SURVEY ON ADVANCED IOT BASED AGRICULTURE SYSTEM CONSISTING SMART WATER SUPPLY & CROP PREDICTION IN COST EFFICIENT WAY

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ABSTRACT:

Agriculture adds to a noteworthy segment of India's Gross domestic product. Two noteworthy issues in present day agriculture are water shortage, scheduling and animals attacks on crops. These issues can be settled utilizing agriculture undertaking mechanization, which energizes exactness agriculture. Considering wealth of daylight in India, this project talks about the outline and advancement of an IOT based Smart Agriculture that atomizes water system errand and empowers remote ranch checking. The smart agriculture is produced utilizing an Arduino microcontroller. While executing the assignment of water system, it checks soil and temperature parameters, and faculties’ soil dampness substance and temperature at general focuses. At each detecting point, information procured from numerous sensors is handled locally to choose the need of water system and in like manner cultivate is watered. On the other hand we will use a smart compound to our farm consisting current pulses which will keep animals away from farm and crop harming is avoided. Further, smart agriculture goes about as an IOT gadget and transmits the information gathered from different sensors to a remote server Android App utilizing Wi-Fi connects. At the remote server, crude information is handled utilizing signal preparing activities such as filtering, pressure and forecast.

Keywords: IOT, WIFI Module, Smart Agriculture, ESP 8266 Controller, Temperature Sensor, Moisture Sensor, Humidity Sensor, Current Pulse Generator, Irrigation, Farm Monitoring, Crop Prediction.

I. INTRODUCTION

Agriculture is the quality of Indian Economy. In any case, for farming water utilization is more than precipitation consistently. Enhancing ranch yield is fundamental to take care of the quickly developing demand of sustenance for populace development over the world. By considering and foreseeing natural conditions, cultivate efficiency can be expanded. Product quality depends on information gathered from field, for example, soil dampness, surrounding...
temperature and stickiness and so on. Propelled instruments and innovation can be utilized to build cultivate yield. Creating IOT advances can gather expansive measure of biological and product presentation information. “IOT incorporates numerous new canny ideas for utilizing as a part of the not so distant future, for example, brilliant home, keen city, savvy transportation, and shrewd cultivating”. The method can be utilized for utilization of exact measure of compost, water, pesticide and so on to upgrade profitability and greatness. Sensors are confident gadget for keen agriculture. The constant ecological parameters like soil dampness level, surrounding temperature and tank water level have nonstop effect on the product lifecycle. By framing sensor arrange, great checking of water direction in the farming field can be accomplished. This paper presents irrigation monitoring and controlling system. The system uses the wireless sensor network to monitor the environmental conditions such as temperature, soil moisture content, humidity and water level of agriculture land for controlling the irrigation and advanced farm compounds is also used to avoid crop damages due to animals. The system has automatic and manual mode. The real time sensed data is stored on the cloud server for decision making and controlling actions. The user can monitor the controlling actions taken at the farm as well as control the irrigation via android app on farmer’s mobile phone.

II. LITERATURE SURVEY

Plenty of research work has been done to improve the performance of agriculture field. In [1] the system uses Arduino technology to control watering and roofing of the green house. It uses statistical data acquired from sensors (like temperature, humidity, moisture and light intensity sensors) compared with the weather forecast for decision making. Kalman filter is used to eliminate noise from the sensors.

Agriculture System (AgriSys) [2] uses temperature, pH, humidity sensors and the fuzzy inference to input the data from sensors. The system monitors the sensors information on LCD and PC. In [3] Wireless sensing Network with ZigBee technology helps to control air humidity, soil moisture and temperature. System is implemented with components as soil moisture sensor, humidity sensor, temperature sensor, ZigBee, 18F458 PIC Microcontroller, water pump, fan, relay and buzzer.

In paper [4], wireless sensor network is integrated with ZigBee to transmit soil moisture level and temperature values. The data is transmitted to a web server using GPRS through cellular network. The data monitoring
can be achieved via internet using graphical application. In [5] the paper explains wireless sensor network for sensing soil moisture level, temperature and relative humidity values. Network lifetime of the node is increased by using sleep - wake up plan. The system in this paper implements clustering of nodes. Graphical user interface (GUI) is designed in MATLAB for data handling.

The paper [6] defines automation for remote agriculture having sensors and actuators connected to IOT gateway running OPC UA server. Cloud services (installing or configuring process controller) are used to change the control rules without updating firmware of remote sensors/actuators. In [7] WSNs integration with Cloud Computing is described. It provides performance comparison guideline for integrating WSN with Cloud Computing to improve performance and to overcome storage and energy constraints of WSN.

All the systems described above are similar in the context of wireless sensor node. The difference lies regarding the communication technologies and the storage of data collected from the nodes. Generally systems use one or more servers to store the collected data. When the quantity of nodes is increased, servers will need more space for storage, resulting in increased cost. This paper proposes irrigation system which describes the combination of the wireless sensor network, IOT communication technology and cloud server to accomplish performance of system and data storage. The proposed system provides remote monitoring and controlling of irrigation with real time sensing of atmospheric and soil conditions like air temperature, humidity and soil moisture. IOT based irrigation improves farm production without any human interference.

III. PROPOSED SYSTEM

The proposed framework causes Farmer to enhance quality and amount of their farm yield by detecting surrounding temperature and moistness esteems, soil dampness esteem and water level of the tank from the field with no human intercession. By utilizing the idea of IOT framework can be more effective. The framework contains remote sensor put in the field to obtain the continuous qualities, an ace hub to get and transmit procured data to the control segment, and a control segment which controls the trickles for watering subsystem. Every hub incorporates temperature, stickiness, soil dampness and water level sensors and also microcontroller and transfer exchanging unit. The detected information from every hub is transmitted to the ace hub by means of IOT.
Once the information is prepared and choice is resolved at the control area with the assistance of water system calculation, the controlling activity is sent to remote sensor hub. The microcontroller from the hub controls transfer exchanging unit and watering subsystem in like manner. Report framework that is an android application is created to convey ongoing field data to Farmer. Additionally it requests that Farmer react to a basic occurrence, for example, ascend in temperature and water necessity for plants. And compound with current pulses is also used for more farm security.

The sensor builds up a direct voltage versus RH yield that is ratio metric to the supply voltage. That is, the point at which the supply voltage fluctuates, the sensor yield voltage follows in the same extent. It can work over a 4-5.8 supply voltage range. At 5V supply voltage, and room temperature, the yield voltage ranges from 0.8 to 3.9V as the mugginess changes from 0% to 100% (non-condensing). The output voltage is converted to temperature by a simple conversion factor.

The general equation used to convert output voltage to temperature is:

\[
\text{Temperature (°C)} = \frac{\text{Vout} \times 100}{5} \text{ (°C)}
\]

b. Moisture Sensor:

![Figure 2: Moisture sensor voltage extraction](image)

<table>
<thead>
<tr>
<th>Soil Condition</th>
<th>Transducer Optimum Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry</td>
<td>0V</td>
</tr>
<tr>
<td>Optimum Level</td>
<td>1.9-3.5V</td>
</tr>
<tr>
<td>Slurry Soil</td>
<td>&gt;3.5V</td>
</tr>
</tbody>
</table>

Figure 3: Moisture sensor voltage out for different soil conditions

IV. SENSOR METHODOLOGY

a. Temperature Sensor:

![Figure 1: Proposed System](image)

V. ADVANTAGES OF PROPOSED SYSTEM
• Advanced IOT Based Agriculture System Consisting Smart Water Supply & Crop Prediction in Cost Efficient Way will improve crop quality.

• Advanced IOT Based Agriculture System Consisting Smart Water Supply & Crop Prediction in Cost Efficient Way will increase agricultural production.

• Advanced IOT Based Agriculture System Consisting Smart Water Supply & Crop Prediction in Cost Efficient Way will avoid crop damage by animals and theft of crops.

VI. CONCLUSION

The investigation and examination identified with the interconnected field investigations of Internet of Things, Machine-to-Machine and Remote Sensor and Actuator Systems, it was conceivable to recognize that there are different advancements over the most recent few years; there is still issue to address in regards to the produced and gathered information. The framework proposed in these undertaking, plans to prompt the blend of such frameworks with the alluring highlights offered by IOT. This joining could be connected to the agricultural applications. The mechanized water system framework exhibited in this work was discovered more feasible, and can oversee water system water supply all the more adequately. It improves the utilization of water for water system reason and crop security. It demonstrates that water utilization is lessened with the execution of soil-dampness based computerized water system framework.

REFERENCES


