

Role of IoT in Enhancing Agricultural Techniques

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Abstract:: In modern era agricultural process faces more discomfort in practice. To overcome these problems modern tools and techniques are adopted and even then the development was not achieved to the expected level. A new trend is to be followed to make the agriculture process more ease. In this paper a new approach has been proposed to simplify the hurdles in the agriculture process, The proposed scheme namely the precision agriculture plays a vital key role in enhancing the process involved in agriculture, The précised agriculture set forth with the enhancement IoT based application, focusing on the sub works and environment of agriculture process. The precise agriculture is purely based on electronics cooperative schemes with the help of Global Positioning System (GPS) and Geographic Information Systems (GIS) along with these sensors monitor and control system is being used.

Key Words: Global Positioning System, Agriculture, Precision Agriculture and Smart Farming.

I. INTRODUCTION

The need of precision agriculture is mandatory for the developing countries like India, In this country three sectors are mainly contributing in GDP growth in that service sector contributes 57.9%, industrial sector contributes 24.2% and agriculture sector contributes only 17.9%,[10]. This can be improved when the same process can be carried out by precision agriculture The basic structure of sensor network has mentioned in figure 1.1 display the basic structure of sensor network which portrays the information retrieve from sensor and the same to be stores in cloud environment. Subsequently the information collected from remote location has been visualized in the corresponding application. The investigation was carried out in agricultural land with time to time [1][4]. With the assist of precise farm practices, framers can gain knowledge through data sensors by determining the current practices and work through for greater efficiency. Application dealing with smart farming includes crop inspection, storage observing, vehicle tracing, irrigation and livestock management [7].

- Maximizing efficiency of irrigation management.
- Cost minimization on operational factors
- Minimization of waste
- Distinction in inter and intra crop verities.
- Determining the planting and harvesting period of crop.
- Pest control and other protective measures through observation.

In precision agriculture the yield will be more when comparing with the existing farming methodology. The farmers can able to cultivate with the specified and definite crops variety with respect to the seasons, and moreover the variety of crops which is to be selected can also be inferred from the preliminary test carried on the soil.

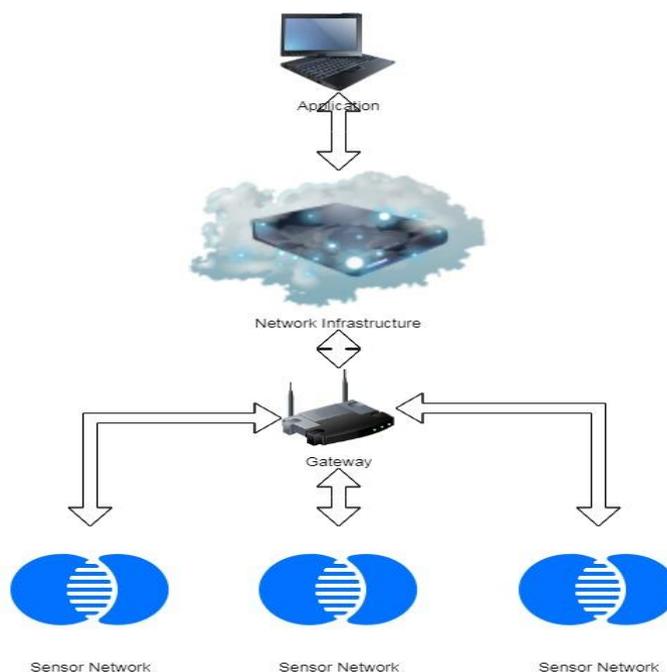


Figure 1.1 Basic Structure of Sensor Network

II. PRECISION AGRICULTURE METHODOLOGY

The Precision farming mainly deals with three criteria's namely data collection, Application, and Interpretation as shown in the figure 2.1. The data collection deals with Soil mapping, Crop condition mapping, Soil Condition Mapping and Yield Mapping.

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Subsequently Interpretation deals with data Integration, crop/ soil Models and Treatment map and finally application area deals with sowing, fertilize and protection[2].

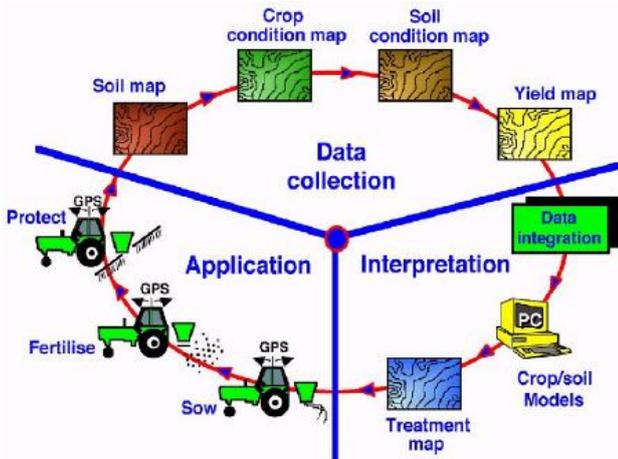


Figure 2.1 Cyclic Process of Precision Agriculture

2.1 Yield Monitoring:

The yield monitoring process [in fig 2.2] is carryout by special type of yield monitors, this yield monitors are produced by different stockholders like GRDC by Australian Government etc. Through the yield monitors a crops yield can be estimated through time or distance[6][9].

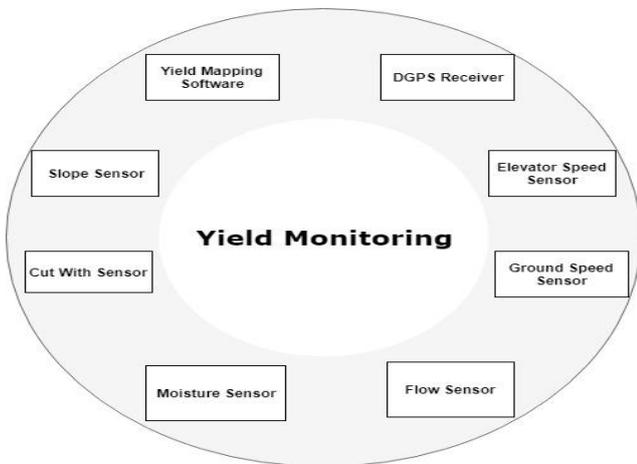


Fig. 2.2 Yield Monitoring

2.2 Yield Mapping

The Yield mapping process is being executed from the data collected through yield monitoring connected through GPS, the collected date which reveals the yield details will be mapped based on the types of farm land[5].

2.3 Variable Rate Fertilizer

The variable rate fertilizers function is carried out by simple computing machines namely by a computer or a mobile device attached with a electronic précised map. The variable rate fertilizer can be analyzed in different states like solid, liquid and gaseous state [fertilizers].

2.4 Weed Mapping

Weed mapping is a collective technique involving in combining grains seeding processes, spraying using keypads on the mobile device through GPS Management. The weed mapping system is carried out based on the matrix dimension of the farm land.

2.5 Variable Spraying

The variable spraying controls has been implemented using locations from weed mapping, and this reduces huge amount of labor charges.

2.6 Topography and Boundaries

The farm planning and farm mapping for field boundaries, tree sheds, Yards can be accurately design using high sensitive differential global positioning system [DGPS].In addition DGPS is also used for field division and also grassed water ways.

2.7 Salinity Mapping

Salinity mapping involves in calculating the salinity level of the farm land with respect to regular time intervals by salinity meter connected with GPS. The salinity mapping cannot be processed individually; it is a combined process along with weed mapping and Yield Mapping.

2.8 Guidance Systems

The guidance system provides accurate position of a vehicle. The guidance system is much compatible with the classical system like spraying the fertilizer. The complete guidance system is being operated by DGPS[3][5][8].

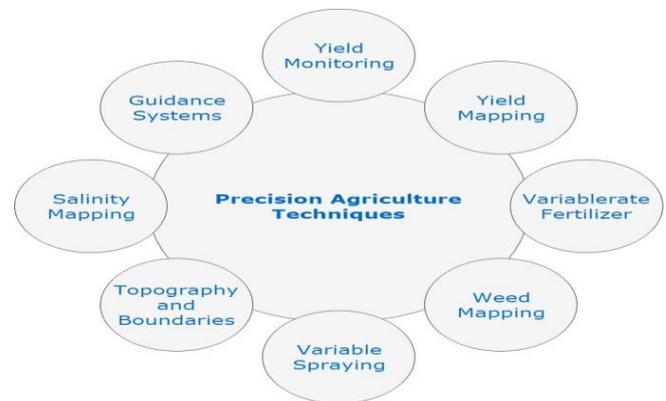


Fig.2.3. Overview of Precision Agriculture System

III. SUMMARY OF PRECISE AGRICULTURE METHODOLOGY

S. No	Precision Agriculture Techniques	Uses
1	Yield monitoring	Monitoring Crop Field

2	Yield mapping	Mapping the Dimensions of form Land
3	Variable rate fertilizer	Analyze the quality of fertilizer with respect to land
4	Weed mapping	Analyzing the ratio of weeding in the Farm Land
5	Variable spraying	Determining the spray[shower] of fertilizers
6	Topography and boundaries	Pictorial representation of farm land through DGPS
7	Salinity mapping	Checking the salinity level in form land.
8	Guidance systems	The overview/cooperative process of précised Agriculture

IV. CONCLUSION

Through the study of research article based on precision agriculture, It is inferred the précised farming methodology would be the best among various farming methodologies. It would serve as best techniques in yielding maximum efficiency in the farm land. In addition the précised agriculture will also depict the environment variable around the farm land more accurately. The entire process deals with the external system involving in factors such as Data sensors, DGPS and other transmission cum storage devices. Since the entire process of précised agriculture depends on Electronics, GPS technology and Network transmissions, In case of any climatic or natural disaster this setup will turn as complexity to the entire system.

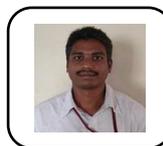
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