LITERATURE SURVEY

IOT ENABLED SMART FARMING APPLICATION SYSTEM

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Abstract:

Internet of Things Smart technology enables new digital agriculture. Today technology has become a necessity to meet current challenges and several sectors are using the latest technologies to automate their tasks. Advanced agriculture, based on Internet of Things technologies, is envisioned to enable producers and farmers to reduce waste and improve productivity by optimizing the usage of fertilizers to boost the efficiency of plants. It gives better control to the farmers for their livestock, growing crops, cutting costs, and resources.The world's total population touched 6.60 billion in 2000 but is projected to grow to 9.32 billion by 2050. Hence, it is necessary to increase the yield on the limited farmland.

It is a high-tech system to grow crop cleanly and sustainably for the masses. It is the application of modern Information and Communication Technologies in agriculture.

The agriculture industry has just become smarter and data oriented. Today world the IOT is most important for Farming side due to the following reasons. The recent lively growth in IOT based technologies has redesigned the way many industries start to work. This revolutionary change in Farming has generated various opportunities as well as new disputes. India is agriculture sector, on either side, is losing ground every day, affecting the ecosystem's output capacity. In order to restore vitality and put agriculture back on a path of higher growth, there is a growing need to resolve the issue. A large-scale agricultural system necessitates a great deal of upkeep, knowledge, and oversight. The IoT is a network of interconnected devices that can transmit and receive data over the internet and carry out tasks without human involvement. Smart farming based on IoT technologies will enable growers and farmers to reduce waste and enhance productivity ranging from the quantity of fertilizer utilized to the number of journeys the farm vehicles have made. So, what is smart farming? Smart farming is a capital-intensive and hi-tech system of growing food cleanly and sustainable for the masses. It is the application of modern ICT (Information and Communication Technologies) into agriculture. In this paper, the hardware and software of the IoT for smart farming will be presented besides sharing the successful results.

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Benefits of Smart Farming

Automatic adjustment of farming equipment made possible by linking information like crops/weather and equipment to auto-adjust temperature, humidity, etc.In large farmland, Internet of Things equipped drone helps to receive the current state of crops and send the live pictures of farmland.Analyzing farmland from the land using its Solutions you will know the current situation of fields and crops in.

According to studies:

86% of the studied farmers use some kind of “precision farming”.

95% acknowledged that “precision farming” is very helpful to use.

70% plan to expand their usage of "precision farming technologies".

Challenges for Building the Internet of Things PlatformA unified solution which can be integrated with different types of Internet of Things devices.The most common challenge for the Internet of Things in agriculture is connectivity. Every area doesn’t have proper internet connectivity.The second most common challenge for Internet of Things based Advanced Farming is the lack of awareness among consumers.Due to various service providers, it becomes really difficult to maintain interoperability between different IoT systems.A scalable solution that can be integrated with thousands of IoT devices for large farms.Solutions for Building IoT based Intelligent FarmingSmart Farming has enabled farmers to reduce waste and enhance productivity with the help of sensors (light, humidity, temperature, soil moisture, etc.) and automation of irrigation systems. Further with the help of these sensors, farmers can monitor the field conditions from anywhere. Internet of Things based Advanced Farming is highly efficient when compared with the conventional approach. The applications of intelligent Agriculture solutions not only targets conventional, large farming. With operations, but could also be new levers to uplift other growing or common trends in agricultural like organic farming, family farming (complex or small spaces, particular cattle and/or cultures, preservation of specific or high-quality varieties, etc.), and enhance highly transparent Farming.

Applications of Internet of Things in Smart Farming

In Internet of Things based smart agriculture, a system is formed to monitor the farmland with the help of sensors, which senses components like temperature, light, humidity, soil moisture, etc. Then, automate the irrigation system and allow farmers to monitor their field conditions from anywhere through IoT Analytics Platform. To make the agricultural process even smarter and accurate, precision agriculture is used. This makes agricultural practice more controlled and precise in terms of raising livestock and farming. Internet of Things based Advanced Farming plays a vital role when it comes to the use of IT and other elements like sensors, agricultural drones, autonomous vehicles, control systems, automated hardware, robotics, variable speed technology, and others.The below highlighted are the applications of Internet of Things in smart farming:

Weather Monitoring

Weather plays a very significant role when it comes to the Agriculture sector. In agriculture, there is almost everything dependable upon the climate condition. In smart Farming, temperature humidity, light intensity, and soil moisture can be monitored through various sensors. These are again used by the reactive system to trigger alerts or automate the process such as water and air control.

Smart Irrigation on Agriculture Land

In smart irrigation, automated sprinkler systems or intelligent pumps are used. Soil moistures sensors are used in different areas to get the moisture of the soil in agricultural land. Based on the results from the soil moisture sensors, theintelligent pumps or intelligent sprinklers are turned On/Off.

Monitoring Soil Quality

Farmers usually use a sampling method to calculate soil fertility, moisture content. Fortunately, this sampling doesn't give accurate results as chemical decomposition varies from location to location. Meanwhile, this not much helpful. To resolve this thing, it plays an essential role in Farming. Sensors can be installed at a uniform distance across the length and breadth of the farmland to collect the accurate soil data, which can be further used in the dashboard or mobile application for the farm monitoring.

Livestock Monitoring

Internet of Things devices can be used to collect data regarding the location, well-being, and the health of the cattle. This data can be further used for identification of the sick animals so that they can be separated from the others, thereby preventing the spread of diseases. This Live Stock Monitoring also lowers the labor costs with the help of Internet of Things based sensors.

Drone Monitoring

Drone monitoring is helping large farms to reduce the cost of monitoring, or the use of Geo-positioning sensors can set a stable path. Moreover, the data collected from these drones are sent back to the server where it can be used for analyzing and decision-making.

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This paper proposes a system which can monitor temperature, level of water, moisture and even the movement, if any, happens in the field which may destroy the crops in agricultural field through sensors using Arduino UNO board. Smart agriculture is an emerging concept, because IOT sensors can provide information about agriculture fields and then act upon based on the user input. The project aims at making use of evolving technology i.e., IOT and smart agriculture using automation. Once hardware has been developed depending on the change in requirements and technology the software needs the updating.Till now the Industrial Internet of Things (IoT) has disrupted many industries and the Agriculture Industry isn't an exception. Till the end of 2018, the connected agriculture market stood at USD 1.8 billion globally and the change hasn't stopped yet. It is expected to grow to USD 4.3 billion by 2023 at a Compound Annual Growth Rate (CAGR) of 19.3%.The IoT technology has realized the smart wearable's, connected devices, automated machines, and driverless cars. However, in agriculture, the IoT has brought the greatest impact.Recent statistics reveal that the global population is about to reach 9.6 billion by 2050. And to feed this massive population, the agriculture industry is bounded to adopt the Internet of Things. Amongst the challenges like extreme weather conditions, climatic changes, environmental impact, IoT is eradicating these challenges and helping us to meet the demand for more food.Throughout the world, mechanical innovations such as tractors and harvesters took place and brought into the agriculture operations in the late 20th century. And the agriculture Industry relies heavily on innovative ideas because of the steadily growing demand for food.The Industrial IoT has been a driving force behind increased agricultural production at a lower cost. In the next several years, the use of smart solutions powered by IoT will increase in the agriculture operations. In fact, few of the recent report tells that the IoT device installation will see a compound annual growth rate of 20% in the agriculture industry. And the no. of connected devices (agricultural) will grow from 13 million in 2014 to 225 million by 2024.