Automatic Green House Controlling Using Node - MCU ESP8266

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Abstract - **Agriculture is the basic industry for economic growth and development. The growth in demand of crops is a result of a rapid increase in the world population. For growth and cultivation of crops, parameters including fields and growing condition of plants are vital. Farmers have usually applied regular strategies for all crops which have led to less yield for some specific crops. [1-3] These specific crops need specific conditions, and in this regard, smart agriculture management system can grow crops under specific conditions. Smart agriculture management system consists of monitoring and controlling of environmental variables monitoring either automatic or remote, based on ESP8266 Wi-Fi Module and IoT technology. Environmental variables including temperature, humidity, light intensity, air quality etc. can reflect the environment condition inside the greenhouse.**

These environmental variables can be monitored by using various environmental sensors placed inside the greenhouse which are managed as a Wireless Sensor Network (WSN). WSN is a network composed of nodes which transmit or receive data using wireless transmission technologies. WSN plays an increasingly vital role in constructing a smart agriculture management system because farmers require to capture the real-time environment data to develop an effective strategy for improving crop yields. These sensors can be powered and then used to transmit real-time data to ESP8266 which can then analyze and process the provided data. Wireless Sensor Network (WSN) can be connected to Internet using Wi-Fi Router, and then real-time data fetched by these sensors can be transmitted to IoT platform periodically[4,5]. Electronic devices with IoT technology are used increasingly nowadays such as smart television, refrigerator, washing machine, air conditioner etc., which can connect to internet and transmit data to users.

Keywords: ESP8266, Wi-Fi Module, Wireless Sensor Network (WSN).

I. INTRODUCTION

Agriculture is the backbone of Indian Economy. In today's world, as we see rapid growth in global population, agriculture becomes more important to meet the needs of the human race.

However, agriculture requires irrigation and with every year we have more water consumption than rainfall, it becomes critical for growers to find ways to conserve water while still achieving the highest yield. But in the present era, the farmers have been using irrigation technique through the manual control in which they irrigate the land at the regular interval. According to statistics, agriculture uses 85% of available freshwater resources worldwide, and this percentage will continue to be dominant in water consumption because of population growth and increased food demand. There is an urgent need to create strategies based on science and technology for sustainable use of water, including technical, agronomic, managerial and institutional improvements. Agricultural irrigation based on Internet technology is based on crop water requirement rules.

By using Internet technology and sensor network technology we can control water wastage and to maximize the scientific technologies in irrigation methods. Hence it can greatly improve the utilization of water and can increase water productivity. Nowadays water scarcity is a big concern for farming smart agriculture management system consists of monitoring and controlling of environmental variables monitoring either automatic or remote, based on ESP8266 Wi-Fi Module and IoT technology. It can provide suitable growing conditions for crops by adjusting environmental variables inside the green-house which can improve crop yields and meet the needs for crop growth. This project helps the farmers to irrigate the farmland in an efficient manner with automated irrigation system based on soil moisture.

II. METHODOLOGY

The main objective of this project is to provide an automatic irrigation system thereby saving time, money & power of the farmer. The traditional farm-land irrigation techniques require manual intervention. With the automated technology of irrigation the human intervention can be minimized.
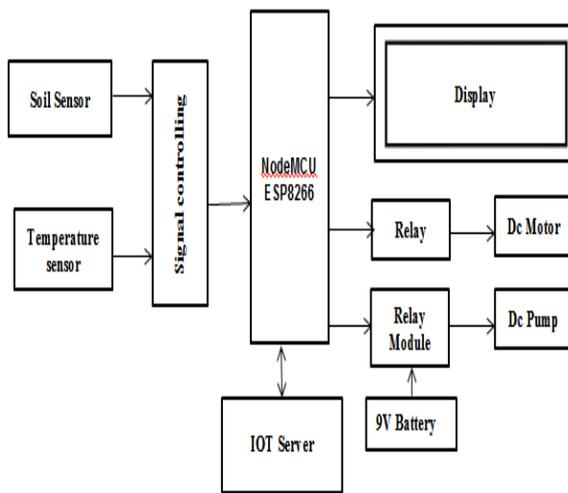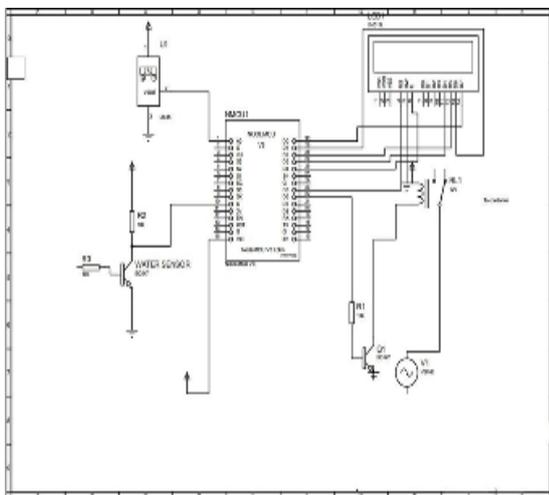
Figure 1: Block Diagram
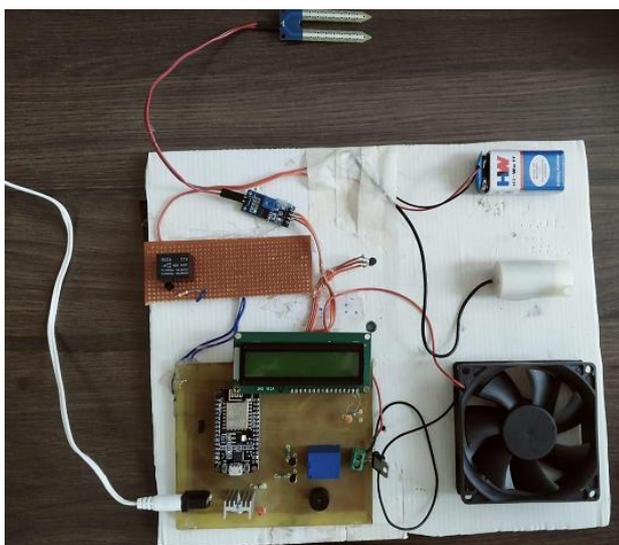

Figure 2: Cricket Diagram

Figure 3: Hardware Implementation

III. RESULTS AND CONCLUSION

This greenhouse management system has low-cost characteristics and is suitable for indoor garden or small sized greenhouse. Moreover, it can be extended to reduce the labor cost in modern agriculture because it realizes the wireless remote control for greenhouses. It also provides efficient visual representation of the parameters of the internal greenhouse environment. Moreover, this management system facilitates users to remotely control the operation condition of the controllers established inside the greenhouse.

In the future, we will evaluate more environmental parameters (including water flow) for monitoring and will aim to implement system in modern smart agriculture field. The system has successfully overcome quite a few short coming of the existing system by reducing the power consumption, maintenance and complexity, at the same time providing a flexible and precise form of maintaining the environment.

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