



AGRICULTURE BASED ON INTERNET OF THINGS

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Abstract:

The Internet of Things is emerging as the third wave in the development of the internet. It refers to the environment where network connectivity and computing capability extends to objects, sensors and everyday items not normally considered computers. These items are then capable to generate, exchange and consume data with minimal human intervention. Devices or things and technologies came into existence playing significant role and helps doctors or physicians to add wisdom to their decision in healthcare monitoring. IOT as a whole is very broad area. This paper explains the concepts of IoT, healthcare monitoring, its overview and adoption to our homes.

Keywords: Internet of Things (IoT)_IoT in Agriculture, Smart farming, smell Sensor etc.

1 Introduction:

In this , the definition, status, components, and standards of IoT (Internet of Things) are introduced, and the possibility of IoT in

agriculture like soil monitoring, smart farming etc. The Internet of Things (IOT) is an emerging topic which includes the entire world. This term was coined by Kevin Ashton in his demo in the year 1998 from which the importance of it has been increased rigorously. In IoT, devices assemble and communicate information directly with each other via internet and the cloud manages to collect record and analyse data

blocks. Introducing IoT into embedded mobile transceivers into a wide range of devices, would add a whole new level to the world of information and communication technology. This technology includes a wide spectrum of networked products, systems, and sensors. Cloud computing has emerged and widespread to meet the demand of latency, reliability, security and efficiency. In order for a smart home heterogeneous set of things to operate with little or no human intervention a management system will be needed. The lack of such a management system along with the cost of the current devices has been a major factor in preventing customer from embracing the connected devices in their homes.

2. Definition of IoT:

The rapid development of information technology (IT) has brought forward a hyper connected society in which objects are connected to mobile devices and the Internet and communicate with one another. In the 21st century, we want to be connected with anything anytime and anywhere, which is already happening in various places around the world. The core component of this hyper connected society is IoT, which is also referred to as Machine to Machine (M2M) communication or Internet of Everything (IoE).

2.1 Market Trends:

The Internet of Things is a phenomenon where tiny machines have the ability to sense, respond, compute, and connect to the Internet, providing unprecedented access to control things and the environment around us. While it is still in its infancy, the time is ripe now with all the key ingredients in place – low price points for the devices, explosion of smartphones, tablets, PCs which are essential for providing the ability to manage and control the devices, broadband access to the Internet in homes, consumer demand, and manufacturers providing the capabilities to differentiate their products for an explosive growth over the next decade. Connected home device shipments will grow at a compound annual rate of 67% over the next five years, much faster than smartphone or tablet device growth, and hit 1.8 billion units shipped in 2019, according to BI Intelligence estimates. Connected home devices include all smart appliances (washers, dryers, refrigerators, etc.), safety and security systems (internet connected sensors, monitors, cameras, and alarm systems), and energy efficient equipment like smart

thermostats and smart lighting, healthcare for remote monitoring, diagnostics and services. Some of these areas like healthcare are in the stages of infancy, whereas, security and energy efficient equipment are in the early growth phase.

2.2 Communication:

Zigbee or Thread like suite of highlevel communication protocols to create personal area networks, designed specifically for the home. Mesh network designed to securely and reliably connect hundreds of products around the home – without blowing through battery life. Designed to support a wide variety of products for the home: appliances, access control, climate control, energy management, lighting, safety, and security. Designed to have extremely low power consumption. Devices efficiently will communicate to deliver a great user experience; yet will run for years on the smallest of batteries.

3 Sensor and Technology:

IoT is described as a connection of various “things” or “objects” around us, like, sensors, mobile phones, Radio Frequency Identification (RFID tags) which work through a unique addressing system with which these things are able communicate with each other and complete their tasks successfully. The role of RFID systems (used to identify and communicate with other devices). IoT mainly depends on Wireless Sensor Networks(while compile the information (which compile the information collection, processing and transformation), intelligent technologies (in order to solve problems and initialize and control the machine-to-machine interaction). Nano-meter technologies (to construct small devices in order to socialize

the IoT applications). There is still research being conducted in the field of IoT in order to make it more easy to use and also increase the security of the information transferred through it.

3.1 Smell Sensor:

Eetrochemical nose, also called an e-nose or micro nose, is an artificial olfaction device with an array of chemical gas sensors, a sampling system, and a system with a pattern-classification algorithm used for analysis of gases, vapors, or odors. Simply put, it is an array made up of chemical gas sensors housed in a device that uses pattern recognition to recognize, identify, and compare odors.

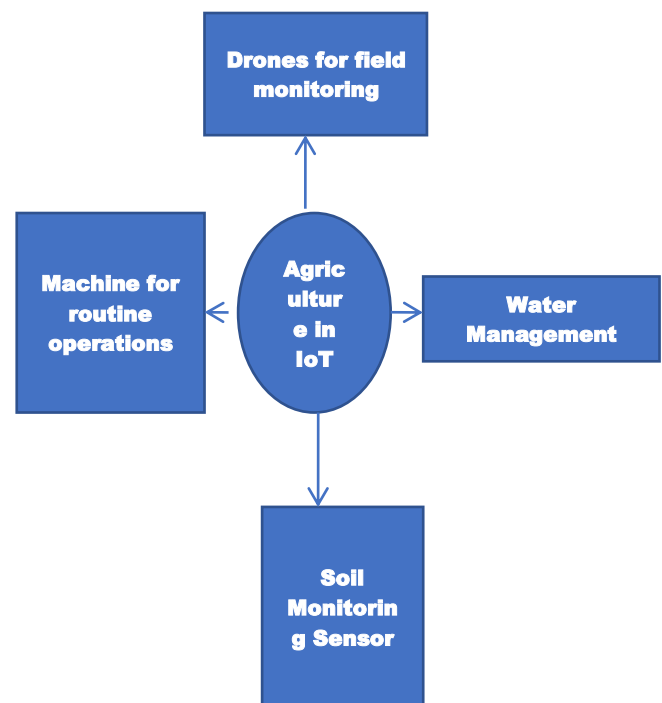
There are many classes of e-noses, including those with conductive polymer, surface acoustic wave, calorimetric, and polymer composite. Often there are several types or classes of sensors used. Chemical data sources include infrared spectrometers, gas chromatographs, and mass spectrometers.

3.2 Smell Sensor in Agriculture

Smell sensor is now introduced in the field of agriculture in order to identify the odor of soil and to sense the fertilizer smell. There are many applications of smell sensors are much needed in the field of agriculture like quality control in fertilizer, infected plant monitoring, raw material analysis, chemical warfare detection etc.

4. IoT in Agriculture

IoT in Agriculture is based on smart farming, crop monitoring with help of sensors to observe light, temperature, moisture, soil, etc., the farmers can monitor the field from anywhere and anytime.

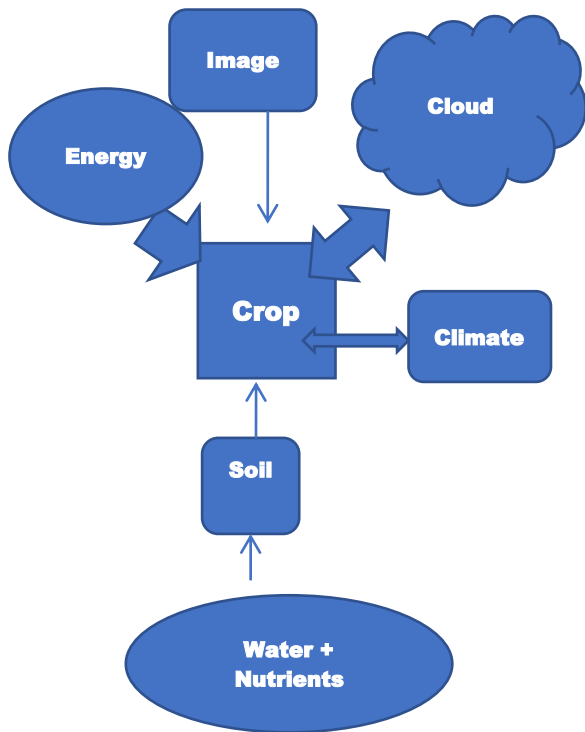


4.1 Smart Farming

Precision agriculture is one of the most famous applications of IoT in the agricultural sector and numerous organizations are leveraging this technique around the world. CropMetrics is a precision agriculture organization focused on ultra-modern agronomic solutions while specializing in the management of precision irrigation.

The products and services of Crop Metrics include VRI optimization, soil moisture probes, virtual optimizer PRO, and so on. VRI (Variable Rate Irrigation) optimization maximizes profitability on irrigated crop fields with topography or soil variability, improve yields, and increases water use efficiency.

The soil moisture probe technology provides complete in-season local agronomy support, and recommendations to optimize water use efficiency. The virtual optimizer PRO combines various technologies for water management into one central, cloud based, and powerful location designed for consultants and growers to take advantage of the benefits in precision irrigation via a simplified interface.



4.2 Sensor Drones

Sensor drone are introduced in the field of agriculture which enhance the work. The drones are commonly used for plant monitoring and also for fertilizer spraying.

The drones are also used to take images of the plants and it takes major role in mapping and plant health monitoring

5.Challenges to face

- Power consumption
- Range of network
- Data and privacy
- Complexity

5.1 Future enhancement

The sensors placed can be damaged because of any disorders so it should be made strong.

- Low power consuming sensor devices must be used.
- Agriculture not includes the irrigation, it includes

livelihood, transport, and marketing.

- Nowadays IoT is used in tracking the livelihood in that field, the sensors track them if any health issues occurs for the livelihood. But we can improve it by diagnosing the disease automatically and make a easy way of medication for it.
- Then IoT can be used to measure the amount (weight) of grains that is collected while threshing.
- Using the IoT devices we can make able to collect the recent updates of agri products marketing.

6. Conclusion:

In future IOT is going to become a reality. It will change our life style. But there are many challenges to face related to the deployment, growth, implementation, and use of this technology. The Internet of Things involves a complex and evolving set of technological, social, and policy considerations across a diverse set of stakeholders. But it will be a boon for us in future. The further research aims to extend with elaboration of framework for C2F U-healthcare monitoring system or other use cases of Internet of Things with enhanced support and other elements or technologies combinations. We hope that more research in this field will be conducted in the future.

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