

Applications of IoT for Smart Agriculture or Farming

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Abstract

Now a day's agriculture is the business or occupation which is having a great need for survival of human being. Prime need of human survival is food and it is fulfilled by agriculture. Similarly India belongs from agro based economy. But today also in Indian agriculture domestic or traditional methods are highly applied by Indian farmers. But in present if they are use new smart and advanced technologies in their farms or agro based industry then they could save extra money, time as well as energy. Today agricultural production decreasing day by day and on other side population of India as well as world is increasing. Obviously in future human being get problems to living his life on the things which developed by himself i.e. smart phones, computers, smart vehicles etc. so end of the day human being needs food to survive. And in present day food is producing only through the farming. Currently we are living in modern or smart era where all the things which are important for us for our daily life such as smart homes, smart vehicles, industries, health etc. Accordingly if the Internet of Things (IoT) would be used in agriculture then it may be become more profitable for world and its society.

Keywords: Human Survival, Smart era, IoT, ICT, Agro based Industry

Introduction

With the increasing use of the Internet of Things (IoT), connected devices have used in each side of our life, from health and fitness, home automation, automotive and provision, to smart cities and industrial IoT. By mistreatment numerous good agriculture gadgets, farmers have gained higher management over the method of raising placental mammal and grooving crops, creating it a lot of certain and economical. Smart farming through the use of IoT technologies will help farmers to reduce generated wastes and enhance productivity. That can come from the quantity of fertilizer that has been utilized to the number of journeys the farm vehicles have made. So, smart farming is basically a hi-tech system of growing food that is clean and is sustainable for the masses. It is the induction as well as the application of modern ICT (Information and Communication Technologies) into agriculture. Internet of Things (IoT) has the potential to influence the globe we have a tendency to live in; connected vehicles, advanced industries, smart cities and towns are all the parts of the IoT.

However applying technology like IoT to the agriculture field might have the best impact. Smart farming supported IoT technologies can alter growers and farmers to scale back waste and enhance productivity starting from the fertilizer utilised to the amount of journeys the farm vehicles have created. Smart farming could be a capital intensive and high tech system of growing food cleanly and property for the plenty. It's the appliance of contemporary Information and Communication Technology (ICT) into agriculture.

In IoT based sensible farming, a system is constructed for observation the crop field with the assistance of various sensors like humidity, temperature, light, soil wetness etc. and automation the water irrigation system. The farmers will monitor the field conditions from anywhere in the world. IoT based smart farming is extremely economical in comparison with the traditional approach. The applications of IoT based sensible farming not solely target typical, huge farming operations, however might even be new levers of uplift different growing or common trends in agriculture like organic farming, family farming and enhance extremely clear farming. In terms of environmental problems, IoT based smart farming will give nice edge together with additional economical water usage or optimization of inputs and coverings. The main applications of IoT based smart farming that are revolutionising agriculture field are as follow.

Applications of IoT in Agriculture

Various projects and applications are integrated in Agricultural fields leading to efficient management and controlling of various activities are as follows.

a. Climate conditions –

Climate plays a really vital role for farming. And having improper data concerning climate heavily deteriorates the amount and quality of the crop production. However IoT solutions change you to understand the time period climatic conditions. Sensors are placed within and out of doors of the agriculture fields. They collect information or data from the atmosphere that is employed to settle on the correct crops which may grow and sustain within the explicit climate. The full IoT scheme is created from sensors which will notice time period climatic conditions like rainfall, wetness, temperature and additional terribly accurately. There are various numbers of sensors offered to notice of these parameters and put together consequently to fit your sensible farming necessities. These sensors monitor the condition of the crops and also the weather encompassing them. If any worrying climatic conditions are found, then an alert signal is send. What gets eliminated is that would like of the physical presence throughout worrying climate that eventually will increase the productivity and facilitate farmers to reap additional agriculture edges.

b. Precision Farming –

Precision Agriculture/Precision Farming is one of the most renowned utilizations of IoT in Agriculture. Exactness cultivating is a procedure or training that makes the cultivating methodology increasingly precise and controlled for raising domesticated animals and developing of yields. Its utilization and things like sensors, self-governing vehicles, computerized equipment, control frameworks, mechanical technology, and so forth in this methodology are key parts. It makes the cultivating practice increasingly exact and constrained by acknowledging savvy cultivating applications, for example, animal checking, vehicle following, field perception, and stock observing. Precision agriculture in the ongoing years has gotten one of the most popular utilization of IoT in the agriculture segment and countless associations have begun utilizing this procedure around the globe.

The products and services offered by IoT systems include soil moisture probes, VRI optimization, and virtual optimizer PRO, and so on. VRI (Variable Rate Irrigation) optimization is a process that maximizes the

profitability on irrigated crop fields with soil variability, thereby improving yields and increasing water use efficiency.

c. Agricultural Drones –

Agricultural drones are a generally excellent case of IoT applications in Agriculture. Agribusiness businesses today have gotten one of the significant ventures where automatons can fuse. Two sorts of automatons, that is, ground-based and flying based automatons are being joined from various perspectives, for example, for crop wellbeing appraisal, water system, planting, and soil and field examination.

Drones with so many sensors as warm, camera, lidar and multispectral are carrying significant advantages to the agrarian business. Horticultural automatons with sensors enable ranchers to see their fields from the sky. Data and information gathered from the automatons uncover such issues as water system issues, soil variety, and bother and contagious invasions. The distinction among solid and unfortunate plants is in some cases hard to distinguish with unaided eyes. Multispectral pictures can help with separating among solid and undesirable plants, and empower ranchers to take convenient activities.

Benefits of IoT in Agriculture

The following are the benefits of IoT in Agriculture:

- a) With IoT, various factors would also lead to the protection of environment.
- b) With IoT productions costs can be reduced to a remarkable level which will in turn increase profitability and sustainability.
- c) IoT enables easy collection and management of tons of data collected from sensors and with integration of cloud computing services like Agriculture fields maps, cloud storage etc., data can be accessed live from anywhere and everywhere enabling live monitoring and end to end connectivity among all the parties concerned.
- d) With IoT, efficiency level would be increased in terms of usage of Soil, Water, Fertilizers, and Pesticides etc.
- e) IoT is regarded as key component for Smart Farming as with accurate sensors and smart equipment's, farmers can increase the food production by 70% till year 2050 as depicted by experts.

IoT and Agriculture Current Scenario and Future Forecasts

The following table shows the growth of IoT based adoption in Agriculture sector from Year 2000 to 2050.

Sr. No.	Year	Data Analysis
1	2000	525 Million Farms connected to IoT
2	2016	540 Million Farms till Date are connected to IoT
3	2035	780 Million Farms would be connected to IoT
4	2050	2 Billion Farms are likely to be connected to IoT

Table 1: The growth of IoT based adoption in Agriculture sector from Year 2000 to 2050. [1]

Conclusion

Here attempt has been made to assess the impact of application of advanced technologies in the tradition agriculture. In this research paper describes how agriculture fields are benefitted from IOT systems, the different IoT Applications in Agriculture and how they are made use of such things. IoT enabled agriculture has helped execute modern technological solutions to time tested knowledge. Data Ingested by obtaining and importing information from the various sensors for real time use or storage in a database ensures swift action and less damage to the crops. This paper will assist farmers in increasing the agriculture yield and take efficient care of food production.

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