FORM - 2

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COMPLETE SPECIFICATION

(Section 10; rule 13)

SMART APPROACH IN FARMING WITH IOT

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The following specification particularly describes the invention and the way it is to be performed:

SMART APPROACH IN FARMING WITH IOT

Field and background of the invention

Farmers would be able to obtain real-time data such as temperature, humidity, and soil moisture through the use of the intelligent farming system being developed in the current effort. The Internet of Things (IoT) is being used in smart farming. Embedded systems, big data analytics, cloud computing, and web services are just a few of the technologies that are used to enable networks of wireless sensors to be implemented, as well as information technology infrastructure and protocols (IITP). For agricultural fields, the Internet of Things offers a number of advantages. These include a wide range of sensors tailored to this specific field of farming, as well as the ability to work remotely on a wide range of agriculture-related projects. Sensors based on a variety of applications assist in collecting and storing data quickly and conveniently in cloud computing services. These real-time data can be retrieved quickly and easily from any intelligent smart device with an internet connection. Farmers may employ Internet of Things (IoT) devices to boost their productivity and the quality of their products, according to experts. It boosts profits/incomes while simultaneously lowering their costs by a large amount. It helps to enhance the efficiency level in the management of water, pesticides, and fertilizer levels when precise data is available as soon as possible.

The farming business is predicted to grow in importance in the coming decades, surpassing that of any other time in human history. A population of 9.7 billion people by 2050 would necessitate a 69% increase in global agricultural output. In order to achieve this vision aim, farming organizations have begun to implement the Internet of Things (IoT) in order to conduct accurate analyses and increase the quality of agricultural products produced. The Internet of Things (IoT) is a technology that was developed to aid in the advancement of agricultural sectors. Sensors, drones, and other high-tech agriculture innovations are quickly becoming the new standard in modern agriculture as they become more affordable. It is anticipated that the collecting and analysis of big data in agriculture would be extremely beneficial in the future of modern farming, particularly in terms of maintaining ecosystems, and that it will aid in the total output growth of developing nations such as Morocco. The Internet of Things (IoT) technology provides greater benefits in real life. Researchers are conducting further investigations into this technology in

order to make it more widely available and to maximize revenues. After the project's analysis, the process proceeds with the creation of several smaller modules. This is followed by the construction of the final system design. These functions should be able to carry out certain duties when called upon. The totality of all those functions is represented by the system as a whole. As a result, we have decided to employ a function-oriented design approach. Using the DFD design method, it is possible to show how functions alter data as well as how the complete system performs.

Summary of the Invention

To ensure that all functionalities are properly implemented, testing will follow. In addition, the results of the test in a field with previously collected data are compared to the findings of the new system. There are multiple functions; several tests can be done, and tests should be created for each function one at a time to ensure that all of the functions work correctly and produce accurate results. The AUI's gardens are surrounded by agricultural fields, parks, gardens, and golf courses can all benefit from the system's automated and efficient irrigation system, which is now being developed. In addition, when compared to other automated systems, our solution will be less expensive and safer. This work will be implemented in accordance with the user requirements and specifications while also adhering to the design methodology and a clear testing plan will be devised.

In order to make this work, the NodeMcu module and other Arduino hardware are being used as the microcontroller, which will be able to connect to the Internet using Wi-Fi along with other sensors, such as a temperature, soil moisture sensor, an LCD, a relay, sensor (LM35) and an RTC module, are also included. (specs may be found in Table 1), can be used to determine the date and time. Additionally, there are certain connectors and cables. All of these components will be connected in accordance with a predetermined circuit. The Arduino application is utilized for the software portion of the project, with the code written in C++. Several libraries are taken into consideration by the code. Each of them is associated with a specific component or sensor in some way. A web server is also constructed, which allows the data collected to be shown instantaneously, and this is accomplished by including HTML, CSS, and JavaScript code in the code.

Brief description of the system

The NodeMcu grid, which has been programmed, is connected to all of the components in our project's circuit. NodeMcu is also used as a Wi-Fi module in some applications. This approach operates on the principle of gathering data from all of the sensors and passing it to the NodeMCU for processing. Cloud computing, in conjunction with the NodeMCU, allows for the updating of data in web servers. The real-time data is transmitted to the web server over Wi-Fi, and we may access it by entering the IP address of the Wi-Fi module (NodeMcu) in any web browser. Aside from that, the NodeMcu communicates with the LCD as well as with the two relays. There are two relays connected to the pump and one attached to the fan. First and foremost, the Database table contains three properties that reflect the data stored, which are: the soil moisture content (result1), the temperature (result2), and the time and date (result3). We will be able to pick, alter, and/or add data to this later on.

Fig 4 shows the model prototype containing a metal and Plexiglas greenhouse with a single room used to cultivate various plants. It has Arduino components in a tiny box, power supply units in another box, solar panel, fan, watering system, and a little bulb. The Arduino device may be powered by either solar energy or electricity, depending on the situation. It is necessary to use Firebase to construct the Smart Farming System Database because it is a real-time database. It is made use of by Nodemcu Firebase. In addition, a new project was established in the Firebase account. It was necessary to store the data in Firebase, and the following steps were taken:

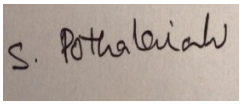
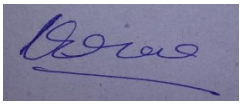
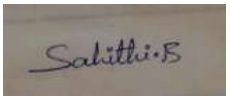
- Added new libraries to the Arduino IDE (Fire base Arduino.h), and updated the firmware (ArduinoJson.h).
- Specified the values of certain variables to be recorded in the database and then created variables that were needed in the firebase project to be stored in the database.

We Claim

1. It is critical to concentrate on cultivating in a more intelligent and effective manner. As a result of the development of innovative procedures for boosting agricultural productivity and management, more and more young people are becoming interested in agriculture and pursuing it as a profession.
2. The Technology such as the Internet of Things (IoT) allows them to cultivate and monitor crops more efficiently by accessing information through mobile phones and the Internet.
3. It's taking these considerations into account, this study emphasizes the significant role played by technologies, particularly the Internet of Things (IoT), in making farming smarter in order to fulfill future expectations. As previously indicated, we make use of wireless sensors, the cloud, Bluetooth, and other devices.
4. The Various farming practices are discussed, as well as how good they are in conserving resources. Final thoughts: It is critical to monitor farmland in order to improve farming and reduce resource wastage. Internet of Things (IoT) technology is required for this.
5. There are numerous features that can be added for future work, such as the addition of a Mobile Application for Android to make it easier to retrieve data from a distance and to store data more simply. Create an IOS version of the prior application based on your findings.

Abstract

Among the fastest-growing industries in various fields, including agriculture is the Internet of Things (IoT) technology. A large number of sectors of activity are being transformed into ones that are convenient, intelligent, and well-endowed with artificial intelligence as a result of the Internet of Things (IoT). Innovative farming systems are aware of a cultural change toward modern agriculture, which is more productive, consumes less water, and is even more affordable than traditional agricultural systems. Using the Internet of Things (IoT) in the agriculture field to collect data instantly (soil moisture, temperature), the manuscript aims to demonstrate how one can monitor some environmental conditions remotely and effectively, thereby increasing agricultural production and, as a result, increasing farmer's earnings substantially. Because we were gathering data remotely, any changes in the environment were observed immediately and taken into consideration when making judgments. As a result, the findings of the prototype testing were highly accurate.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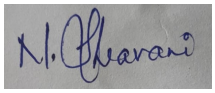	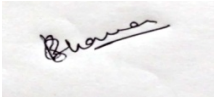	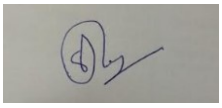	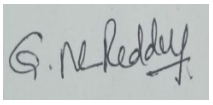
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