IoT Based Smart Crop Protection System for Agriculture

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Paper 1: Smart IoT Monitoring System for Agriculture with Predictive Analysis

Author: A. A. Araby *et al*.

Published in: 2019 8th International Conference on Modern Circuits and Systems Technologies (MOCAST).

Description:

The future of many businesses can be shaped by the Internet of Things (IoT) technologies. Data is the language used by distinct nodes in a network to communicate with one another; networks serve as the communication channel. Precision agriculture uses IoT features to help in managing crop production by optimising the quality of the crops through the application of necessary nutrients and reducing the negative environmental effects due to the application of excess pesticides. The cloud is the source and destination of the data that adds intelligence through data analytics software. In this study, we set up a sensor network to collect data from some crops (such as potatoes, tomatoes, etc.) in the field. We then fed this data to a machine learning algorithm to get a warning message that eventually appeared on the screen.

Paper 2: Development of IoT based smart security and monitoring devices for agriculture.

Author : T. Baranwal, Nitika and P. K. Pateriya.

Published in: 2016 6th International Conference - Cloud System and Big Data Engineering (Confluence).

Description:

Because it is the foundation of the Indian economy, agriculture demands protection. Agriculture products need security and protection from the very beginning, such as defence against rodent or insect attacks in fields or grain storage, and not just in terms of resources. These difficulties should also be taken into account. The security systems in use today are not intelligent enough to alert users in real time when a problem is detected. Modernizing agriculture may be accomplished by fusing established practises with cutting-edge innovations like wireless sensor networks and the internet of things. We created, tested, and examined a "Internet of Things"-based device with this situation in mind. This device is capable of interpreting the detected data and then communicating it to another device.

Paper 3: IOT Based Protection for Flowering Plants.

Author: M. M. Kirubakaran, K. Madhumitha, M. F. Ajay, V. Ellakkiya and M. S. Mohan

Published in: 2021 International Conference on Advancements in Electrical, Electronics, Communication, Computing and Automation (ICAECA).

Description:

Agriculture sector being the backbone of the Indian economy deserves security. Security not in terms of resources only but also agricultural products needs security and protection at very initial stage, like protection from attacks of rodents or insects, in fields or grain stores. Such challenges should also be taken into This paper focuses on protection of flowering plants using IOT technique. Tamil Nadu stands second in the cultivation of flowers and production. In flowering plants, Jasmine is one of the plants which gives more productivity. The aim of this paper is to restrict flowers from falling off the plants. The shedding of jasmine flowers during rainfall will make extreme changes in flower productivity. Rain sensor used here detects the rain and sends the information to the farmers using the IOT technology. In recent years, explosive development of IOT devices have enhanced the challenges in smart farming. Once the sensor senses the rain, the blower starts to blow out the air till the rain stops. Blower is a device that raises the velocity of air or gas when it goes through supplied rotor. The head of the blower extends like a shield over the plants to protect the flowers from falling off. As the speed of the rainfall increases, the range of air from the blower can be increased. This method is

effectively because wireless sensor networks can communicate the information gathered from a monitored field through wireless links.

Paper 4: Intelligent Crop Monitoring and Protection System in Agricultural fields Using IoT.

Author: S. S. Ramaprasad, B. S. Sunil Kumar, S. Lebaka, P. R. Prasad, K. N. Sunil Kumar and G. N. Manohar.

Published in: 2019 4th International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT).

Description:

The most valuable natural resource that is available to us is water. Due to causes like urbanisation, population growth, and many others, we must use resources very sparingly. Water is a key component of agricultural production, and if it is applied to crops in an ad hoc manner, it will waste water and reduce crop yield. The goal of the study is to use a scientific irrigation method that is based on soil moisture content. In order to create this smart irrigation system, we used an Arduino microcontroller and a few sensors. These sensors will monitor the soil's moisture content, and depending on that level, the water pump will turn on or off.

Paper 5: IoT based Agri Soil Maintenance Through Micro-Nutrients and Protection of Crops from Excess Water.

Author: S. Ayyasamy, S. Eswaran, B. Manikandan, S. P. Mithun Solomon and S. Nirmal Kumar.

Published in: 2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC).

Description:

Smart agriculture uses the internet of things, usually for irrigation purposes. IoT is employed in this case to manage the water log on fields. The soil moisture sensor is used to keep track of the soil moisture in agricultural areas. The Cloud Service Brokerage issues a directive to the relay telling it to turn ON the suction motor when the moisture level reaches a specific level. The farmland's extra water is removed by the suction motor. With this project, we want to use IoT to

analyse the availability of micronutrients and control the farmland's excess water log. This semi-automated water management system can operate independently or be managed using a smartphone app. The weather there is determined by the DHT sensor readings.

Paper 6: IoT based Crop Protection System during Rainy Season.

Author: R. M. Joany, E. Logashanmugam, E. A. Devi, S. Yogalakshmi, L. M. Therase and G. Jegan.

Published in: 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS).

Description:

Smart agriculture uses the internet of things, usually for irrigation purposes. IoT is employed in this case to manage the water log on fields. The soil moisture sensor is used to keep track of the soil moisture in agricultural areas. The Cloud Service Brokerage issues a directive to the relay telling it to turn ON the suction motor when the moisture level reaches a specific level. The farmland's extra water is removed by the suction motor. With this project, we want to use IoT to analyse the availability of micronutrients and control the farmland's excess water log. This semi-automated water management system can operate independently or be managed using a smartphone app. The weather there is determined by the DHT sensor readings.

Paper 7: Ontologies and Artificial Intelligence Systems for the Cooperative Smart Farming Ecosystem.

Author: S. S. L. Chukkapalli *et al.*

Published in: IEEE Access (Volume: 8).

Description:

Large amounts of data are produced by Cyber-Physical Systems (CPS) and the Internet of Things (IoT), which encourages the development of AI-based smart applications. To balance the rising need for food supply, the agriculture and farming sector is moving toward an IoT connected ecosystem, driven by the quick improvements in technology that support smart devices. A cooperative (co-op) farming level can now include AI supported systems once the number

of smart farms reaches a critical threshold. There are currently 1,871 co-ops servicing 1,890,057 member farmers in the United States alone. Therefore, when such cutting-edge infrastructure and technologies are integrated into the co-op farming ecosystem, small member farmers who run and manage these autonomous co-op entities can greatly profit. In this essay, we create a related solution for this problem.

Paper 8: Design, Development and Evaluation of an Intelligent Animal Repelling System for Crop Protection Based on Embedded Edge-AI.

Author: D. Adami, M. O. Ojo and S. Giordano.

Published in: IEEE Access (Volume: 9)

Description:

By bringing processing and storage capabilities close to end devices, edge computing has recently emerged as a crucial technology for the development of real-time applications. This reduces latency, boosts response times, and ensures secure data transfer. In this study, we concentrate on a Smart Agriculture application that intends to build virtual fences using computer vision and ultrasound emission to protect crops from ungulate attacks and thereby drastically minimise output losses. This paper presents a thorough explanation of the design, development, and evaluation of an intelligent animal repulsion system that allows to detect and recognise the ungulates as well as create ultrasound to drive away the ungulates and protect crops from their attack.

Paper 9: IIOT Based Smart Crop Protection and Irrigation System.

Author: I. Nanda, C. Sahithi, M. Swath, S. Maloji and V. K. Shukla.

Published in: 2020 Seventh International Conference on Information Technology Trends (ITT).

Description:

This will be an integrated strategy in the IIOT space created for sensitive agriculture that is moving forward with its arrangements using open source software and low-power hardware [1]. The goal of this project is to produce a monitoring system for farm security against animal assaults and environmental circumstances related to climate change [4]. Smart farming usually makes use of Industrial Internet of Things (IIoT) advancements to highlight the grade of agriculture [12]. This project effort includes a positioner and several types of sensors, controllers, and WSN for the ARM Cortex- The main component of the categorization is a board that uses 700mA or 3W of electricity. The board is interfaced with a variety of sensors, including the DHT 11 Humidity & Temperature Sensor, PIR Sensor, LDR Sensor, HC-SR04 Ultrasonic Sensor, and cameras.

Paper 10: **Smart Irrigation and Security System for Agricultural Crops and Trees.**

Author: R. Sachan, S. Kaur and A. K. Shukla.

Published in: 2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO).

Description:

The current effort, in particular, focuses on a smart water-irrigation and security system that protects agricultural seeds during the sowing time while also predicting the quality and fertility of the soil. Small sirens will be placed in the field to assist deter birds from flocking to the crops. The system's tanker will receive an additional section of fertiliser, which will add the necessary fertiliser in accordance. The system will be made up of various sections that may transport various fertilisers. These fertilisers will be mixed with the water tanker used for irrigation supplies. Based on location (GPS) and online user input, different fertilisers will be needed.