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IOT BASED GREEN HOUSE MONITORING SYSTEM USING ARDUINO

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Abstract: Farming is a conventional method that is considered to be time-consuming and needs a lot of work and effort. The greenhouse is designed for proper monitoring and controlling the health of the crops by developing a system; as not every time a human can look after their crops. The system will help to monitor and maintain crop health automatically. There are multiple challenges for plant growth that could control with the help of a greenhouse.

A greenhouse is an exceptionally outlined homestead structure building to give a more controllable environment to better harvest generation, crop security, product seeding and transplanting. Also, the accessible space of area for developing yields has been altogether diminishing, following to more space of area is vigorously utilized for housing and commercial ventures as a part of this present day period. In most tropical nations, the utilization of greenhouse has been developed for cost effective farming i.e. organic products, new blossoms and vegetables generation. The effectiveness of plant creation inside greenhouse depends fundamentally on the conformity of ideal atmosphere development conditions to attain to high return at low cost, great quality and low natural burden. To attain to these objectives a few parameters, for example, light, temperature and humidity, soil moisture must be controlled ideally given certain criteria through warming, lighting, ventilation and water creation. Persistent checking and controlling of these ecological variables give significant data relating to the individual impacts of the different elements towards acquiring most extreme harvest creation. Greenhouse situations present remarkable difficulties to great control.

Hence the proposed work consists of developing an automatic monitoring system using sensors which can be helpful to produce better quality crops. The proposed system will be implemented using Arduino. The system consists of sensors that can monitor water levels in the crop, soil moisture control, control C02 concentrations, pH sensor, regulate the humidity in its environment. Thus, by introducing different types of sensors, crop diseases can be detected and the live tech 720 p camera will be used to detect animals before they damage the crops in the fields.

I: INTRODUCTION A Greenhouse can be defined as a close structure that is used to protect the plants from external factors such as climatic conditions and product pollution. It offers a sustainable and efficient development of the plant throughout the year. Growing crops is a beautiful activity that makes a farmer proud of himself, for he has created a new life. Crop production requires varying farm activities and constant maintenance in order to provide a high and healthy yield. A greenhouse is a framed structure that is used for the production of fruits, vegetables, flowers, and any other plants that require special conditions of temperature and humidity.Greenhouses warm up during the day times when sun rays penetrate through them, which heat the plant, soil, and the structure.The environment inside the greenhouse affects the quality of the plant. In this case, it is very important to manage parameters like temperature, light, and humidity. In this project, Arduino enables the user to track different parameters in the greenhouse automatically for improving plant growth.

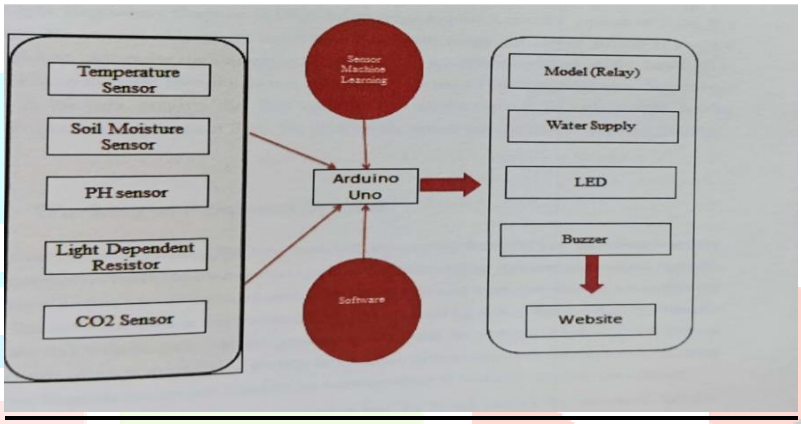
Basic factors affecting plant growth are sunlight, the water content in the soil, temperature, humidity sensor, pH sensor, C02 gas sensor.Monitoring of greenhouse environment play an important role in greenhouse production and management. To monitor the greenhouse environment parameters effectively, it is necessary to design measurement and control system. The objective of this project is to design a simple, easy to install, microcontroller-based circuit to monitor and record the values of temperature, humidity, soil moisture and sunlight of the natural environment that are continuously modified and controlled in order optimize them to achieve maximum plant growth and yield. The controller used is a low power, cost efficient chip manufactured by ATMEL having 8K bytes of on-chip flash memory. This project is designed and developed on "Arduino uno". It communicates with the various sensor modules in real-time in order to control the light, temperature, humidity, pH sensor, soil moisture efficiently inside a greenhouse by actuating water pump and lights respectively according to the necessary condition of the crops, Also, the use of easily available components reduces the manufacturing and maintenance.

II: EXISTING SYSTEM The concern with a lot of consumer needs and demand for the agriculture products has stimulated awareness among the farmer that increases their products in the market by implementing advanced technologies in this industry. Sensors allow farmers to collect various data points at unprecedented granularity. They provide real-time information on critical climate factors including, temperature, humidity, pH sensor, light exposure, and carbon dioxide across the greenhouse. This ensures irrigation and fertilization activities are on par with the actual needs of cultivated plants for maximized yields.

III: PROPOSED SYSTEMS Food shortage is one of the biggest problems confronting mankind in the 21st century. Global warming and weather elements have affected substantial landmass that was available for crops cultivation. Crop diseases, if not treated timely and properly, can significantly reduce the yield, thus endangering global food security. For this reason, disease protection is the most important task for every farmer. Since early detection can successfully control the disease. To solve the problem of monitoring the crops and make crops of better-quality good connectivity between greenhouse and client is needed. Thus, our proposed work is to develop a prototype comprising of a sensor network (SN) based node, Machine Learning that is active to monitor the climatic parameters with air temperature, air humidity, soil moisture, air carbon dioxide, and light intensity, within a greenhouse environment. measure the differences in surface temperature of the plant leaves and canopy. The sensor captures infrared radiation emitted from the plant surface. Thermography sensors can detect the changes due to the disease before it even appears. and crop protection from animals will be implemented by fixing the live tech720 p camera. If any animal is detected then the buzzer sensor will get activated automatically and also client will get notification.

PROPOSED SYSTEM

IV: WORKING



BLOCK DIAGRAM

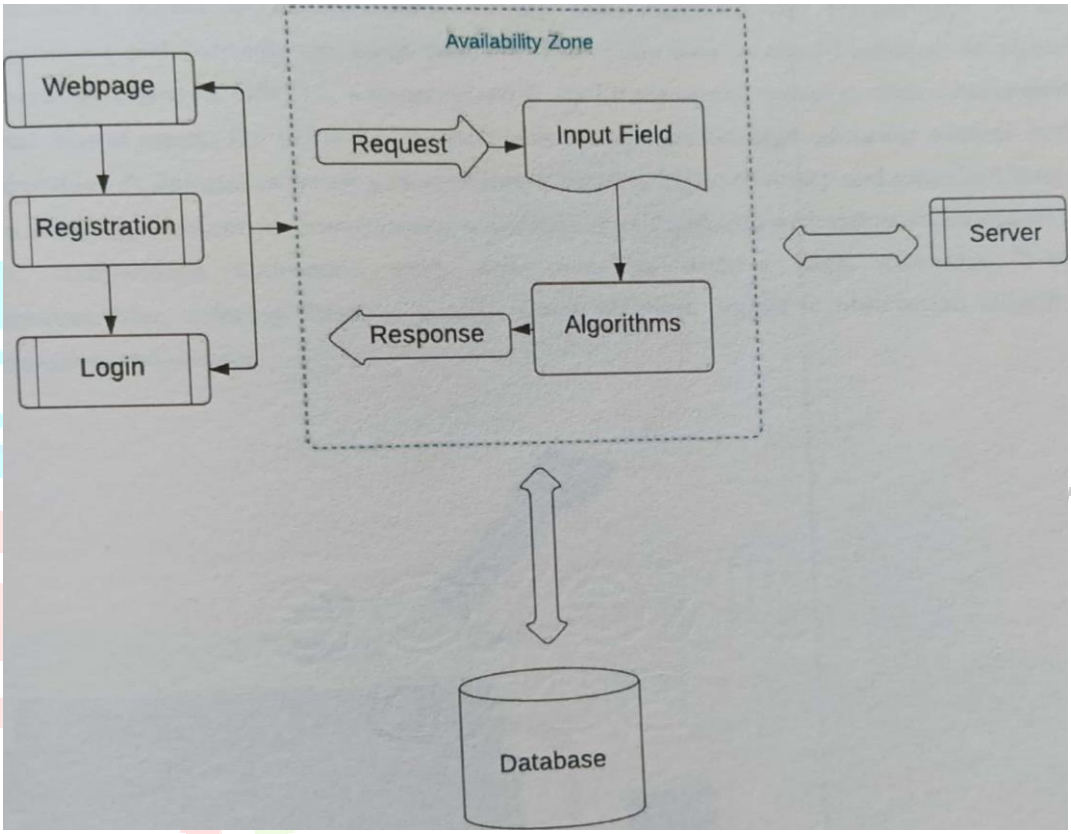
In our project we collect the data from 10T sensors like from DHTI I we collect humidity [a]nd temperature value then we connect soil moisture sensor to Arduino and collect moisture [d]ata from it, also we connect c02 and LDR sensors to and from that sensors we collect the data. We use these data to analyse and take action based on it. For that we have to integrate Arduino and website part. For integration we use flask framework. Flask is a one type of framework which is available in python to integrate python with web (Html, CSS). By using flask we integrate our project features on website which is useful to monitor greenhouse

Our first module is to detect disease from leach So in this module we use neural network algorithm to identify and classify that disease. When user upload any leaf image on our user-friendly website then we feed that image to trained neural network algorithm (CNN). A digital camera or similar device is used to take different types of pictures and then they are used to identify the alTected area on the leaves, then different types of image processing techniques are applied to them, processing these pictures to obtain different ones and useful functions required for this purpose. The identification of plant leaf diseases is particularly necessary in order to predict both the quality and the quantity of the first segmentation step, which is mainly based on a smooth polygonal leaf model that is first created and then used to calculate the development of an energetic contour by combining the global shape descriptors of the polygonal model with local curvature features, the leaves on the back are classified in data sets.

The first segmentation step based on the graphical cutting approach is carried out first and then used for guidance. The development of leaf boundaries and implementation of classification algorithms to classify diseases and recommend fertilizers for affected leaves. The leaves are attacked by bacteria, fungi, viruses and other insects. The algorithm classifies the image of the sheet as normal or affected. like colour, shape, textures. Then hyperplane was created with conditions to categorize the pre-processed leaves and also to implement a multiclass classifier to predict diseases in the leaf image with greater precision.

Our second module is to detect which crop is suitable for greenhouse environment. For that we collect the live data from 10T sensors which are connected to Arduino. Then we feed to trained machine learning algorithms which predict some values like N, P, K and

crop name. Precision agriculture facilitates in reduction of non-suitable crop that so will growth Productivity, apart from the following benefits like efficacy in enter in addition as output and better selection making for farming. This approach offers answers like providing an advice machine through an ensemble model with majority preference strategies mistreatment random tree, SVM and Naive Bayes as learner to recommend suitable crop supported soil parameters with excessive precise accuracy and potency. The categorized image generated via way of means of those strategies includes floor reality statistical data and parameters of it vicinity unit weather, crop yield, state and district sensible crops to expect the yield of precise crop under particular weather condition. The layout consists of collection period of time records and constructing the prediction model so creating a user interface for giving inputs. On the begin data pre-processing is completed. once the pre-processing is completed, the usage of ML. set of rules model is generated for prediction. The test records is given to the generated model for prediction. The model is examined towards random enter values supported accuracy rate and error created while predicting through0Ut testing. Until the error price is decreased and accuracy rate is improved this approach is repeated. In order to accumulate the input from user, web application is employed. The inputs accrued are given to the crop prediction model for predicting the appropriate crops.



WORKING MODEL

V: LITERATURE SURVEY [Il Tripura and the team, have proposed a system that is comprised of a temperature sensor, stickiness sensor, dampness sensor, light control, and C02 sensor. The temperature sensor screens the temperature and if it goes over a preset worth, the framework turns on a cooler until the temperature gets steady. The framework centre is Arduino viable innovation and the WSN dependent on Wi-Fi is utilized for short distance correspondence and WSN for worldwide framework correspondence. A GUI board is planned to utilize Thing Speak programming to screen and control the sensor hub parts and gadgets.

[2] Kulkarni and the group have used a raspberry P13 using Python language to act as the central hub that manages the various sensors such as LM35 Temperature, soil moisture, Water Level, and LDR as transducers; and creating a website to allow the user to interact with the greenhouse controller. This work showcases a Web-Based climatic condition monitoring all the parameters that are required to grow plants.

[3] Jehangir and his team proposed the integration of a third-generation Raspberry pi-based intelligent embedded system, climate sensors, and 10T analytics (Thing Speak). The proposed plug-and-play prototype can be physically installed in a greenhouse environment to record climate parametric data being forwarded to the gateway. The gateway nodes are in control to frontward this data to agriculture professionals through a web browser over the internet. Based on the received information, the ES activates the smart decision-making by the implementation of a suitable arrangement to control the climate parameter values.

[4] Saraswati and the team focused on developing a system that can automatically measure and monitor changes in temperature, light intensity, humidity, and moisture level in the greenhouse. Based on the characteristics of correct perception, eilicient transmission, and intelligent synthesis of the Internet of Things

[5] Purushottam and team proposed a theory related to Wildlife conservation and ecosystem balance A system kept track of the forest by monitoring it with the help of Raspberry pi software. The proposed 10 T-based forest Security system works in two parts, first to collect sensors data from tree sites. Secondly, a python-based system where receive process, analyse, sends SMS and Location of the affected site to concerned security persons, employees, or forest office.

VI: RESULT

WORKING MODEL

GRAPHICS OF LIVE SENSOR

VII: CONCLUSION The research paper has successfully implemented a comprehensive, complete package in the form of 10T based Greenhouse Monitoring system employing a novel combination of Monitoring, Alerting and Automation and Disease Prediction using Machine Learning. The results developed, using both from internet and live testing, have high accuracy and employ memory efficiency. Future implementation of this system can be to include more number of sensors for improvement of data by including more parameters and installing multiple cameras at distinct points. This would generate a much wider database and would further aid in honing the results. However, there might be a possibility that its portability could be limited in that case. Further, with academic industry partnership this system can be made available to the farmers with small land holdings and encourage them to opt for greenhouses so that they do not bear the brunt of pests, droughts and floods and can minimize their crop loss.

VIII: FUTURE WORK The proposed system will be power efficient multi-functional, low cost & optimal in size. The sensors stores information which analyses the environment, identifies the location, object & present conditions. Early detection & diagnosis of pesticides can detect the changes on crops before it appears with the help of thermography disease detection method. In case, if any animal enters the green house, the system catches it using a live tech 720p camera. The camera ranges from 1m to

infinity. If the animal is detected by the camera, the buzzer will get activated & from website will notify to the client.

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