Things", September 2019IEEE Access PP(99):1-1 DOI:10.1109/ACCESS.2019.2941521