VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION

ANNUAL RESEARCH JOURNAL

ISSN(ONLINE): 2581-7280

Role of IoT Technology in Agriculture

Mr. Ashish.A.Tiwari[1], Mr. Kamalesh.D.Yadav[2]

(Department of MCA, VIVA Institute of Technology / University of Mumbai, India)
(Department of MCA, VIVA Institute of Technology / University of Mumbai, India)

Abstract : *Internet of Things (IoT) the agricultural sector in India is declining day by day which affects the productive the capacity of the ecosystem. Agriculture is the most important aspect of man. To make good decisions, farmers need knowledge throughout the farming cycle. An information data flow model is developed that connects the various scattered sources and plant structures. IoT is important for the development of the agricultural sector. This paper aims to enable the agricultural sector to use automation, agriculture and IoT Technologies.*

Keywords - *Agriculture; Automation, Data Flow, Internet Of Things,IoT Technologies.*

I. INTRODUCTION

Internet of Things, or IoT, is a system of related computer systems, electronic and digital objects, objects, animals or people with unique identifiers (UIDs) and the ability to transmit data over the network without the need for a human or computer. communication. An internet object can be a human heart implant, a farm animal with a biochip transponder, a car with sensors built into it to warn the driver when the tire pressure is low or another natural or man-made one. An object that can be provided with an Internet Protocol (IP) address and capable of transmitting data over a network. Growing up, organizations in various industries are using IoT to operate more efficiently, better understand customers to deliver improved customer service, improve decision-making and increase business value. [1]

1.1 How to use IoT in Agriculture

IoT's smart farming solutions are a system designed to monitor the field of plants with the help of sensors (light, humidity, temperature, soil moisture, plant health, etc.) and an automated irrigation system. Farmers can monitor field conditions anywhere. They can also choose between manual and default data options required based on this data. Smart farming works much better than the traditional method. Data collected by intelligent agricultural sensors, in this farm management program, an important part of the sensors, control systems, robots, autonomous vehicles, automated computer systems, adaptive technology, motion sensors, button camera, and portable devices. This data can be used to track business status in general and employee performance, equipment efficiency. The ability to foresee a production result allows you to plan for better product distribution. Agricultural Drones ground and air drones used in agriculture to improve various agricultural processes: crop health testing, irrigation, crop monitoring, crop spraying,

VIVA-Tech International Journal for Research and Innovation   *Volume 1, Issue 5 (2022)*
ISSN(Online): 2581-7280
VIVA Institute of Technology
10th National Conference on Role of Engineers in Nation Building – 2022 (NCRENB-2022)

planting, and soil and field analysis. cordless to gather information about the location, health and well-being of their cattle. This information helps prevent the spread of disease and reduces labor costs. [2]

Fig 1 .How IOT used in agriculture
https://www.biz4intellia.com/blog/5-applications-of-iot-in-agriculture/

1.2 IOT Architech: We will know how IoT can help you with your agricultural situation. There are many cases of use in the agricultural industry IoT that can help you solve them. But in each case of use, the final solution will be slightly different, even if the overall system structure is based on the same principles.At the heart of the entire IoT system is DATA. Lots of data. The IoT system architecture should provide the ability to collect data from sensors, store data for analysis, analyze data for data and share the results achieved with other programs or users. Now I will show you a complete example.There is a farmer living in a house far away. Owner of a court with a doll. But poppy is very common in fungi and other diseases, which can damage the entire crop.What can a farmer do? He could also spray fungicides and pesticides throughout the crop OR he could diagnose the problem at the right time and spray the right time at the right place. And thus he was able to save costs, reduce environmental impact and produce more and better poppies.But how can he do that? He can place sensors in different parts of the field to adjust the natural environment and climate and crop changes. Then, the data from all the sensors is transferred to a central unit where it can be processed by SW (Middleware and Applications). SW is designed to manage sensors, analyze their data, visualize results and set notification rules to inform other programs or users about important issues. Such a system can be really helpful for the farmer, who can respond quickly to each situation and help him to manage or harvest properly and thus protect his values and save something. [3]
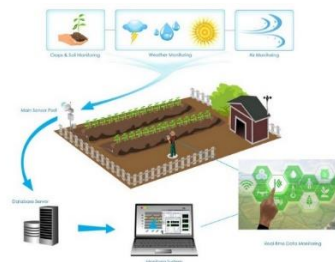

Fig 2. IoT Architecture for Agriculture
https://www.agrotechnomarket.com/2018/08/iot-architecture-for-agriculture.html

VIVA Institute of Technology
10th National Conference on Role of Engineers in Nation Building – 2022 (NCRENB-2022)

II.   SENSORS IN IOT AGRICULTURE

Technological change is leading to more productive farming activities than ever before, harvesting more crops in each area and producing higher quality products. Sensors play a vital role in this technological change. Let us examine five key elements in intelligent agricultural technology:

2.1 PH Sensors in Agriculture: The pH sensors provide important feedback on soil nutrient deficiency or the presence of unwanted chemicals.

2.2 GPS Sensors: GPS technology for highly precise vehicle steering systems. In many agricultural applications, such as gardening, the use of automated systems can improve the field trajectory, reduce process clutter and ultimately reduce the time required to complete a project.

Agricultural Temperature Sensors: Temperature sensors are essential to the two most important phases of intelligent agriculture - environmental monitoring and mechanical equipment monitoring. For example, wine harvesting on the ice is known to occur inside a small temperature window when the local temperature begins to reach between -10 ° C and -12 ° C during the harvest season. [4]

III.   ADOPTION OF IOT IN AGRICULTURE

Current Updates on Life Sciences 710 IoT for Agricultural Discovery: IoT is a combination of global knowledge, web-based content or objects, and is an integral part of the future internet. IoT focuses on automation processes by reducing human interaction. In the automation process, IoT collects data using sensors and analyzes data using controls and completes automation processes using actuators, IoT in agriculture and agriculture focuses on transforming all aspects of farming and agricultural processes to make the process more efficient and effective. Traditional methods of livestock management (such as cattle breeding) are not fully feasible and have many problems such as high human interaction, labor costs, energy consumption, and water use, It is important to identify highly researched sub-verticals, data collection and technology to create new IoT applications in the future. [5]

IV.   IOT IN AGRICULTURE IN DIFFERENT COUNTRIES

4.1 Japan: Japan values agricultural development as an important goal of developing its agricultural knowledge technology. Japan is actively responding to the rise of IoT Technology, and actively uses it in agriculture, which successfully solves agricultural problems, control, quality and food security, reducing costs and more in the agricultural sector in Japan, and will gradually improve. . Japanese agriculture has become a natural, safe, and prosperous agricultural industry. In 2004, for the first time Japan documented the development of IoT agriculture in a government program, at the same time, the Japanese Ministry of Home Affairs and Communications proposed a Japanese Program. One of the main objectives of this project is to recognize the interaction between people and Objectives, thereby creating a system in which people and things can connect and exist. light, water demand, oxygen demand, etc. in the greenhouse is automatically controlled by a computer, and they are supplied in bulk from time to time. Each farmer has a computer-controlled sprayer, dropper irrigation and artificial air system, which has access to variables and equipment throughout the agricultural and business process. The sophisticated horticulture system installed is rapidly evolving, which uses an automated production control system to control performance using a remote computer and to control movement by viewing the seed bed as a unit [6]

V.   TREND IN IOT IN AGRICULTURE

5.1 IoT technology is a disruptive technology that offers significant growth across the industry. Smart farming is a emerging concept, which uses modern knowledge and communication technologies to increase product value and quality through easy development strategies.

Sensory-based farming

5.2 IoT is an intelligent technology that combines a combination of sensor devices, gates, and communication systems. Sensors are plugged into the fields to capture relevant data, which is stored in a cloud space for further analysis. Farm managers have quick and easy access to wild data through their smart dashboards. Sensitive-based farming provides improved strategies for farmers to better manage their farms [7]

www.viva-technology.org/New/IJRI

VI.   AGRICULTURE IN INDIA

Agriculture in India has a broad base dating back to ten thousand years. Currently, India is ranked second in the world in agricultural production. It also contributes significantly to Global Gross Domestic Product (GDP). In addition, the sector recruits approximately 50% of all employees.

Despite the gradual decline in their contribution to the country's GDP, agriculture is currently the largest industry in India. Overall, it plays a key role in the country's economic growth.

In terms of agricultural contribution, some of the most developed provinces in India are:

All these provinces play an important role in agricultural development in India.

The total area cultivated in India is 15, 73, 50,000 km2, representing approximately 52.92% of the total land area of the country. [8]
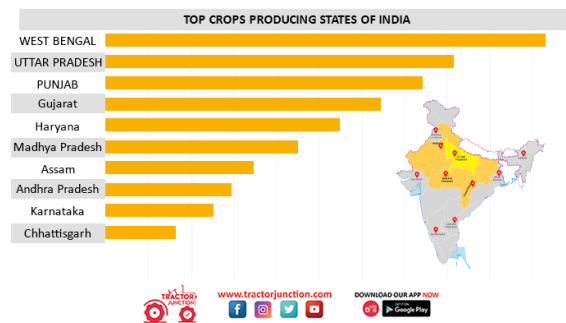

Fig 3. The state of agriculture in India.
https://www.tractorjunction.com/blog/top-10-agriculture-states-in-india/

6.1Problem faced by Indian farmer
Farmer need to deal with many problems including how to:
- Dealing with climatic change, soil erosion and biodiversity loss.
- Satisfying customer flexibility and expectations.[9]

Fig 4. the condition of farmer.
https://blog.apnikheti.com/agriculture-problems-and-their-solutions/

6.2. Impact of traditional farming.
- Soil fertility decreases with the use of fertilizers
- Synthetics pesticides can damage the food chain by staying in the ground for a long time [10]

VIVA-Tech International Journal for Research and Innovation   *Volume 1, Issue 5 (2022)*
ISSN(Online): 2581-7280
VIVA Institute of Technology
10ᵗʰ National Conference on Role of Engineers in Nation Building – 2022 (NCRENB-2022)

VII.   HOW IOT HELP IN AGRICULTURE IN INDIA

As the world's population flourishes, projected to reach 9.6 billion by 2050, the agricultural sector must meet demand, despite adverse environmental conditions and climate change. In order to meet the needs of the growing population, the agricultural industry will need to adopt new technologies to meet the much-needed limit. The agricultural use of IoT (Internet of Things) will allow the industry to improve productivity, reduce costs, reduce waste, and increase its yield quality.IoT-based smart farming is a system designed to monitor agricultural land with the help of sensors (soil moisture, moisture, light, temperature, etc.) and to automate irrigation processes. Farmers can check the conditions of the field anywhere. For example, it will warn the farmer if the soil moisture level is low; the grower can use the sensors to start watering. IoT-based smart farming works much better than traditional methods. Accurate farming is the most common IoT system in farming. It makes agricultural processes more accurate and well-organized by incorporating processes such as real-time crop monitoring and soil conditions[11]

7.1 Iot technology in agriculture works very well for the following reasons:

- Global connectivity for any devic.

- Small human effort.

- Immediate Access.[12]

VIII.   CHALLENGES FACED BY IOT IN AGRICULTURE

Due to Lack of Infracture even if farmers use iot technology they will not be able to take advantage of this techonology due to poort communication infrastructure.hight cost the resources needed to implement iot in agriculture is also expensive.[13]

IX.   CONCLUSION

 Smart farming that recently incorporates agricultural technology has a major role to play in this era. Extract a few Commitments to farming wisely is the best thing a farmer can do to produce the best life and wealth. Earth The year 2040. So, to survive this huge population. The agricultural industry must embrace IoT, and in order to cope with challenges such as extreme weather, rising temperatures and the environmental impact of deep farming. The need for more food must be met. However, the agricultural industry unit benefited from IoT programs. We have implemented a lot of IoT applications in agriculture and how they created their use. Therefore, in conclusion Io will not only create more jobs but also help solve major economic and environmental challenges.

ACKNOWLEDGEMENT

REFERENCES

[1] https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT

[2] https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT

[3] https://www.agrotechnomarket.com/2018/08/iot-architecture-for-agriculture.html

[4] https://www.arrow.com/en/research-and-events/articles/top-5-sensors-used-in-agriculture

VIVA Institute of Technology
10th National Conference on Role of Engineers in Nation Building – 2022 (NCRENB-2022)

[5]https://www.researchgate.net/publication/347736349_

[6]https://www.researchgate.net/publication/328032827_Application_Progress_of_Agricultural_Internet_of_Things_in_Major_Countries

[7] https://www.biz4intellia.com/blog/8-iot-trends-that-are-currently-followed-for-improved-agriculture/

[8]https://www.researchgate.net/publication/309374814_Problems_faced_by_farmers_in_application_of_e-Agriculture_in_Problems_faced_by_farmers_in_application_of_e-_Agriculture_in_Bangladesh

[9] www.mapsofindia.com

[10] https://www.indiastudychannel.com/resources/150719-Advantages-and-Disadvantages-of-Organic-Farming-Methods.aspx

[11] https://www.precisionag.com/digital-farming/how-iot-solutions-for-indian-agriculture-are-working-despite-unique-challenges/

[12] https://www.agrifarming.in/future-of-iot-in-agriculture-in-india-iot-challenges-benefits

[13] https://www.geeksforgeeks.org/challenges-faced-by-iot-in-agricultural-sector/