

IoT based Greenhouse Monitoring using PIC16F877A

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Abstract - This project explains the design and implementation of an electronic system based on GSM/GPRS (Global System for Mobile Communication) and Internet of Things (IOT) for sensing the climatic parameters in the greenhouse. In the field of agriculture, use of proper method of farming is important. The project uses PIC16F877A series microcontroller which is programmed to receive the input signal of varying moisture condition of the soil, light and temperature of the atmosphere through the sensing arrangement. This is achieved by using an analog to digital converter which is present in PIC16F877A, which acts as interface between the sensing arrangement and the microcontroller. Once the controller receives this signal, it generates an output that drives a relay for operating the water pump and cooler fan. An LCD display is also interfaced to the microcontroller to display the status of the soil, light, temperature. This system deals with monitoring and controlling the environmental conditions like temperature, relative humidity, with sensors and sends the information to the webpage and then plot the sensor data as graphical statistics. The data updated from the implemented system can be accessible in the internet from anywhere in the world.

Key Words: GSM/GPRS modem, Internet of Things, Im35 sensor, moisture sensor, LDR, Humidity sensor.

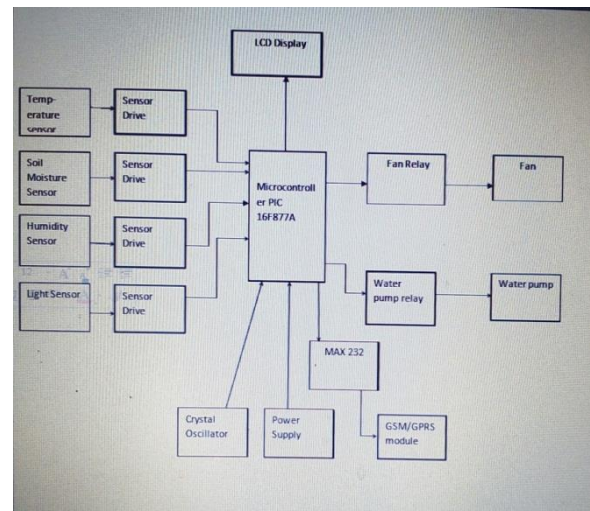
1. INTRODUCTION

A greenhouse system is modern off season cultivating method that gives high yields at any season. The greenhouse industry is the fastest growing sector worldwide. The greenhouse separates the crop from the environment, thus providing some way of shelter from the direct influence of the external weather conditions. Due to wide growth of greenhouse and intelligent monitoring system gives more attention in a modern greenhouse system. A greenhouse is a multivariate interactive system due to the inside weather fluctuation with outside. Most of the agriculture sector in the country is facing the low economical resource, but some of the greenhouse running in the low tech. So many researchers have been focusing on the automated wireless embedded intelligent monitoring system for greenhouse. Our project deals with collecting data through sensors and then viewing this data from anywhere in the world through the internet facility.

If monitoring has been implemented using the wired networks, the cables connected to the devices need to be rearranged for every crop, so it is waste of money and man

power, so it needs to be replaced by the Internet of Things(IOT) because it provides a new method for accessing the farmland information. It expands the communication between the devices and the people by the intelligent embedded wireless system using this methodology to achieve the real time monitoring of the physical world to get a data using that data to make decision for what action to make. The information gained by the embedded wireless node has been send to the server through "GPRS module".

2. Block diagram



2.1 PIC 16F877A:-

The term PIC stands for Peripheral Interface Controller. Initially this was developed for supporting PDP computers to control its peripheral devices, and therefore, named as peripheral interface device. These Microcontrollers are very fast and easy to execute a program compared with other microcontrollers. PIC microcontroller architecture is based on Harvard Architecture. PIC microcontrollers are very popular due to their ease of programming, wide availability, easy to interfacing with other peripherals, low cost, large user base, and serial programming capability, etc.

2.2 GPRS

GPRS modules are similar to modem but there is one difference: A GSM/GPRS modem is an external equipment, whereas the GSM/GPRS module is a module that can be integrated within an equipment. It is an Embedded piece of

2.6 Light Sensor:-

LDR (Light Dependent Resistor) is also known as photo resistors, are light sensitive devices most often used to indicate the presence of light, or to measure the light intensity. In the dark, there resistance is very high, sometimes up-to 1MB ohm, depending on the light intensity. LDRs have the sensitivity that varies with the wavelength of the light applied and are nonlinear devices. They are used in many applications but are sometimes made absolute by other devices such as photodiodes and photo resistors.

A Light Dependent Resistor (LDR) or a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light sensitive devices. They are also called as photo conductors, photo conductive cells or simply photocells.



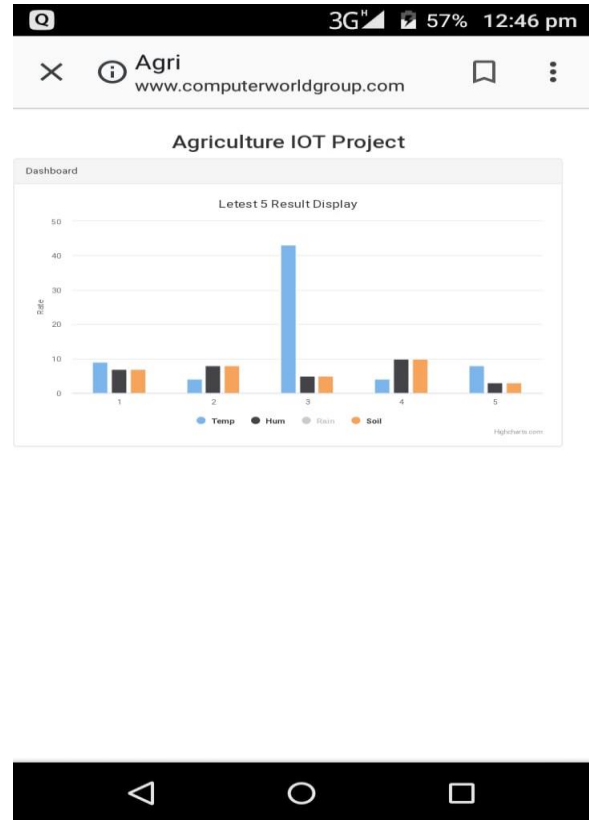
3. Working of IOT:

The Internet of Things is a technological revolution that represents the future of computing & communications and its development depends on dynamic technical innovation in a number of important fields from wireless sensors to nanotechnology. First in order to connect everyday object devices to large databases and networks and indeed to the network of the networks (the internet), the simple, unobtrusive and cost effective system of item identification is crucial.

Only then can data about things be collected and processed. Radio frequency identification (RFID) offers this functionality. Second, data collection will benefit from the ability to detect the changes in the physical status of things, using sensor technologies. Embedded intelligence in the things themselves can further enhance the power of the network by devolving information processing capabilities to the edge of the network. Finally, advances in miniaturization

and nanotechnology mean that smaller and smaller things will have the ability to interact and connect.

4. Result:-



Conclusion:-

The objective of the project is to promote the intelligent and automation in greenhouse monitoring using a new trend called Inter of things. The greenhouse monitoring of greenhouse environment is done. The proposed study about building greenhouse monitoring system based on Internet of Things in which the software for the development board with sensor has been developed with the embedded system and communication technology.

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