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TEMPERATURE AND HUMIDITY ANALYSIS USING ML FOR PRECISION AGRICULTURE

Engineering

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ABSTRACT

Modernisation is evolving with time in every sector of human life. Technology is appearing to be a basic need in every sector. Agriculture, greenhouse and nurseries contribute a major part of our routine. Internet of things, Machine Learning and Artificial Intelligence are being widely used in these sectors. Our project proposes a well-defined and structured process where the measures of temperature and humidity in the surroundings are observed, analyzed, and displayed to the outputs. With the machine learning approach, it is possible to take dynamic decisions whereas in traditional agriculture manual processes are being used widely for every possible activity. IOT plays an important role in the collection of data in which different interfaces are connected across the structure. Machine Learning delivers a brief part of the model building and process of prediction, where a linear regression module will be used. These measurements are meant to be useful so one can study them and the needed decision can be taken accordingly. This project is an attempt to grow the technical hands in the ground sectors.

KEYWORDS

Temperature, Humidity. Machine Learning, wireless.

INTRODUCTION

Environmental parameters are the crucial contents of any structured process. These parameters can decide the flow of the field following the results. Modern agriculture or development in various agriculture sectors is growing daily. Along with the development the study and analysis of various atmospheric parameters need to be studied for better results. As communication delivers an important role in different domains of modernization it also participates in the development of agriculture and other consecutive sectors. Communication is a developing sector, with the initialization of the wired structure, the wireless communication system came to a peak after the observations of the requirement and demand. In addition to this Cloud Computing helped the concept in domains of transferring and storing data. The design and Implementation of various types of sensors can carry out the processes of collection, monitoring0, transferring, and analyzing the data. Temperature and Humidity are some parameters that can be studied and analyzed with the Machine Learning algorithms for doing the required adjustment in the agriculture system to get the expected result.

The designed architecture focuses on the development of wireless temperature and humidity monitoring prototype system with the initial emphasis on measuring the temperature and humidity of surroundings. In many industry sectors, domains of the production and fabrication room develop a adjustable air-conditioned clean rooms. In food production industry, the storage monitoring is to preserving the food items in certain period for sustainability of the food contents safety and good well of quality. Legal requirements say that specially prepared, air-conditioned rooms should be essential for processes such as semiconductor manufacturing, components fabricating and electronics assembly to constantly regulate and control air humidity.

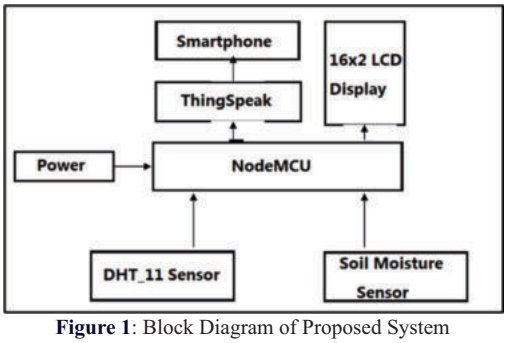

Figure 1: Block Diagram of Proposed System

For consistent, comparable, and functional results, those working in fabrication room, production sector and clean rooms require stable, controlled atmospheric conditions. The temperature and humidity is particulars sense to influence the nature and properties of materials, as well performed of chemical operations. Humidity is a primary initiator for developing effects on electronics and a constant threat to efficient production and quality results. The necessity of this system is to reduce the manpower on controlling environmental parameters like air temperature and humidity of surroundings in various sectors as the effect of decrease in the devastating effects on electronics components.

The system will work with cloud platform through NodeMCU and activate humidifier automatically when temperature and humidity of certain atmosphere is out of the safety range irrespective of presence of the user in particular region. Humidity and temperature of the room could be controlled and monitored microcontroller by using a DHT-11 sensor and Arduino board. DHT-11 sensor is accurate and adequate for temperatures between-40oC to 80oC with an accuracy of approx 2°C.

APPLICATION AND FUTURE SCOPE

Focusing on the health of the crop by checking the temperature and humidity of the soil and study the temperature and humidity pattern of the surrounding weather then decide when and how much to provide water using intelligent Machine learning algorithms for the efficient growth of the crop or overall yield. Currently this prototype is developed, so it can be used in various applications such as agriculture, warehouses, cold storage and can be implemented in self owned clay ovens. This design will play a major tole for horticulture industry as it analyses temperature and humidity which is best suited for specific plant.

RESULTS

Based on current-day the system is working on tested data and is fully ready for real-time implementation procedure. Total architecture on installation will work in sections of collecting, transferring, storing and displaying the data. We are using Machine leaning algorithm like decision tree that will measure soil moisture and other parameters and then will be shown on a customized application.

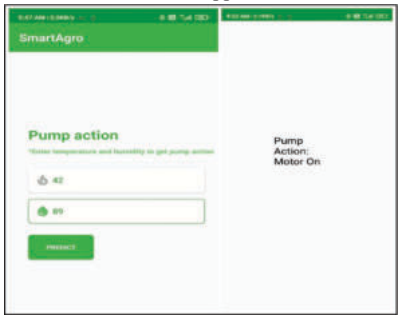

Figure 2 : Application Interface input output

Sensors will transfer the information where ThingSpeak platform will act as a mediator to transfer. Store and display it. The outputs can be varied in various time zones, regions, and atmospheric conditions. The output is collected according to set time slots (2 Hours & 2 Days) and limited in limited parametric sections.

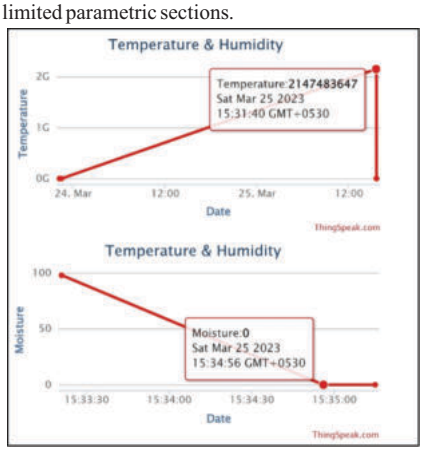

Figure 3 : ThingSpeak Moisture Vs Time Ratio

CONCLUSION

This study proposes an automated intelligent system that can integrate and deploy Machine Learning and IoT concepts and capabilities with an existing design. With real-time sensor data, a framework allows the user to control and monitor between the device and the fog layer, and vice versa. Furthermore, data are stored in the cloud and are accessible from anywhere. Furthermore, using the Internet of Things concept addresses one of the most pressing concerns in automation today, maintenance, by offering a platform for monitoring the entire system from the cloud, lowering maintenance costs. As a result, the proposed system uses the Machine Learning algorithm and IoT to help farmers while simultaneously enhancing the yield by maintaining accurate factors such as soil moisture, temperature and humidity. The findings for elements such as soil moisture, temperature and humidity for the plants are investigated using a graphical depiction based on real-world data collected using the suggested model. A graphical representing equipment is used to keep track of elements from afar, including soil moisture, temperature and humidity. Farmer may collect these data using a cloud account and an internet connection. Finally, using regression-based supervised ML algorithms, the performance of the innovative system is evaluated for intelligent, precise management.

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