IOT BASED ADVANCED GREEN HOUSE MOINTORING AND CONTROLLING SYSTEM

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ABSTRACT—In the field of automation there is significant advancement in the world over a decade. automation has been adopted in several field like industry home agriculture. From Greenhouse technique many agriculturalists in rural area are benefited. By automation monitoring and controlling of greenhouse environmentchange the straight regulation of the human.

Greenhouse is climate-controlled structure with wall & tops & especially intended aimed at off period growing of plants. The latest development in data & communication is internet of things for knowledge providing global connectivity & organizing the sensors devices, data handler. The plant diseases are perceptible such as leaves, etc are helping farmers to prevent from loss.

Corporeal identification of plant sickness of leaf from metaphors is a tedious job. For division of input image an algorithm known as K mean clustering is used. To extract textural structure from the input image gray level co- occurrence matrices (GLCM) is used. For image organization K nearest neighbor algorithm is used. ESP32 microcontroller is the main block of the complete system that enables the system to gather the sensor information and MATLAB information from Wi-Fi, and send to cloud server Google Firebase and smart phone application. Recording of all the information from the sensor is done by the handler of the google firebase cloud server and stores in google firebase storage element which can be accessed from android phone. In proposed model temperature sensor measures the environment temperature and is applied to the Arduino and displayed the value in LCD. When the light intensity inside the greenhouse is increased it is detected by the light sensor and displayed through LCD display. When the soil moisture is dry or wet that will be detected by the soil moisture sensor and when soil is drier than water is pumped through motor.

Index terms: productivity, green products, soil moisture, humidity.

I.INTRODUCTION

Green house technique is growing of small plants and vegetables in a building or a small place. The environmental condition such as cold region is provided by covering the roof by glass or luminous plastic are actual cold to take them to an outer temperature. Greenhouse effect concept the process in which different greenhouse gases receives infrared rays from sunlight which increases the carbon di oxide level helping in increasing the amount of chlorophyll which future helps in plant growth and yield, this is known as greenhouse effect. The growth of plants efficiency is boosted by greenhouse system. This system is used to perform monitoring& controlling and would take care weather inside the greenhouse from a particular place. The various sensors parameters are considered for data attainment in greenhouse. By using this information for processing and simulation to achieve the enhanced development of growing within greenhouse. There is an environmental effect from this data.

Definition of greenhouse is a protected construction that avoid the plants and vegetables from exterior geographies such as climatical circumstances, contamination, etc. Green house provides maintainable, effective growth of the plants throughout entire year. Humidity Sunlight, temperature, water content in soil, fertilizers etc are the fundamental features that are affecting the growth of plants. Water sprinkling and irrigation system had made innumerous research. Many different methods are opted for determining the soil moisture condition. It is hard to control the required data manually inside a greenhouse hence automated system is needed.

In this paper, attention is focused towards to find different leaf disease with Image processing technique and hardware part such as MCU interfacing, calibration of sensor signal conditions, Wi-Fi, cloud server sensing technology and android application.

II. Problem statement

A problem statement describes the analysis of climatical condition and providing the solution to the problems faced by the plant's growth from undesired environmental condition. This can be obtained by analyzing the environmental parameters such as temperature, soil moisture, light intensity etc.

III. Objective

In conventional farming approaches is incapable to deliver a suitable amount of fertilizer and environmental parameters cannot be measured. In the paper presented, Arduino Uno based embedded system sensor network- based node (SN) we have developed a prototype comprising a sensor network (SN) based node, is used to actively monitor the environmental parameters such as light intensity, soil moisture and temperature inside the greenhouse environment.

IV. LITRERURE SURVEY

In recent days most of the problems are solved by IOT (internet of things) by using information available and providing expressive extrapolations on the consequences of the information.[1] Being an actual significant area as far as facility in India is concerned, Agriculture has commonly been a target to variations in climate and additional topographical difficulties and there is many that IoT can do to avenge the area from execution. In Greenhouses agriculture have constricted limits than traditional agriculture on the constraints that effects yield growth. Climatic constraints are essentially to be determined and evaluated repeatedly at Greenhouses to examine that plants get all they needed at correct amounts for their appropriate growth. IOT based solution is provided for tracking and controlling the parameters and yield prediction is used in greenhouse system. In green house Cost effectiveness and limitation of size in weather monitoring is the important parameter that an IOT based solution was proposed for monitoring of weather parameters, and sending this data to cloud and alert their deviations. Greenhouses are environment with walls and roof specifically developed for plants which are grown in offseason. Manually systems are used for monitoring the temperature in many of the greenhouse which is uncomfortable to the workers to control the temperature manually every day [2]. Bluetooth, WiFi and ZigBee are the three different communication technologies. These are broadly used in IoT devices because of short transmission range, acceptable power consumption, faintness of interference and therefore for wide range cellular network LPWAN (Low Power Wide Area Network) is proposed, for massive device and lower power consumption with reliable communication. The disposal of waste is done by burning or by simply land filling. Burning of waste leads to emission of large amount toxic greenhouse gases. Which effects the atmosphere.[4]. Disease attack is one of the major key factors that leads to low yield. The soil borne, fungi and viruses are the major for diseases in groundnut plants. The system proposed by Montgomer.k ,Chiang's had made use of data processing, front data acquisition, data transmission and data reception. The temperature sensor of data terminal is real time processed.

V. Proposed Model

In this proposed model different sensors are functioning together to control like temperature, light, soil moisture and humidity the climatic parameters. The data collected from the sensors are converted into digital information and applied into Arduino uno unit for processing. The threshold values to the processor are given using IOT interface.

Agriculture is the main focus of this paper. Leaf diseases can be monitored by using wireless sensors and making use same water level and soil temperature. Temperature is regularly monitored by soil. By using their mobile via wireless network monitored report can be accessed and plant diseases can be checked before the plant is spoiled. When irregularities are identified, pesticides been used to instantly to overcome irregularities.
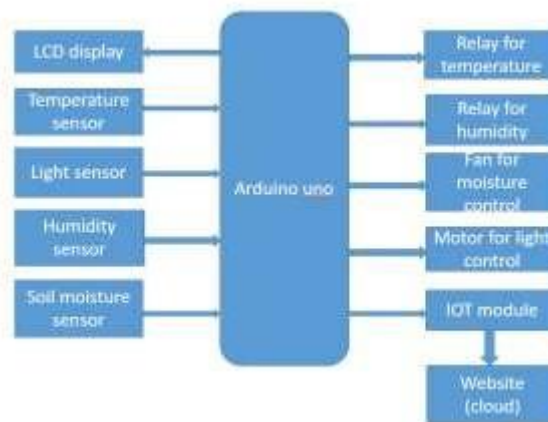

Fig 5.1 Block diagram of proposed model

5.1 ARDUINO UNO

The design and manufacturer of single board microcontroller and microcontroller kits Arduino is the open-source software and hardware used to develop digital device. A variety of microprocessor and controllers are used to design Arduino board. The board consists of sets of digital and analog input/output pins that interfaces many expansions board and other circuits. The board has many features like serial communication interface such as universal serial bus, which are used for program loading. C, C++ language programming can be used for programming microcontroller. Standard API can also be used as Arduino language.

Fig 5.2 Arduino

5.2 Temperature Sensor

Fig 5.3 shows the temperature sensor which is an electronics device measuring environmental temperature and converts the analog data into digital output and can be displayed.

The DHT11 sensor are available both as sensors and also as a module. In both the performance is same. This sensor are available in a 4-pin package in which only three pins will be used but the module will come with three pins as shown above.

Fig 5.3 Temperature sensor

5.3 Relay

The above fig 5.4 shows the relay, relay are mainly used for transmitting and receiving the information, the transmission and receiving is either 0 0r 1 as input signal which is known as morse code which is mechanically considered as ON and OFF of light bulb which means that pulse of 1s and 0s are using electromagnetic converted into ON and OFF. Various application uses Relay as switch. The electromagnet acting as switch is known as Relay.

Fig 5.4 Relay

5.4 LDR SENSOR

A LDR stands for light dependent resistor they are also called as cadmium sulphide or Photoresistor also. Fig 5.5 shows LDR It is also called a photoconductor. Photoconductivity is the working principle of LDR. LDR are made up of photocell which are passive component resistor where the resistance value depends on light intensity ,as the resistance value decreases as the light intensity decreases.
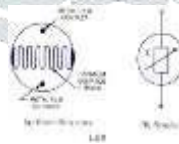

Fig 5.5 LDR

A high resistance in mega ohms range is obtained when light is absent. When light falls on the sensor the resistance decreases as electrons are emitted from the material and conductivity increases. When the intensity of light increases above certain frequency, the semiconductor absorbs the photon and electrons jumps from valency band into the conduction band. As the resistance drops the holes and free electrons starts conducting drastically (< 1 Kiloohm).

5.5 LCD

In recent days all devices such as TV, DVD players CD player, Computers, Digital watches etc are made up of LCD. LCD are commonly used for replacement of CRTs in screen industries. CRT (Cathode ray tubes) consumes large power heavyweight and higher when related to LCDs. But LCD devices are thinner, lighter as and consumes very less power. The fig 5.6 shows LCD 16×2, the principle of working is, it stops the light other than disappear . The LCD 16x2 pin is as shown in fig.5.6.

Fig 5.6 LCD Display

5.6 FAN

The direct current fans, or DC fans runs with 5V,12V,24V and 48V fixed voltage battery. The alternating current fans, or AC fans, are operated with ac current.

A rheostat or variable resistor in the 12V wire is inserted to control the seed of the fan. The range of the rehosts is from3 watts to 10 watts, and have a resistance range from 20 – 50 Ohms. When a CPU fan is used the fan should be operated with slowest speed. The fan used is as shown in fig 5.7

Fig 5.7 Fan

5.7 MOSTIURE SENSOR

Capacitance is used in soil moisture to measure the dielectric permittivity of surrounding medium. The soil water content is a function of dielectric permittivity. Sensor used for moisture testing are as shown in fig 5.8. The sensor produces a voltage that is proportionate to dielectric permittivity, and hence the soil water content is detected. water moisture is measured using soil moisture sensor. The module output is at high level when more water content is present in soil and output will be level low when soil remains

Fig 5.8 Soil Moisture Senor

5.8 DC MOTOR

A rotary electrical motors which converts electrical energy direct current (DC) into mechanical energy. When kept in magnetic field, a current carrying conductor gain torque and develop tendency to move is the principle on which DC motor works .The water is pumped when the soil is dry through DC motor.

Fig 5.9 DC Motor

5.9 Google Firebase Cloud

Androids and Web application developers developed google – backed development software called as Google Firebase. Reporting ,fixing the app crashes, tracking analytics, s, creating marketing and product experiment are the tools provided by firebase. It is a database which is cloud-hosted database. All clients can share one real time database instance and automatically receives latest updates when a platform is created cross-platform apps with our JavaScript SDKs iOS, and Android.

Fig 5.10 google firebase

5.10 MIT App Inventor

An online platform that teaches computational concept thinking by discovering mobile application is known as MIT App inventor. The application are formed by selecting and placing components to design view and making use of graphic block language for programing the application performance .There are two user interface they are block design and editor design.

Fig 5.11 App inventor

VI RESULTS

Fig 6.1
The above fig 6.1 shows the result obtained from temperature sensor and soil moisture.

Fig 6.2 Output of humidity SensorThe above fig 6.3 shows the output produced by humidity sensor.
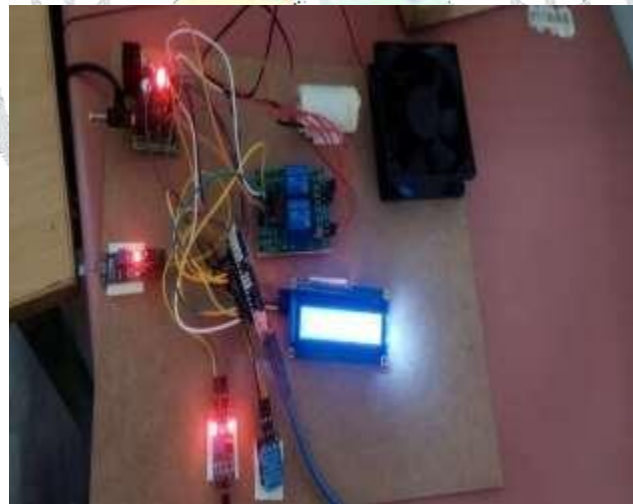

Fig 6.4 Circuit Connection
The above fig 6.4 shows the green house monitoring and controlling system.
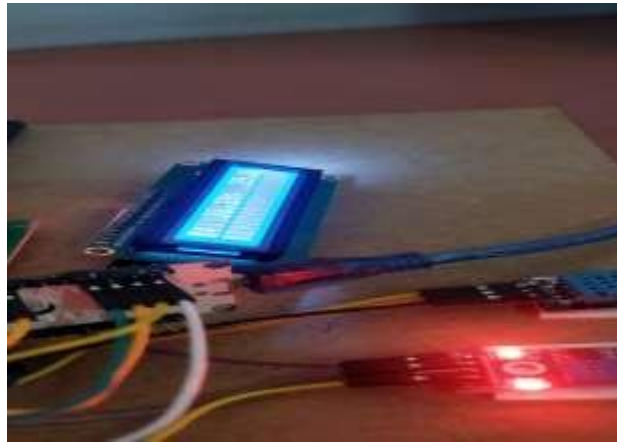

Fig 6.5 Temperature sensor

Fig 6.6 Temperature sensor output

VII. CONCULSION

The proposed design is implemented with Arduino platform for greenhouse monitoring, controlling the environmental parameter such as temperature/humidity, light and soil moisture with the help of Web Server using This model reduces cost ,human effort and time consumption. The conventional green house monitoring and controlling model is labor based ,expensive and long time process. This proposed system provides controlled environment for plant growth and prevents from diseases. the Soil Moisture, Light Humidity, and Temperature readings. Are recorded. It provide past and present reading to the user. Which can be used for multiple plants growth and provide accurate sensor readings that deviate from the defined range.

VIII. Future Scope

The major infection caused by Bacteria, Fungus and Viral cause leaf diseases. It is very important to identify these and treat at right time. This can be done by utilizing Quad copter at field level to capture the picture of different plants in the farm. A frame work can be done to associate this data to the sever. This capture data can be send to the farmer's registered mobile number by using GSM module

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