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Smart Irrigation System

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ABSTRACT

Today, there is a small crop due to the change in weather or environment of the livestock farm. It is a cause of different effects like increasing rates, the reduction of yield and the risk of disease in the farm has increased whether the Agri farm and beef cattle, pigs, broilers etc. If there exist devices that serve to inform the strange environment of the home, it can aid farmers to combat such issues. The agriculture sector is a critical sector for stable food supply within our nation. The invention of an automatic environmental monitoring can contribute significantly to the development of the agriculture sector. In current system, the Agri requires a presence of manpower to check the climate manually to the Agri. Proposed system's usage can substitute the manual to automatic state for the Agri thereby solve the labor issues in the industry and bring an automatic IoT process into the agriculture industry. The Proposed system can be used in Agriculture Farm and Agriculture sector. This project emphasized the technology-driven solution for low cost, asset saving, quality focused and productive management of Agri framing. This project aimed to investigate using an Intelligent System that employed an Embedded and IoT Framework for monitoring Agri farm to regulate environmental parameters through IoT and technologies.

INTRODUCTION

Today, Agriculture sector is a significant sector for sustainable food supply in our nation. The creation of automatic Agri feeding machine can be greatly beneficial to the development of the Agriculture industry, the sprinkler for controlling the temperature is the most labor-intensive task and the most significant task. All these manual procedures are required in typical Agriculture farm. To make Agriculture work easy by replacing manual Activities and Agriculture work simpler with making smart Agriculture farm. For smart Agriculture farm to utilize one type of smart system for Automatic Food Feeder in container and water sprinkler for controlling the temperature of environment. System is made in such a manner that user can remotely control to the system using android mobile application. With the help of this prototype Human work is also reducible and smart work will be performed.India is counted as an Agriculture rich Country of food and prime place in India as the eggs and Agri meat are decisive and affluent sources of protein, vitamins and minerals. Agriculture provides rich natural feces and is a vital source of income and employment to vast numbers of farmers and other persons engaged in concerted activities in the Agriculture business. Agri is the most broadly acknowledged meat in India. The health of Agri depends on the environment in the Agriculture farm. If the surrounding should not meet with the requirements then there can be question of growth of Agri and such health issues. Healthy agri grows quickly and has good demand on the market. The layout of agricultural farms allows for the use of features like ventilation, cooling, and lighting on the floor, walls, and rough surfaces to vary the environmental conditions. The micro-level climate that surrounds the birds is crucial to their well-being. This project introduces a new concept that transforms traditional agri-farming into smart farming by utilizing the newest, most advanced technologies. The smart farm sends environmental parameter data (temperature, humidity, smoke, weather, etc.) to a desktop computer via sophisticated sensors and a microprocessor. Smarter technologies like sensors, microcontrollers, and application programs are being incorporated into the farm to automate agricultural production.

RELATED WORK

An IoT-based smart agriculture farm monitoring system that tracks environmental factors including temperature, humidity, and air quality was proposed by Sharma et al. (2020). The system utilizes sensors to monitor real-time conditions, sending alerts to farmers when any parameter deviates from the optimal range. This system allows for better control of the farm environment, improving Agriculture health and

productivity by minimizing environmental stressors.Li et al. (2019) emphasized the incorporation of embedded IoT devices for environmental monitoring in Agriculture farms. The system gathers information on several parameters, such as temperature, humidity, and ammonia levels, and sends the data to a cloud platform. With remote access for farmers to real-time data, the system allows for immediate corrective measures, eliminating the risk of diseases and maintaining a healthy environment for Agriculture. Zhang et al. (2021) integrated IoT and artificial intelligence to develop a predictive Agriculture farm monitoring system. It utilizes machine learning algorithms to predict environmental fluctuations and make changes in the ventilation, heating, and cooling systems based on it. Through forecasting probable interruptions in advance, the system keeps the agriculture house at the optimal temperature and humidity, enhancing productivity and energy savings.Patil and Yadav (2018) created an IoT-based system for temperature and humidity management in Agriculture farms. The system automatically controls the environmental conditions using sensors and adjusts the ventilation and heating systems of the farm. The method minimizes manual intervention, saving time, and keeping the Agri in the optimal condition for maximum growth at all times.Mohan and Raj (2020) suggested a cloud-intelligent Agriculture farm monitoring system where farmers can remotely view real-time information from anywhere. The technology provides farmers with actionable knowledge by tracking many environmental parameters, including temperature, humidity, and air quality. Cloud storage and processing ensure scalability and availability of the system so that farmers can monitor several farms with ease.Khan and Faisal (2019) proposed an IoT and embedded technology-based system for environmental monitoring in Agriculture farms. The system utilizes a sensor network to monitor temperature, humidity, and airflow, sending this information to a central unit. The solution enables farmers to make informed decisions, which ensures improved environmental control and overall farm performance.

Singh and Kumar (2021) have proposed an IoT-based machine learning Agriculture farm monitoring system. It utilizes current environmental data in conjunction with machine learning to forecast and anticipate harmful environmental conditions. Alarms are raised when conditions pass set thresholds, allowing farmers to countermeasure before Agriculture health is affected**.**Zhao et al. (2020) suggested a smart IoT system for Agricultural environment monitoring for Agriculture farms. To monitor environmental factors like temperature, humidity, and light intensity, their system uses a collection of sensors. Through constant data collection and reporting to a cloud-based system, farmers can operate their Agriculture farms more effectively with enhanced production levels and the well-being of the Agri.

Ahamed and Sangeeta (2021) proposed an IoT-based cost-effective environmental monitoring system for small-scale Agriculture farms. The system provides a low-cost means through which farmers can monitor temperature, humidity, and air quality to make real-time adjustments to farming activities. The system is straightforward to install and maintain, a feature that enhances its affordability by farmers with constrained resources.Chavan and Shinde (2021) created an IoT-based Agriculture farm monitoring and control system that automates environmental condition regulation in Agriculture houses. The system checks temperature, humidity, and air quality, and adjusts them in real-time for optimal conditions. By minimizing manual intervention and overall environmental quality, the system maximizes productivity as well as animal welfare.

PROBLEM DEFINITION

This book is specifically concerned with broiler chicks. Laying time, egg weight, and mean broiler weight are a few examples of the environmental and climatic variables that have a significant impact on the earnings and productivity of the production, all of which are crucial to the birds' well-being. The henhouse, or incubator, has to be able to control the illumination, humidity, water use, and length of light, in addition to measuring and monitoring these variables. Whenever environmental data fall below the necessary levels, it is quite probable that respiratory, digestive, and behavioral diseases will manifest. This results in the decrease of food consumption and ultimately raises mortality rates and incidence of diseases. Most Agriculture farmers are conducting different operations manually.

- Thus, they suffer immense monetary loss due to incorrect weather prediction and failed procedures used in traditional farming.

- • New technical approaches are therefore required to effectively and continuously enhance the sustainability, profitability, and productivity of large-scale agricultural systems.
- • A fully automated farm that aims to improve production and provide an ideal habitat for the broilers (chicks) is called an integrated agriculture farm.

EXISTING SYSTEM

So far, farmers have not been able to reap the supplementary advantages of modern farming since it is entirely manual. Agrarians used to routinely consume entire grains as a scratch feed or supplement to their regular diet a few decades ago. Automatic feeding systems, which mostly use full-fed complete meals, became the dominant method of feeding with the emergence of large-scale agricultural production. One of the primary tasks is the entire care of Agri, which includes monitoring and managing the environmental elements related to an agricultural field. The goal is accomplished by means of a system that relies on sensors. A key component of environmentally controlled agriculture is the use of PLCs for automation in farming. Every hour of the day and night, these ECA sheds go into automatic mode. With less work and fewer mistakes made by humans, it will increase productivity. Most Agriculture farmers are conducting various operations manually.

- The present automated lighting system and the use of counters that run both ways to count how many people are entering the farmhouse overall.
- Robot based system can be operated through the gestures of human parts watching over the farm.
- To find out how many individuals have entered the farmhouse, we employ bidirectional counters and the current automatic lighting system.

DRAWBACK

The old Agriculture farms do not have effective and efficient management to sustain health and growth of Agri.
Manually carrying out varied operations.
Hard and costly in manual maintenance
Also the inefficiency of maintenance produces less growth of Agri.

PROPOSED SYSTEM

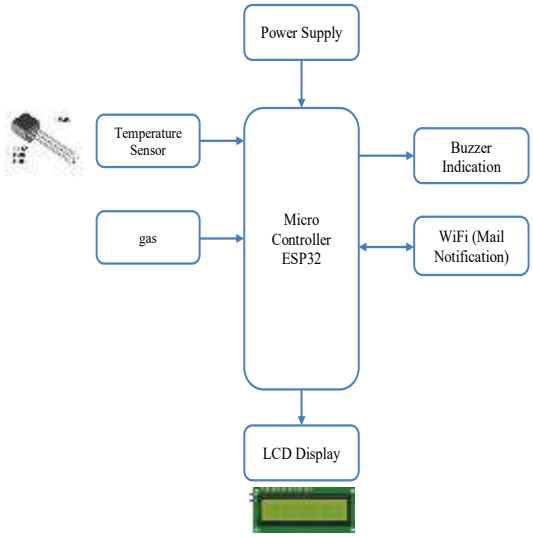
This whole thing runs on autopilot. It is impossible for us to tell whether any Agri has been affected by illnesses just by looking at it. Because of reason, In order to measure the temperature of the specific Agri in the agricultural field, we suggested this kit. to use Internet of Things (IoT) technologies to construct a farm that practices smart agriculture. The temperature may be controlled by the system. to provide water, and it also serves as a food feeder for the agricultural sector. Verifies agricultural farm's temperature and humidity.

- Our team has developed a system that uses sensors to measure environmental factors, such as humidity and temperature.
- The Arduino microcontroller processes the data collected by the sensors.
- The Internet of Things (IoT) solution that stands out in this project is the ability to monitor conditions like temperature and humidity as well as the existence or absence of electrical connection, regardless of time or place.
- While building a Smart Agriculture farm, an Internet of Things (IoT) based system should be developed.
- The Agri-system may help control the temperature so that water can be produced.
- Temperature, water level, and daylight condition are just a few of the parameters that our system uses sensors to detect.
- Regardless of time or place, the project highlights the Internet of Things (IoT) solution for temperature and condition monitoring, including things like the existence of an electrical connection.
- According to the system's recommendations, these tasks should be carried out by a completely automated system that takes into account almost all environmental factors, including temperature, light, and water supply.

ADVANTAGES

- The design offers an efficiently automated monitoring system.
- The automated system is utilized to enhance the health and development of Agri.
- Generate a tremendous profit and good revenue from Agriculture farming.
- Also offers an effective and economical solution for Agriculture farm management.

ARCHITECTURE



PROJECT DESCRIPTION

Among the features of this automated lighting system are controls for the water feeder, temperature, and humidity.

Automatic Light Switching System

Sunlight may reach the agricultural land via two mesh apertures, providing enough lighting throughout the day. If the farmer wants to check on the chicks' health, he or she may sneak onto the farm at night. For this reason, an automated lighting system is essential for agricultural farms. During the day and night, the farmhouse's LSR sensor detects light; when the door opens, the infrared sensor picks up motion and feeds that information into the microprocessor, which in turn activates the light via the relay. After motion detection is lost, the light goes off.

Climate Control System (Temperature Control)

The real-time data from a temperature sensor will trigger the automated activation of a fan or heater. When it comes to measuring temperatures in the home, a simple LM35 sensor will do the trick. When the microprocessor detects that the Agriculture home needs more heat or less, it activates the appropriate heating or cooling system. Along with energy savings, it creates a comfortable environment for cattle that doesn't need lengthy human monitoring. Whether the Agriculture house has to be humidified or dehumidified is determined by the sensor, which also has a humidity sensor. An electric jug produces steam, which is used to humidify the Agriculture home whenever the sensor's humidity reading drops below the threshold. When the relative humidity climbs over a specific threshold, the exhaust fan turns on. When there is too much moisture in the air, the exhaust fan removes it.

Water Supply Control

Another component of the system is a water level sensor. This sensor is designed to detect when the water level drops below a certain threshold. It then communicates this information to the microcontroller, which then activates the pump by sending a high output signal. The pump is activated to replenish the water feeder. Furthermore, when the water feeder reaches the higher threshold level, the sensor alerts the microcontroller to shut off the pump. The water level sensor was reset from its normal range of 1-

1023 to a range of 1-100 using the map function in the Arduino library to offer the most accurate readings. The sensor was given a 90-10 range. where the lower bound is 10 and the upper bound is 90.

Wireless Fidelity (WiFi)

In order to facilitate remote data gathering from the integrated agricultural equipment, a WiFi system on a chip (SoC) is also connected. The ESP32 system on a chip (SoC) is built around a low-power Xtensa® 32-bit dual-core LX6 CPU that operates at 240MHz. It has a Wi-Fi baseband protocol processor, 448kB of read-only memory (ROM), 520KB of static random-access memory (SRAM), and numerous other peripherals that are used to connect the sensors and actuators. The complete library support for the Arduino-esp32 port was used to connect the application code to the connection. A reasonable 25-meter Line of Sight is effectively achieved by the installation. With the right network credentials, any TCP client may access the data regardless of the host device (PC, tablet, or smartphone), making the system data streaming interface extremely flexible.

IMPLEMENTATION

Hardware System Design

The agricultural farm makes use of LDR sensors, LM35 sensors, and water level sensors to gather data. On to the microcontroller (ESP32) goes the collected data or information, heat source, and fan, which are 12 V and 240 V, respectively, and exceed the 5 V supplied by the ESP. The microprocessor receives data from the light-dependent resistor (LDR) sensor and uses it to operate the lighting system. Based on the data collected from the LM35 sensor, the microcontroller regulates the humidifier, heat source, and fan via relays. According on the readings from the water level sensor, the microcontroller determines whether to power on or off the LED. In order to indicate that the pump has been operated, the LED is switched on whenever the water level falls below a predetermined level.

Climatic Condition

The temperature and humidity conditions at the agricultural farm were carefully controlled to ensure the health of the chicks. In order to get reliable readings of the hot and cold air temperatures in the agriculture farm, the environmental monitoring was executed with precision utilizing LM35 sensors that were strategically placed near the chicks without being in their way. Half of the total temperature data and half of the total humidity readings from the two LM35 sensors were used to calculate the average values of the two variables.

Automatic Lighting System

A door-hinge-mounted switch was designed to be pushed when opening the door, which in turn sent a signal to the microcontroller to turn on the lighting system. It was possible to light the farmer's way at night.

Automatic Water Supply System

When the tank was almost full, the sensor registered 90. In contrast, the water level sensor displayed 10 when the tank was almost empty, using 10 as the lower threshold. It was programmed to activate the pump if the water level dropped below 10 and deactivate it once it rose beyond 90.

Real-Time Monitoring with Liquid Crystal Display (LCD)

In addition to displaying the current date and water level, the LCD could also display the relative humidity and temperature. For the purpose of fitting all the necessary letters and numbers into the 16 by 2 LCD, the parameters: light, temperature, and water level have been condensed to LIGHT, TEMP, and WATER. Agricultural system monitoring was made easier by the LCD showing real-time data of the farm.

CONCLUSION

Additionally, the design and construction of an Internet of Things (IoT) agriculture farm that can autonomously detect and manage environmental conditions was a success. In order to maintain the ideal environment for broiler chicks, the controller module constantly monitors and makes adjustments. The goal of improving productivity and the environment will be helped by the automated system. The weather on the farm is perfect for the broiler chicks because of the agriculture. A device that can track humidity and temperature using a smartphone is the Agriculture House monitor, which is based on the Internet

of Things. The user will get a sense of the agricultural situation from the data presented. This device may be used as a monitoring agent in any type of controlled environment, such as homes and workplaces, in addition to agricultural houses.The system might be upgraded in the future with new hardware or software features. In order to improve the research experiment report and the production of high-quality cattle, this role might be extended to include prediction functions that analyze the collected data.

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