Green House using Raspberry Pi

Saurav Baranwal[1], Rajneesh Patel[2], Pankaj Kushwaha[3], Vikash Kumar Sharma[4]

[1]UG Student, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, India

[2]Assistant Professor, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, India

[3]UG Student, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, India

[4]UG Student, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, India

ABSTRACT

This paper presents two autonomous control design for Home Agriculture project. The first thing is to control or say that protect from invaders like monkeys. In tropical country animals reside within the garden, park and nearby houses. The control systems uses different things to safeguard the crop like siren and electric fence through motion sensor instruments . The algorithm involves with not broken K which is applied as time setting for daily irrigation. The time setting autonomously changed allied with the changes of weather like dry climate, raining and climax. The control algorithm has been checked and result shows the management of soil moisture through weather feedback element is economically improved and would be possible by increase yearly crop yield .

KEYWORDS: Soil Sensor, Raspberry pi, DHT-11(Temperature and Moisture Sensor).

INTRODUCTION

Origin of life on earth explains the essential concept of green house. Before origin of any living organism on the world, the temperature of earth was around -18°C because of absence of atmosphere between earth and sun. Various gases namely nitrogen (N), CO2 (CO2), ozone (O3), CO (CO), oxygen (O2), laughing gas (N2O) etc. available inside earth came out through spaces between plates of earth and formed a porous layer around earth, called atmosphere. The newly formed atmosphere around earth had a novel property that it absorbed ultraviolet and far-infrared radiation coming from sun and allowed only radio radiation length (0.3-3 μm) radiation emitted by sun to succeed in the earth surface. Further, the atmosphere failed to allow long wavelength (> 3.0 μm) radiation emitted by earth (Cengel, 1998). Hence, increase in temperature between earth and atmosphere is due to thermal energy. the increase of temperature of air is thought as atmospheric phenomenon. per Encyclopedia 2000 (Anonymous, 2000) the atmospheric phenomenon term for the role the atmosphere plays in insulating and warming the layer. The atmosphere is essentially transparent to incoming radiation. When this radiation strikes the layer, a number of it's for environment is defined as: atmospheric phenomenon - absorbed, thereby warming the layer. The surface of the world emits a number of this energy back enter the shape of actinic ray. As this actinic ray travels through the atmosphere, much of it's absorbed by atmospheric gases like CO2, methane, laughing gas and water vapor.

HARDWARE REQUIREMENT

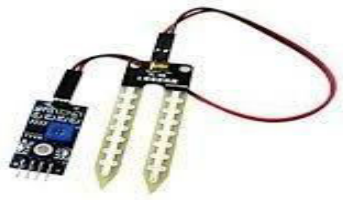
There are various numbers of Hardware are used in Green House with Raspberry Pi Temperature & Humidity sensor mainly this consists of the following different functional blocks.

1. DHT-11(TEMPERATURE AND MOISTURE SENSOR)
2. SOIL SENSOR
3. RASPBERRY PI
4. RELAY
5. 7805 IC
6. 2 LED (12 VOLT)
7. 12 VOLT CHARGER

1. DHT 11

DHT11 is one of the basic, digital temperature and humidity sensor. It has capacitive humidity sensor and a thermistor to measure the surrounding air. Its fairly simple to use. The main use of this sensor is you can only get new data from it once every 2 seconds. We have used this sensor to detect Humidity and Temperature level and display on LCD.

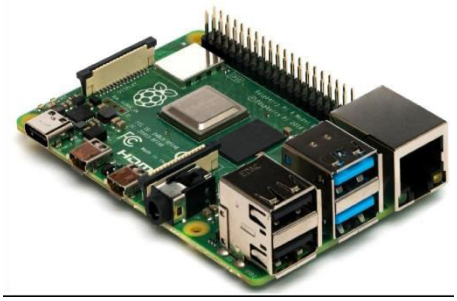
2. SOIL SENSORS



Soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighing of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content.

3. RASPBERRY PI

The Raspberry Pi could be a series of small single-board computers developed within the UK by the Raspberry Pi Foundation to push teaching of basic engineering science in schools and in developing countries. The original model became way more popular than anticipated, selling outside its target marketplace for uses like robotics. It doesn't include peripherals (such as keyboards and mice) or cases. However, some accessories are included in several official and unofficial bundles.

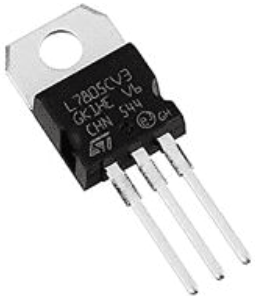


4. RELAY

A Relay is an electronically operated switch.It consists of a set of number of input terminals for a single and multiple control signals.Relay is used where it is necessary to controls a circuit by an independent low-powered signal.When input of the relay is high the coil is magnetized to switched the NO pin.

5. 7805 IC

A transformer IC maintains the output voltage at a continuing value. 7805 IC, a member of 78xx series of fixed linear voltage regulators accustomed maintain such fluctuations, could be a popular transformer computer circuit (IC). In 78xx the xx indicates the output voltage it provides.



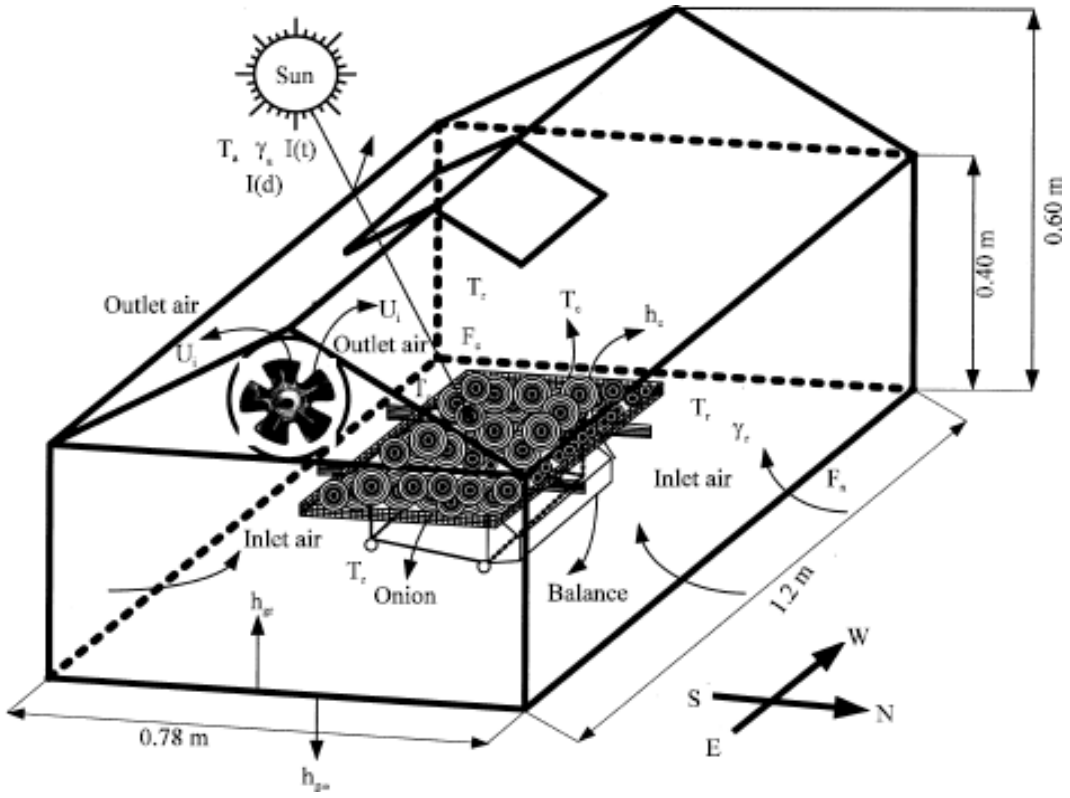
SOFTWARE REQUIREMENT

RASPBIAN

Raspbian is based on Debian for free operating system, optimized for the Raspberry Pi hardware. Raspbian comes with 35,000 packages precompiled software bundled in a nice format for easy installation on your Raspberry Pi. Raspbian is a community project under active under active development, with an emphasis on improving the stability and performance of as many Debian packages as possible.

ADVANTAGES

Greenhouse cultivation helps to create favourable environment where production of vegetables and flowers is made possible through out the year or part of the year as per the requirement. Greenhouse not only creates suitable environment for the plants but also encourages proper growth and bear fruit as compared to open field cultivation. In horticultural sector Greenhouse has tremendous scope , especially for production of hybrid seeds, high value vegetables, ornamental plants, medicinal plants, cut flowers and fruits, which fetch more prices in domestic likewise as international markets Energy flow processes in greenhouse system Open sun drying (OSD) is that the foremost primitive crop drying, under which the radiation falls directly on the crop surface and it's absorbed.

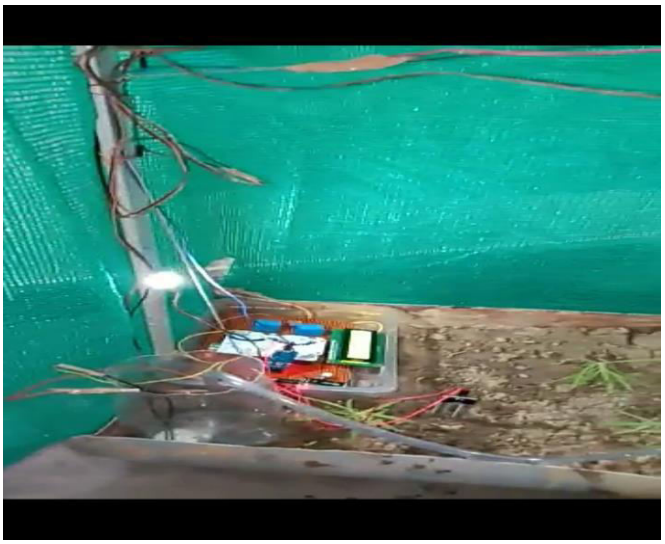


Schematic view of greenhouse dryer

During this process, the quantity of solar power received at the crop surface is lost at various stages through reflection, radiation, convection and conduction. Also the standard of the merchandise is lowered significantly. In general, open sun dried products don't fulfill the international quality standard and so cannot sell on international markets.

RESULT

Due to low cultivating land ploughing of foods is difficult. This problem is arise due to construction of buildings, houses etc. For that we can use greenhouse technology to cultivate the food flowers or any other things in small area. In this work we use tomato plant to grow under greenhouse technology and maintain the temperature from 7 to 15 celsius, humidity from 60 to 70 percent and the soil needs to be damp at least 6 - 8 inches below the ground to stimulate root growth . For making it advance we used raspberry pi by which we can control it through mobile and also with the help of wifi module.



CONCLUSION

Prior to the conduction of this experiment, it was hypothesized that the internal and external temperature of the greenhouse located in Mililani Town will be higher due to a difference in altitude, and therefore a difference in weather conditions relating to sun exposure. This hypothesis was supported by the data collected in the experiment. This data can be further applied to the real world, because it shows that despite the fact we cannot control the weather, sun exposure, and concentration of solar energy within the atmosphere, we can control the gases that are contained within the atmosphere catalyzing the heating of the atmosphere. It can be further concluded from the experiment that the Greenhouse Effect occurs rapidly, constantly, and the fact that it is so simple to recreate shows how natural it is. This means that we can acknowledge the fact that the Greenhouse Effect is an inevitable and necessary part of life. The tendencies of a greenhouse are similar to that of our atmosphere, and while we cannot control many of the factors that effect its habits, we can change how they effect us.

FUTURE SCOPE

1. Greenhouse Complexes around Metropolitan and Other Big Cities.
2. Export of Agricultural Produce.
3. Greenhouse for Plant Propagation.
4. Cultivation in Problematic Agriculture Zones.
5. Greenhouse Technology as Base for Other Biotechnology.
6. Cultivation of Rare and Medicinal Plants.

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