Ideation Phase

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LITERATURE SURVEY

Abstract

The smart irrigation system included those sensors for monitoring water level, irrigation efficiency, climate, etc. Smart irrigation is based on smart controllers and sensors as well as some mathematical relations. In addition, this work illustrated the application of unmanned aerial vehicles (UAV) and robots, where they can be achieved several functions such as harvesting, seedling, weed detection, irrigation, spraying of agricultural pests, livestock applications, etc. real-time using IoT, artificial intelligence (AI), deep learning (DL), machine learning (ML) and wireless communications. Moreover, this work demonstrates the importance of using a 5G mobile network in developing smart systems, as it leads to high-speed data transfer, up to 20 Gbps, and can link a large number of devices per square kilometer.

Introduction

he climate also affects the quantity and quality of crops and may lead to an increase in soil sensitivity to desertification. Therefore, the focus on survey land resources to use in agricultural development in arid regions is necessary In developing world countries, the agricultural sector is one of the most important pillars of national income. Therefore, implementing new technologies to improve the agricultural sector is a significant issue for supporting the national economy in those countries .

IoT in smart agriculture

The Internet of Things (IoT) is an intelligent and promising technology that offers unconventional and practical solutions in many areas, as shown in , such as smart cities, smart homes, traffic control, healthcare, smart agriculture, etc. In the agricultural field, IoT technology has made significant development in agricultural management. This technology allows all agricultural devices and equipment is to be linked together to make the appropriate decision in irrigation and fertilizer supply . The smart systems enhance the accuracy efficiency of devices that monitoring plant growth and even raising livestock. Wireless sensor networks (WSNs) are used to collect data from different sensing devices. In addition, cloud services are also essential to be integrated with IoT to analyze and process the remote data that facilitates decision-making to implement the best decisions . Smart farm management requires using ICT, ground sensors, and control systems installed on robots, autonomous vehicles,

and other automated devices. The success of smart systems depends on high-speed internet, advanced mobile devices, and satellites to provide (images and positioning). succeed used IoT real-time to track and diagnose leaf diseases that obstruct crop growth using many satellite images and sensors positioned in farms (paddy and banana crops); this system helped to be analyzed the data and made the decision then sent back to the farmers Via the webserver.

Smart sensing for agriculture

Sensors are responsible for measuring and monitoring all factors in the smart system; for example, soil health monitoring has special sensors such as nutrients contents, phosphate contents, soil moisture, and compaction and so on. The smart irrigation system included many sensors for monitoring water levels, irrigation efficiency, climate sensors, etc. The sensors can measure and monitor the changes in soil and yield properties and local weather on-farm sites. So, the sensors can gather the different data to be used for the analysis of the farm statutes and for making a suitable decision. These smart sensors monitor the variation in soil, crop, livestock health, in addition, contribute to enhance the agricultural product in terms of quantity and quality. The standard sensors used in smart farming networks are soil moisture sensors that use to measure the change in soil moisture, soil temperature used to measure the monitor the temperature in soil, air temperature, soil pH value, humidity, N, P, K sensors, etc.

Smart farming approaches in developing countries

The implementation of SF technology is considered very important around the globe, and the developing countries are interested in localized such technology. The developing countries have several challenges in implementing smart systems regarding the availability of infrastructure owned by the state and other capabilities possessed by individuals . Therefore, the obstacles to the implementation of smart agricultural technology in developing countries can be summarized as follows;1) The availability of a suitable network of the fourth or fifth generation and is the most crucial factor in terms of data transmission between sensors via the Internet.2)The availability of sensors as they are responsible for measuring the various phenomena and characteristics on the farm.3) Availability of devices and equipment that can achieve agricultural operations.4) trained experts based on smart farms. However, their several approaches in the developing countries, in India, several factors affect the majority of farmers regarding the implementation of smart farming technology such as weak socio-economic backgrounds and face many challenges due increasing cost of cultivation. Furthermore, one of the significant natural problems influencing agricultural productivity is climate change . The same authors used GISbased integrated modeling, which incorporates soil moisture accounting and irrigation water demand modules, rainfall-runoff modules, system loss modules, and groundwater flow system modules.

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