International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 6 June 2021, pp: 1174-1178 www.ijaem.net ISSN: 2395-5252

Iot Base Smart Polyhouse Using Renewable Energy Source

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Submitted: 01-06-2021 Revised: 14-06-2021 Accepted: 16-06-2021

ABSTRACT:-Modern agriculture uses different types of polyhousesystem. The production of healthy crops and improved quantity can be succeed through polyhouse system. The growth of plant is controlled by the environmental conditions liketemperature, humidity and moisture. Through this system we are able to protect the crops from insects, inevitable weather conditions and disease. The poly house will be reduce all the shortcomings for unhealthy seasonable crops and power consumption possible by using solar power in it. The factors that influence the growth of the crops are monitor using suitable sensors. Raspberry pi 3B+ microcontroller will control the optimum conditions inside the polyhouse system.24-hour temperature strategy The 24-hour temperature strategy continuously monitors the temperature and automatically controls the light intensity, ventilation and heating to ensure that the desired average temperature is achieved during a 24-hour cycle.

Keywords—ESP32, Internet of things (IoT),Renewable Energy Sources, PolyhouseAutomation,Sensors.

I. INTRODUCTION

Solar Energy,Polyhouse Automation, Renewable Energy Sources, Carbon Emission**.**Now a days Carbon emission of the plant is increases due to the industrialization to stop these carbon emission we use the renewable energy source. Use of non-renewable energy sources is very much dependent for it, which has given rise to global warming due to depletion of ozone layer. Hence use of renewable energy sources is very much effective method to minimize the amount of carbon emission. Now use of renewable energy sources like solar energy is very much applicable to the polyhouse automation .This paper describes the design and implementation of a solar powered automated greenhouse. The objectives are to automatically control the environment, irrigation, and fertilizer to plants in the polyhouse. Another aspect is to control the humidity of the planet and other things.Develop a modular, user-friendly and simple to operate. Battery is charged by solar cells.There are some important parameters to be monitored inside the poly house are temperature, relative humidity and soil moisture.

II. OBJECTIVE

Main aim of this project is to monitor the crops by operating the temperature, humidity, moisture. Also monitor receive andsend signals using internet of things. Temperaturesensor senses the temperature and it is obtained inform of analog signal. The moisture and humiditysensor values are also obtained. The status of entireoperation can be known with the help of internet ofthings. For this purpose we are using LDR sensor for Light measurement, DHT11 for Humidity and temperature measurement, soil sensor for measuring moisture, and PIR sensor for motion detection, and above all we are using solar energy for all our electricity needs to operate all electric devices used in our project, which in turn will also conserve energy and would prove to be cost effective in future.

III. LITERATURESURVEY

- The emerging idea of the Internet of Things (Iota), A Survey on Enabling Technologies, Protocols, and Applications is rapidly finding its path throughout our modern life, aiming to improve the percentage of application in that applicationwe

Displaythetemperature, humidity,water level. Overall, the Iota would allow for the automation of everything around us. This paper presented an overview of the premise of this concept, its

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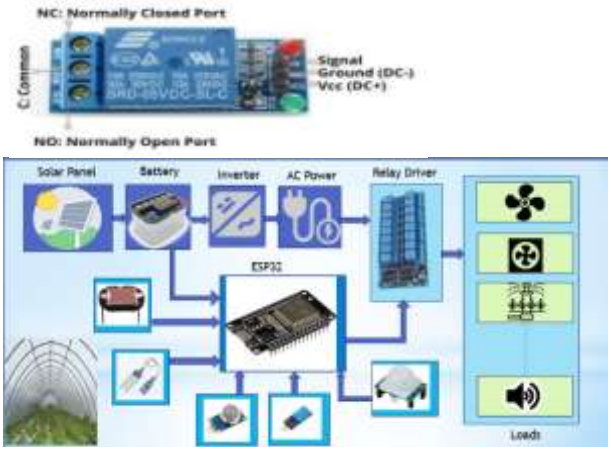
enabling technologies, protocols, applications, and the recent research addressing different aspects of the Iota... Further, some of the challenges and issues that pertain to the design and deployment of Iota implementations have been presented.

- The proposed system is very useful for elderly and physically disabled persons who are in need of a physical assistance for daily needs. It eliminates the limitation of wiring complications also the range of voice commands can be extended by using wireless routers and Iota. On the off chance the viable usefulness and the cost of home automation decrease will enable compatibility with future technologies for customized user support. It implies that creation capacity as well as innovation level ought to enhance increasingly.
- Most of the literature is focused on the clear idea about solar based playhouse automation through IEE papers study with Design and development of low cost automation in playhouse, in this paper the design and development system's which action can be controlled according to different atmospheric conditions for various types of crops in playhouse.
- Design of controlling playhouse Appliances Remotely Using Raspberry pi, in this we got the interfacing idea of sensors with Developed using raspberry pi as a web server for operating the playhouse with sensors interfacing.
- A Hybrid Green House Management by Power Intelligent Device / Wireless Networking gives the Greenhouse management with wireless devices like sensors interfacing. (Playhouse Automation System).

IV. METHODOLOGY

Block Diagram:-

Resource survey: Solar, Polyhouse, sensors and appliances. Making flow chart of the system.Designing the circuit diagram. Making changes according to availability of the parts. Simulating the circuit diagram. Testing the program. Adding devices to the system. Making changes in the system if required.Finalizing the system.



COMPONENTDESCRIPTION

1. HardwareConfiguration

A. Microcontroller description (Raspberry pi):-

The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting an updated 64-bit quad core processor running at 1.4GHz with built-in metal heat sink, dual-band 2.4GHz and 5GHz wireless LAN**,** faster (300 mobs) Ethernet, and Poe capabilityvia a separate Poe HAT..Ithas1.2Ghzquad coreARMcortexA53andRAM 1 Bit required power up to to 5V, 2.5 amp which is negligible with respect to PC.

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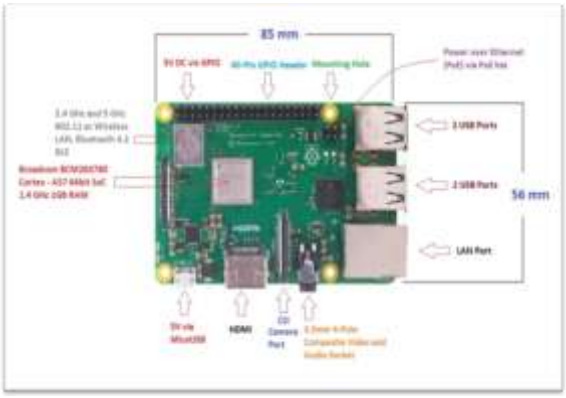

B. Ardiunoboard:-

Ardiuno is a single board microcontroller kit for building digital devices and interactive objects in the physical and digital world. It allow to program in C language. It has internal analog to digital convertor.

C.ESP-32:-

ESP32 can perform as a complete standalone system or as a slave device to a host MCU, reducing communication stack overhead on the main application processor. ESP32 can interface with other systems to provide Wi-Fi and Bluetooth functionality through its SPI / SDIO or
I2C / UART interfaces

D. Relay Module:-

5V relay signal input voltage range, 0-5V. VCC power to the system. JD-VCC relay in the power supply. JD-VCC and VCC can be a shorted.

E.Soil Moisture:-

The Soil Moisture Sensor uses capacitance to measure dielectric permittivity of the surrounding medium. In soil, dielectric permittivity is a function of the water content. The sensor creates a voltage proportional to the dielectric permittivity, and therefore the water content of the soil.

F. Dht11

The humidity sensing capacitor has two electrodes with a moisture holding substrate as a dielectric between them. Change in the capacitance value occurs with the change in humidity levels. The IC measure, process this changed resistance values and change them into digital form.

2. **Software Description**

a. RaspbianOS:-

Of all the operating systems Arch, Risc OS, Plan 9 or Raspbian available for Raspberry Pi, Raspbian comes out on top as being the most user-friendly, best-looking, has the best range of default software's and optimized for the Raspberry Pi hardware. Raspbian is a free operating system based on Debian (LINUX), which is available for free from the Raspberry Piwebsite.

b. PYTHON:-

Python is a widely used general-purpose, high-level programming language. Its syntax allows the programmers to express concepts in fewer lines of

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code when compared with other languages like C, C++or java.

c. Adafruitdht:-

Standard library functionality includes basic communication functions and support for some of the most common types of hardware like servo motors and character LCD displays. Standard Libraries are pre-installed in the "Libraries" folder of the Arduino install.

d. Spidev:-

Python Spidev. This project contains a python module for interfacing with SPI devices from user space via the spidev linux kernel driver.

V. RESULTS

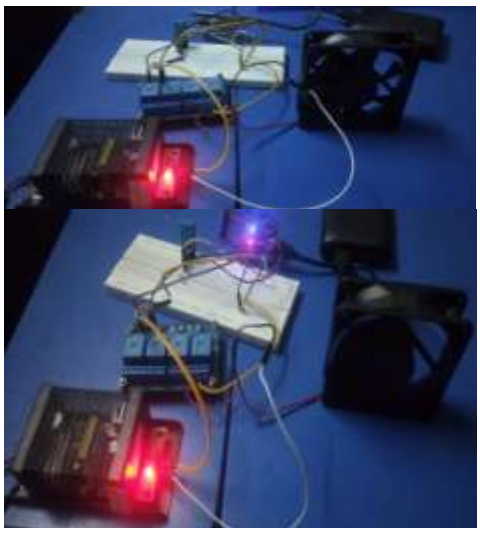

Fig Dht11 Sensor interfacing with Esp-32.

Fig .3 DHT11 sensorinterfacing withraspberry pi.

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VI. CONCLUSION

The primary applications for this project are for farmers and gardeners who do not have enough time to water their crops/plants. It also covers those farmers who are wasteful of water during irrigation. The project can be extended to greenhouses where manual supervision is far and few in between. The principle can be extended to create fully automated gardens and farmlands. Combined with the principle of rain waterharvesting, it could lead to huge water savings if applied in the right manner. In agricultural lands with severe shortage of rainfall, this model can be successfully applied to achieve great results with most types of soil. The greenhouse parametercontrol system for desired conditions is implemented. The sensor devices available are integrated with Microcontroller board is very useful. The setting needs series ofobservations and study inter dependency of various parameters, such as temperature, humidity and sun light intensity. Arduino board makes it easy to install and maintain the system. The system deployment in test green house is studied implies need of polyhouse structures study, inside, outside environment study, crop needs etc. Simply controlling given parameters is not enough. DC supply can be given in the form of a battery bank easy to charge with solar system. There are limitation in terms of seasonal measurements and crop needs. The user awareness of how to check system operation is a basic need to be fulfilled.

VII. FUTURE SCOPE

Further enhancement can be done in the proposed system by controlling different factors which affect the growth of crops such as CO2 level inside the polyhouse, pH of the soil. These factors can be monitored by using different sensors. According tothe readings of the sensors changes can be done inside the polyhouse.

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