GREENHOUSE ENVIRONMENTAL MONITORING AND CONTROLLING SYSTEM

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Abstract - *Greenhouse system is beneficial for rural areas agriculture sector because where almost all sectors going to automation like home, industry. Man power is reduce day by day. Where in agriculture sector today also use old technology. Greenhouse is artificial close shied In which we focus on monitoring and controlling the internal component of greenhouse. Greenhouse can observe and monitor by a single human. Greenhouse consist of different type of sensors like light sensor, temperature sensor, soil moisture sensor and also consist of Arduino Uno (microcontroller ATmega328). And also consist of cooling fan, artificial lights, watering system. All sensors are directly controlled by Arduino Uno. All sensors are connected to 6-analog pins of Arduino uno and collect the data from greenhouse and display on LCD. The automatically on cooling fan, artificial and watering system for maintain the efficiency of greenhouse, when any Thing will shortage like oxygen level in soil, temperature level in greenhouse or chlorophyll. LCD and LED are connected to 14-digital pins of Arduino uno.*

1. INTRODUCTION

If we are talking about this country. where population is increasing in form of exponential. because of this here is shortage of land, and approximate 70% middle class family directly dependent on only agriculture sector. and here today also use old technology for agriculture sector. where in most of all sectors controlled and operate automatically. that's why this paper will helpful for specially for agriculture sector. greenhouse is one type of a close shield which is covered from glass or translucent plastic. it can also made on our roof, if we have not land. we can monitor this house from any Where either home or office through wireless Communication. now lets talk about effects of green house. in greenhouse we are use different type of sensors like light sensor, temperature sensor, moisture sensor etc. these sensors help farmers to grow crops, vegetables and flowers. phototransistor sensor which is more sensitive, compare to the other light sensors. this sensor Use to maintain the carbon dioxide in greenhouse. temperature sensor Use to maintain the desired temperature in greenhouse. and moisture sensor use to maintain the level of oxygen in soil in greenhouse. with which increment in production of food. when infrared rays coming from sun and interrupts with green House gases like (carbon di oxide, nitrous oxide, methane and ozone) then level of carbon di oxide is increase then level of chlorophyll is increase which with our crops grow in better way and efficiency of greenhouse is good.

2. Literature Review

various national and international researchers have already published paper in this field. A brief summarization of them is presented below.
Automated greenhouse system is specially for agriculture sector. it means this system should be very useful for farmers because there will be Not shortage of production of food. if we consider these points then we have to mind two important factors in greenhouse for better performance (1) atmospheric condition (2) plants diseases the atmospheric condition can controlled using microcontroller unit it consists different type of sensors like temperature sensors, light sensors, moisture sensor, the motor, fan, light. plant disease can monitor with help of image survey process the evaluation of cheaper image framework for crop disease can monitor using image survey system. which is fully automated for data security.

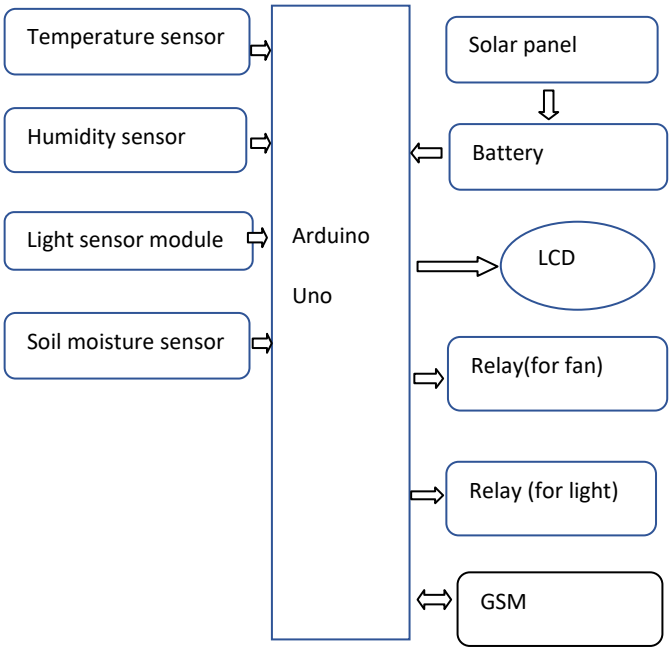

Fig-1: *Block Diagram*

3. COMPONENT EXPLINATION

3.1 HARDWARE COMPONENTS

1. Light Sensor
2 Temperature Sensor
3 Moisture Sensor
4 Power supply
5 Microcontroller (Arduino UNO)
6 16*2 LCD Display
7 Cooling Fan
8 motor
9 light Source
10 Solar Module

3.1.1 LIGHT SENSOR (photo transistor)

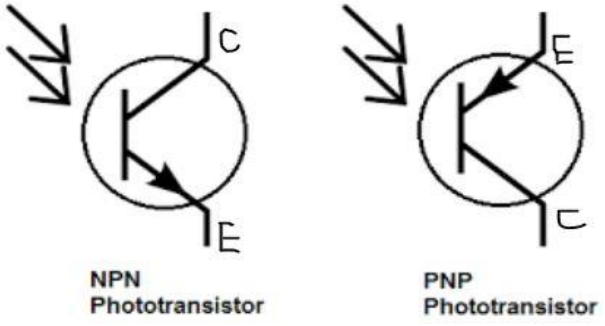

Fig-2: Light sensor

- Transistor are operated in their active region.
- photo the photo transistor must be properly biased.
- A light sensitive collector base p-n junction controls current flow between the emitter and collector.
- As light intensity increases resistance decrease creating more emitter base current.
- The small base current controls the large emitter collector current.
- collector current depends upon the light intensity and the DC current gain of the photo resistor.
- if light incident on base of the photo transistor then current flow through its emitter. if light intensity is increase then the current will also be increase.
- light sensor attached to the system when the surrounding natural lights are low, it displays the digital values

3.1.2 TEMPERATURE SENSOR

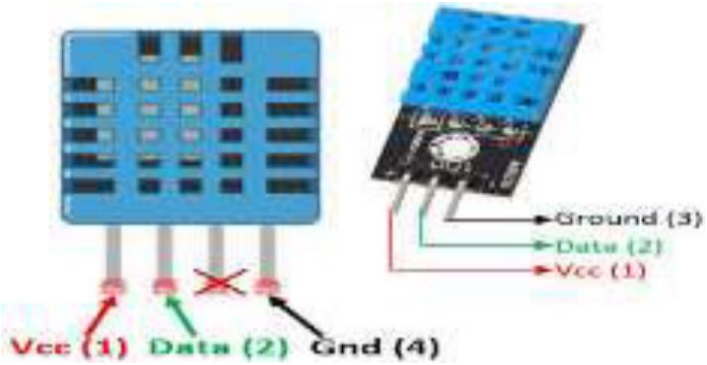

Fig-3: Temperature sensor

- Temperature sensor is commonly measured physical parameter. whether we talk about process industry or be it a laboratory.
- Temperature is physical quantity which measure the degree of hotness or coldness of an object or substance measured on a definite scale such as Fahrenheit, Celsius etc.
- A temperature sensor is a electronics device that measured the temperature and convert it into a signal.
- Temperature sensor maintain the desired temperature in greenhouse if temperature is low in green House then automatically fan is on.
- when some times the temperature inside the greenhouse reaches above the critical

temperature level, the cooling fan is provided to cool down the temperature

3.1.3 SOIL MOISTURE SENSOR

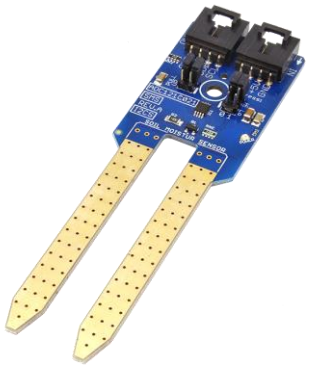

Fig-4: soil moisture sensor

Soil moisture sensor measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric content, or interaction with neutrons, as a proxy for the moisture content.
Soil moisture sensor collect the information from soil, like shortage of water and Display on LCD then automatically water is flow in greenhouse for maintain oxygen level in soil for better efficiency of greenhouse.

3.1.4 ARDUINO UNO (microcontroller A T mega 328)

Fig-4: Arduino Uno

- Arduino Uno mainly consist of 14-digital pin, 6-analog pin, micro controller (ATmega328), power supply, power jack, USB port, reset button.
- 14-Digital pins are used for connect the output component like LED, LCD, Relay.
- 6-Analog pins are mostly used for connect the sensors (IR sensors, RF sensors, PR sensors) because these sensors has analog value that's why we connect with analog pins.
- Power supply pins are used for give the power to input or output component.
- Power jack is used for give power to Arduino.
- USB port is used to upload program to Arduino.
- Reset button is used to restart the the program which is uploaded in Arduino.

3.1.5 SOLAR MODULE PROCESS

First we take a source of silicon (sand) sio2 and do a carbo thermal reduction at high temp. after this reduction metallurgical grade of silicon.
Sio2+2c--------high temp-------->Si (metallurgical grade Si)
Si+3Hcl----------> SiHcl3 (Trichlorosilane formation)
And after that,
SiHcl3+H2---------->Si (Poly crystalline Si)
Poly crystalline silicon is not good because in this silicon collision of atom and resistance is more for reduce collision and resistance we have to convert poly crystalline to crystallin silicon through C-Z process.
We need p-n junction Si for solar cell. For this we have to doped pentavalent atom (P, As) and tri valent atom (Al) for n-type and p-type similarly.
If we give heat on n-side of semiconductor then excitation of electron is increase then current is following the semiconductor and this is called solar cell.
One solar cell Provide approximate 0.5v(voltage source).
Then combination of solar cell is called solar module.
If we take 72 solar Cell then we make a solar module which is give 36v (voltage source).

3.1.6 POWER CONSUMPTION BY COMPONENTS

Components	Consumption
Arduino	9V
Temperature Sensor	1.5V to 5.5V
Light Sensor	3.3V
Soil Moisture Sensor	3.3V to 5V
Fan	110 to 240
Light Source	25V
Motor	230V
Total	517.8V

4. ADVANTAGE

1. Good production of food
2. Off – season crops
3. increment in fertility
4. Easy to use

5. APPLICATION

1. This project has a good application in rural areas for agriculture sector.
2. It is use to control and monitor the temperature at home like in bedroom, kitchen.
3. It can also be used in agriculture farm and garden.

6. RESULT

Greenhouse environmental, monitoring and controlling system is implemented successfully using Arduino Uno platform. which is more beneficial for agriculture sector

7. CONCLUSION

This design which is environmental, controlling and monitoring the parameters inside the greenhouse. Is implemented on Arduino Uno platform. from this project we survey the atmospheric condition (weather condition) and inspection the crops. from this farmer's saves time, money, man power

8. REFERENCES

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