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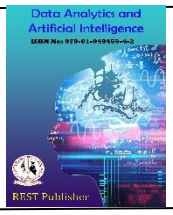

Advanced Smart Agriculture Assistance System for Production Improvement

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Abstract: Smart Farms is an agriculture management system using the current technology to enhance the quantity an amount of agricultural production. Farmers nowadays are having access to GPS, soil testing, managing data, and IoT technologies. The main objective of this contribution, is to incorporate smart farming techniques is to build and mini stratify support mechanism for managing farms. Smart farming considers the issues related to climate change, increase in population and labour that has earned a lot of industrial attention, from implanting and irrigating crops too bat in healthy harvesting. Using Sen surplice light, humidity, temperature, soil moisture, etc. in IoT structure is built for observing the yield in the field and powering the watering system.

1. Introduction

IoT in a farming context turns every element and action involved in farming into data collected by using devices like sensors, cameras, etc. There is a need of smart farming methodology in order to expand and advance the agriculture system. Smart metropolises use IoT tools to collect and analyses data using sensors, meters, and lights. This data is used by the cities nor Detroit protein restructure, public facilities and services. The yield per acre of Landis increased by using methods like efficient water management, humidity and soloist true monitoring, etc. The inappropriate and excess usage of pesticides and fertilizers can be kept away by the application of accurate farming which internal lows the farmer to increase the quality of land nature. The precision farming gasses a savior while the water intensities in our country are falling at a swift rate because unparalleled claim by the agricultural and manufacturing sectors. The skill-developed migrants in India who had returned to their native places during the Pandemic COVID-19 recently picked farming as their primary job. These migrants can easily get adopted to smart agriculture systems.

2. Literature Survey

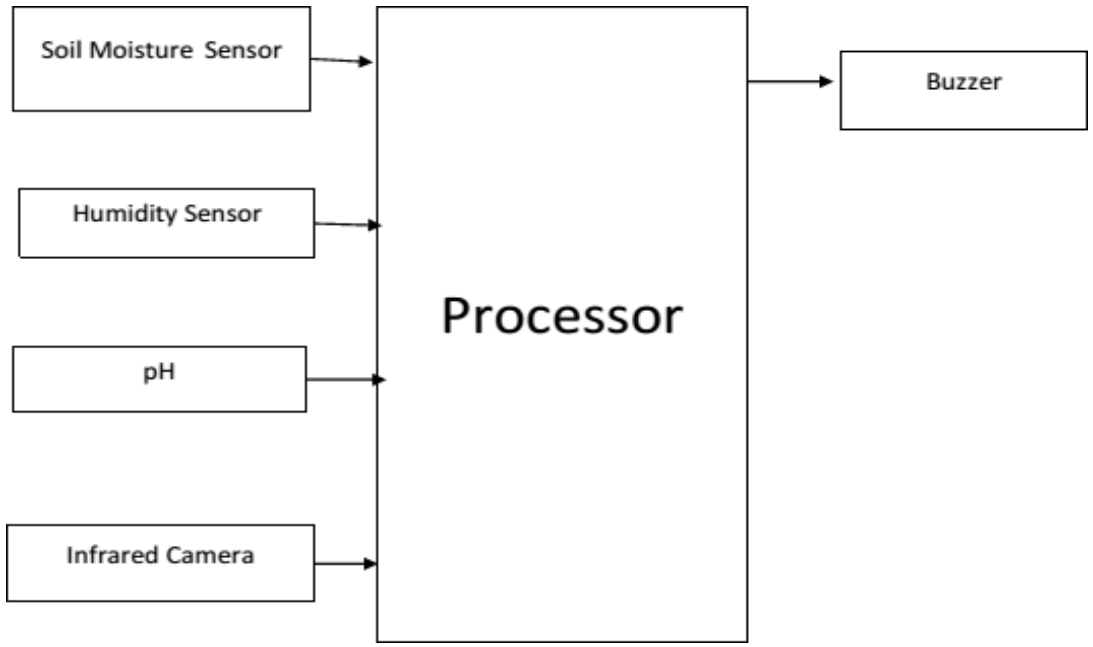
The IoT is modernizing the agriculture by involving the farmers and utilizing awed range of strategies, like accuracy and conservative cultivation, to address field difficulties. According to Galati et al. (2015) [1], an irrigation scheme focused on soil water monitoring, by calculating the volume of the water required for irrigation is one of numerous modalities sthatre searched shave of freed forte agriculture in dusty. This relies on the Bluetooth communication technology, which has its own restrictions on device compatibility and range. In order to increase energy efficiency, Nikeshetal., recommended scheduling the power supply to the sensors in the year 2016[2]. Usage of Internet of Things in farming is described by an author in paper Suomi Hebel [3], but lacks demonstrating interoperability, which is essential when discussing vast agricultural landscapes. For an energy comparison of two appliances, Jinn soon providing a method in his paper. Suma et al., [4]. N.K. Surya dear et al., has employed ideas from pervasive computing, data aggregation, and other related technologies to track environmental parameters using ZigBee. Apparat Malayali, et al., [5] in their paper, implemented with more nodes which may cause issues with increased power consumption. The agricultural automation is demonstrated by R. Nageswara Rao and Sridhar, [6], defines a method for giving farmers real-time information about their land and crops. Apparat Nalajalaet al., [7] is a standalone system and delivers the relevant information. Yick, et al., [8], the concept of phono net was introduced. The work by BJ Bimetal., [9], which is anew work of intelligent wirelesses so nodes that communicate with both the central system a de ache there to share information.

3. Methodology

In this IoT based smart farming system Node MCU is used as processor linked with sensors soil moisture sensor, pH sensor, Infrared Cameras, Humidity sensor and actuators Buzzer and a Pump motor. Soil moisture sensor calculates the quantity of water content available in the soil and gives it as the input to the processor. If the water is available in excess, then the soil will be less resistive and hence conduct more electricity and hence the level of moisture is high. Humidity sensor measures the moisture content and temperature of air of the surrounding environment. Humidity quantifies the concentration of water vapor exist in the air. Data is collected as input from these sensors, process sedan instructions will be sent to the motor. If the soil moisture and humidity Sen so value area smaller amount than the three should value, then the process sorgivesins tractions to turn the motor ‘ON”. The processor checks the soil moisture and humidity levels constantly and up-

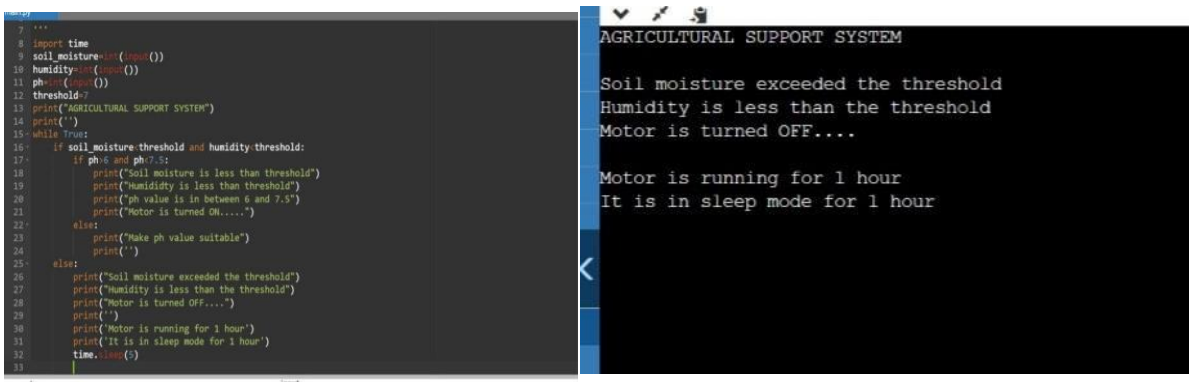
dates the processor, if the soil moisture and the humidity levels are larger than the threshold then the motor is turned 'OFF". pH sensor determines the pH value of the soil constantly if the pH is abnormal i.e., greater than 7 or less than 6.5 then the processor sends an alert / buzzer to the farmer. Infrared cameras are used for surveillance of the agricultural field. These are installed data the Agricultural fields which captures the boundaries of the field Dall time. When there is anonym aloha per son enters the field then the farmer gets an alert / buzzer. Figure 1 shows the block diagram of the advanced smart agriculture assistance system. Figure2 shows the working flowchart of the advanced smart agricultures distance system**.**

FIGURE 1. Block Diagram of Advanced Smart Agriculture Assistance System



4. Results and Discussion

Initially the soil condition and moisture is read to set perfect conditions to yield. The soiled corsage used to acquire precise root zone data from underground where the development certainly takes place and transmits this data to the Observing Service, which converts tin to significant information for agriculturalists which can be used to handle their most important challenges and increase crop production and quality sustainably while reducing working costs and water consumption. The excessive amount of humidity for air at the same temperature is then associated with the live humidity evaluation at that temperature to determine the relative humidity. The relative humidity must be calculated, and sensors are required to measure the temperature. The soil threshold and humidity threshold are specific values indicating water availability for plant consumption. These thresholds are used to determine the quantity and time of water requirement for irrigation. The pH value is calculated on a scale from 0 to 14, less than 7 is considered acidic, whereas more than 7 is considered basic, considered as neutral if the pH value is 7. Neutral soil provides the best circumstances for plant growth and development. After checking the second it ion the motor will turn on then after sometime the system measures the soil moisture levels and humidity levels constantly and the motor will turn off when the levels are ok. Figure 3 shows the output of the advanced smart agriculture assistance system**.**



```
'''
import time
soil_moisture=int(input())
humidity=int(input())
ph=int(input())
threshold=7
print("AGRICULTURAL SUPPORT SYSTEM")
print('')
while True:
    if soil_moisture>threshold and humidity>threshold:
        if ph>6 and ph<7.5:
            print("Soil moisture is less than threshold")
            print("Humididty is less than threshold")
            print("ph value is in between 6 and 7.5")
            print("Motor is turned ON.....")
        else:
            print("Make ph value suitable")
            print('')
    else:
        print("Soil moisture exceeded the threshold")
        print("Humidity is less than the threshold")
        print("Motor is turned OFF....")
        print('')
        print('Motor is running for 1 hour')
        print('It is in sleep mode for 1 hour')
        time.sleep(5)
```

```
AGRICULTURAL SUPPORT SYSTEM

Soil moisture exceeded the threshold
Humidity is less than the threshold
Motor is turned OFF....

Motor is running for 1 hour
It is in sleep mode for 1 hour
```

FIGURE 2. Output of Advanced Smart Agriculture Assistance System

5. Conclusion and Future Work

Our automated smart agriculture uses fewer resources and less time compared to manual farming. Utilizing the Internet of Things sensors are connected and measures the humidity, soil moisture content in the field. This technique works well under ideal circumstances, such as with sufficient lighting or illumination. The focus of future work will be on improving the sensors to gather more data, especially in regard to pest control, and predicting the output thus suggesting the farmers for selection of crops of agriculture based on weather condition, soil type and appropriate pest control mechanism to be utilized.

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