IBM

TITLE: SmartFarmer- IoT Enabled Smart Farming Application.

LITERATURE SURVEY:

Paper 1: Agricultural Production System Using IoT as Inclusive Technology

Publication year: December - January 2016

Author name: **CHANDHINI. K.** Bangalore, Karnataka.

Summary: The IoT (Internet of Things) based agricultural convergence technology is a technology to create a high value such as improvement of production efficiency, quality increase of agricultural products in the whole process of agricultural production. In addition, implementing precision agriculture, which is an alternative to the future agriculture, through the convergence technology allows prediction of supply and demand, real-time management and quality maintenance during the entire life cycle of agricultural products. We make a literature study on the cited title and present it in the form of this note.

Methodology used: Sensor/Information Collection Layer, Transport/Network Layer, Application Layer, Sensors, Cloud-Computing, Mobile-Computing &Big-Data Analysis.

Conclusion: The IoT-based agricultural production system has built on the long-standing desire of farmers to ensure their land remains productive into the future. It also addresses the community's expectations and concerns for safe food and for environmental protection. An agricultural production system for the agricultural production using IoT technology and implemented it as GUI visualization software was designed. The IoT based agricultural production system through correlation analysis between the crop statistical information and agricultural environment information has enhanced the ability of farmers, researchers, and government officials to analyse current conditions and predict future harvest. Additionally, agricultural products quality can be improved because farmers observe whole cycle from seeding to selling using this IoT based agricultural production system. The production system can be improved to support more types of products and provide more services. By taking advantage of IoT technology, the efficiency of agricultural production can get a significant improvement. With constantly improving, agriculture IoT must be able to lead agriculture production to a new era.

Paper 2: Smart farmer system

Publication year: 04, April 2020

Author name: Athrva Dalvi, Shefali Kulkarni, Utsavi Kulkarni, Shweta Todkar

Summary: Agriculture is considered as the backbone of India, is the major contributor to the country's economy. However, technology involvements and their usage have still not been incorporated in this sector. Some initiatives have been incorporated by the governments by providing mobile messaging and calling services to farmer's queries relating sowing, harvesting and selling of crops, it provides static data related to quantity of soil in each region. The paper takes care of all major factors of agriculture i.e., monitoring, irrigation and security.

Methodology used: In this system can monitor the humidity, moisture level and can even detect motions. In, the authors have identified current and future trends of IoT in agriculture and highlight potential research challenges. In, the authors have introduced the latest technologies such as sensors, IoT to radically revise approaches to agriculture by collecting the data about various parameters of soil, analysing the data and performed the computations.

Conclusion: The described system uses supervised machine learning algorithm to classify the crops into the various months in which they should be yielded based on their ideal requirements. The system uses information from soil moisture sensors to irrigate the soil to avoid the damage of crops due to over irrigation or under irrigation. The project provided us with an opportunity to study the existing systems, along with their features and drawbacks.

Paper 3: Smart Agriculture using IoT

Publication year:23, March 2018

Author name: Dr V.Nagaveni

Summary: In the literature there are numerous examples of versatile IoT application-oriented studies. In, an example of control networks and information networks integration with IoT technology has been studied based on an actual situation of agricultural production. A remote monitoring system with combining internet and wireless communications is proposed. Furthermore, taking into account the system, an additional information management sub-system is designed.

Conclusion: The main advantage of this paper is that, all the functions to be performed by the Fan and Sprinkler to control the climatic conditions like temperature, relative humidity and soil moisture levels in the Greenhouse environment are all automated and it does not require any human intervention. This is particularly an important factor because the presence and availability of the human cannot always be trusted on. For important structures like the greenhouses, we need a more dependable and reliable way for its management which is easily achieved by this project. Greenhouses are very important as they are responsible for the efficient growth of crops that are either necessary to feed the population or necessary for the economic growth of any country.

Paper 4: IoT and agriculture data analysis for smart farm

Publication year: 2018

Author name: Jirapond Muangprathub, Nathaphon Boonnam, Siriwan Kajornkasirat, Narongsak Lekbangpong, Apirat Wanichsombat, Pichetwut Nillaor.

Journal name: Elsevier B.V

Summary: In this paper, we propose developing a system optimally watering agricultural crops based on a wireless sensor network. This work aimed to design and develop a control system using node sensors in the crop field with data management via smartphone and a web application. The three components are hardware, web application, and mobile application. The first component was designed and implemented in control box hardware connected to collect data on the crops. Soil

moisture sensors are used to monitor the field, connecting to the control box. The second component is a web-based application that was designed and implemented to manipulate the details of crop data and field information. This component applied data mining to analyze the data for predicting suitable temperature, humidity, and soil moisture for optimal future management of crops growth. The final component is mainly used to control crop watering through a mobile application in a smartphone. This allows either automatic or manual control by the user. The automatic control uses data from soil moisture sensors for watering. However, the user can opt for manual control of watering the crops in the functional control mode. The system can send notifications through LINE API for the LINE application. The system was implemented and tested in Makhamtia District, Suratthani Province, Thailand. The results showed the implementation to be useful in agriculture. The moisture content of the soil was maintained appropriately for vegetable growth, reducing costs and increasing agricultural productivity. Moreover, this work represents driving agriculture through digital innovation.

Paper 5: Smart Farming using IoT, a solution for optimally monitoring farming conditions

Publication year: 2019

Author name: Jash Doshi, Tirthkumar Patel, Santosh kumar Bharti.

Journal name: Elsevier B.V

Summary: network of different devices which make a self-configuring network. The new developments of Smart Farming with use of IoT, by day turning the face of conventional agriculture methods by not only making it optimal but also making it cost efficient for farmers and reducing crop wastage. The aim is to propose a technology which can generate messages on different platforms to notify farmers. The product will assist farmers by getting live data (Temperature, humidity, soil moisture, UV index, IR) from the farmland to take necessary steps to enable them to do smart farming by also increasing their crop yields and saving resources (water, fertilizers). The product proposed in this paper uses ESP32s Node MCU, breadboard, DHT11 Temperature and Humidity Sensor, Soil Moisture Sensor, SI1145 Digital UV Index / IR / Visible Light Sensor, Jumper wires, LEDs and live data feed can be monitored on serial monitor and Blynk mobile. This will allow farmer to manage their crop with new age in farming.

Paper 6: IoT based SMART FARMING SYSTEM

Publication year: December 2018

Author name: YASIR FAHIM

Journal name: CENTRAL INSTITUTE OF TECHNOLOGY, KOKRAJHAR

Summary: The aim / objective of this report is to propose IoT based Smart Farming System assisting farmers in getting Live Data (Temperature, Soil Moisture) for efficient environment monitoring which will enable them to increase their overall yield and quality of products. The IoT based Smart Farming System being proposed via this report is integrated with Arduino Technology mixed with different Sensors and a WIFI module producing live data feed that can be obtained online from

Thingsspeak.com. The product being proposed is tested on Live Agriculture Fields giving high accuracy over 98% in data feeds**.**

Methodology used: Internet of Things has a strong backbone of various enabling technologiesWireless Sensor Networks, Cloud Computing, Big Data, Embedded Systems, Security Protocols and Architectures, Protocols enabling communication, web services, Internet and Search Engines.

Conclusion: IoT based SMART FARMING SYSTEM for Live Monitoring of Temperature and Soil Moisture has been proposed using Arduino and Cloud Computing. The System has high efficiency and accuracy in fetching the live data of temperature and soil moisture. The IoT based smart farming System being proposed via this report will assist farmers in increasing the agriculture yield and take efficient care of food production as the System will always provide helping hand to farmers for getting accurate live feed of environmental temperature and soil moisture with more than 99% accurate results.

Paper 7: IoT-Enabled Smart Agriculture: Architecture, Applications, and Challenges

Publication year:27 March 2022

Author name: Licensee MDPI

Journal name: applied sciences

Summary: The growth of the global population coupled with a decline in natural resources, farmland, and the increase in unpredictable environmental conditions leads to food security is becoming a major concern for all nations worldwide. These problems are motivators that are driving the agricultural industry to transition to smart agriculture with the application of the Internet of Things (IoT) and big data solutions to improve operational efficiency and productivity. The IoT integrates a series of existing state-of-the-art solutions and technologies, such as wireless sensor networks, cognitive radio ad hoc networks, cloud computing, big data, and end-user applications.

Methodology used: IoT ecosystem for smart agriculture based on three main components, including IoT devices, communication technologies, and data process and storage solutions. An illustration of the IoT ecosystem for smart agriculture is presented

Conclusion: In this study, we presented an overview of IoT and big data for the smart agriculture sector. In addition, security, technologies need to be continuously improved, but in our opinion, the application of IoT solutions for smart agriculture is inevitable and will enhance productivity, provide clean and green foods, support food traceability, reduce human labor, and improve production efficiency

Paper 8: A Low-Cost Platform for Environmental Smart Farming Monitoring System Based on IoT

Published year: 24 May 2021

Author name: Ben Othman Soufiene, Faris A. Almalki

Summary: When integrating the Internet of Things (IoT) with Unmanned Aerial Vehicles (UAVs) occurred, tens of applications including smart agriculture have emerged to offer innovative solutions to modernize the farming sector. This paper aims to present a low-cost platform for comprehensive environmental parameter monitoring using flying IoT. This platform is deployed and tested in a real scenario on a farm in Medenine, Tunisia, in the period of March 2020 to March 2021. The experimental work fulfills the requirements of automated and real-time monitoring of the environmental parameters using both under- and aboveground sensors. These IoT sensors are on a farm collecting vast amounts of environmental data, where it is sent to ground gateways every 1 h, after which the obtained data is collected and transmitted by a drone to the cloud for storage and analysis every 12 h. This low-cost platform can help farmers, governmental, or manufacturers to predict environmental data over the geographically large farm field, which leads to enhancement in crop productivity and farm management in a cost-effective, and timely manner.

Conclusion: Smart farming involves the integration of advanced technologies into existing farming practices to increase production efficiency and quality of agricultural products. The evolution of IoT and UAVs has enabled the vision of sustainable smart farming, where these smart technologies have proven to increase the quality of crop yield and reduce the environmental footprint from the agricultural sector. This paper shows a low-cost platform for comprehensive environmental parameter monitoring using flying IoT. The proposal is based on experimental work to fulfill the requirements of automated and real-time monitoring of the environmental parameters using both under- and aboveground sensors. These IoT sensors devices on a farm collect vast amounts of environmental data.