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"Smart Irrigation System Using Wireless Sensor Network And WIFI Module"

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Abstract- IOT is a shared Network of objects where these objects interact through Internet. One of the important applications of IOT is Smart Agriculture. Smart Agriculture reduces wastage of water, fertilizers and increases the crop yield. Here a system is proposed to monitor crop-field using sensors for soil moisture, humidity and temperature. By monitoring these parameters the irrigation system can be automated if soil moisture is low.

I. INTRODUCTION

As the world is trending towards new technologies and implementations it is a necessary goal to trend up in agriculture too. Many researches are done in the field of agriculture and most of them signify the use of wireless sensor network that collect data from different sensors deployed at various nodes and send it through the wireless protocol. The collected data provide the information about the various environmental factors. Monitoring the environmental factors is not the complete solution to increase the yield of crops. There are number of other factors that decrease the In order to provide solution to such problems, it is necessary to develop an integrated system which wills improve productivity in every stage. But, complete automation in agriculture is not achieved due to various issues. Though it is implemented in the research level, it is not given to the farmers as a product to get benefitted from the resources. Hence, this project deals about developing smart farming as a point of view from farmer. The complete monitoring of all the parameter which are essential towards the growth and economy of the farmer is taken care in this

II. Overview

Our system collects information about the hardware and software that are used to create this system that uses full for human and provide fewer human efforts for doing cultivation. We studied the microcontroller circuits that control other sensors like moisture sensor, temperature and humidity sensor. The sensors send the data to the microcontroller and microcontroller send data onto the GPRS module on the database that is connected with the internet and the data accessed by the farmers by using the internet in their personal computer and smartphones with the help of graphical interface. This kind of framework can be used in the area where the water level is too low and much more difficult to provide proper irrigation. By making use of Arduino that provides controls to the sensors by using 'C' programming language. The farmer can set a different kind of threshold values of the different kind of seeds and soils according to their necessity by the help of system supporter.

III. Objectives

• To monitor all agriculture parameter on mobile using IOT .

• To create Graphical User Interface (GUI) on mobile for easy use for farmer.

• To turn on/off agriculture water pump using Mobile phone.

• To use solar panel to charge battery.

• To make single application for various crop.

IV. Motivation

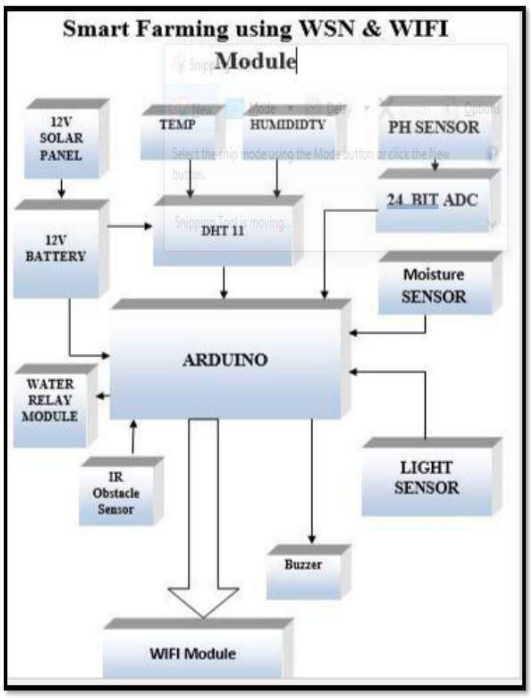
In the previous era, a lot of hard work for doing farming and a lot time consumed for the irrigation and cultivation of crops in the field. Sometimes the farmer having a lot of loss by droughts, floods, and other disasters. In our modern era, a lot facility is coming on the market like fertilizers for good crop production and spraying machines and other machines. Small changes in agricultural practices can substantially improve productivity and profitability. However, offering farmers standardized agricultural advice has limited effectiveness due to variation in local

conditions and farmer characteristics. Traditional extension systems have been unable to incorporate and disseminate this information to farmers, in part due to the high costs of operating in rural area. In developed countries, new technologies are transforming agricultural production by allowing farmers to better target inputs and management decisions to local conditions. In developing countries, many of these technologies are beyond the reach of individual farmers. However, several technological innovations have created new opportunities to provide customized information to farmers.

V. Block Diagram and Description

The Block diagram of the system is given below shows the block diagram of smart irrigation system with IoT. Farmers start to utilize various monitoring and controlled system in order to increase the yield with help of automation of an agricultural parameters like temperature, humidity and soil moisture are monitored and control the system which can help the farmers to improve the yield. This proposed work includes an embedded system for automatic control of irrigation. This project has wireless sensor network for real-time sensing of an irrigation system. When the moisture level in the soil reaches below threshold value then system automatically switch ON sensed parameters and current status of the motor will be displayed on user's android application.

ESP2866 WI-FI Module: The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, [Type here] .lj. meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)!



This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.

DHT 11: The DHT11 is a basic, ultralow-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air.

It's fairly simple to use, but requires careful timing to grab data. The only real downside of this sensor is you can only get new data from it once every 2 seconds. So when using the library, sensor readings can be up to 2 seconds old. In this project, we will use this sensor to measure the air temperature and humidity.

IR Sensor: An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.

Moisture Sensor: Soil moisture sensors are used in numerous research applications, e.g. in agricultural science and horticulture including irrigation planning, climate research, or environmental science including solute transport studies and as auxiliary sensors for soil respiration measurements. The output of the soil moisture sensor changes in the range of ADC value from 0 to 1023.

Relay Module: Relays are electric switches that use electromagnetism to convert small electrical stimuli into larger currents. These conversions occur when electrical inputs activate electromagnets to either form or break existing circuits. It works on the principle of an electromagnetic attraction. When the circuit of the relay senses the fault current, it energises the electromagnetic field which produces the temporary magnetic field. This magnetic field moves the relay armature for opening or closing the connections

Software Components:

1. Blynk Server: Blynk is an opensource Internet of Things application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. Blynk enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates.

2. **Eagle (PCB Design):** Eagle is professional PCB Designing Software to design schematic layout and PCB design. It has all library to make PCB built easy

Working Principle

In this project, Arduino is used for the controlling whole process with sensors and Wi-fi module. All the sensors are connected with Arduino where all the parameters are gathered and being send using the Wi-Fi module to the user mobile. All the data is received via app on the usersdevice. The whole data is monitored across various conditions and the parameters are set. If the water level in the soil decreases the pump starts and available of water occurs. All this is done with the help of Solar Panel. For backup also battery is used if in any case their occurs problem.

Justification

The proposed agricultural system is designed to solve to find an optimal solution to the water crisis. The design implements IoT technology using an android device, a main controlling unit (MCU), sensors to measure various parameters and a water pump, which will be used to supply water to the farm. This system brings an efficient way to the farmer to learn about the conditions and whether the it is necessary or not to provide water.

Conclusion:

The application of agriculture networking technology is need of the modern agricultural development, but also an important symbol of the future level of agricultural development; it will be the future direction of agricultural development. After building the agricultural water irrigation system hardware and analyzing and researching the network hierarchy features, functionality and the corresponding software architecture of precision agriculture water irrigation systems, actually applying the internet of things to the highly effective and safe agricultural production has a significant impact on ensuring the efficient use of water resources as well as ensuring the efficiency and stability of the agricultural production. With more advancement in the field of IoT expected in the coming years, these systems can be more efficient, much faster and lesscostlier. In the Future, this system can be made as an intelligent system, where in the system predicts user actions, rainfall pattern, time to harvest, animal intruder in the field and communicating the information through advanced technology like IoT can be implemented so that

agricultural system can be made independent of human operation and in turn quality and huge quantity yield can be obtained.

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