A REVIEW ON IoT IMPLIMENTATION IN AGRICULTURE

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Abstract

Agriculture has a major impact in the survival of human being. More number of populations in the nation is in need of more number of agriculture products for the daily survival. So our focus of study was to examine the positive and negative effects of agriculture and its development. Agriculture crop yielding always suffer a huge loss from the naturally occurred environmental variation, if not properly controlled will leads to under yielding and huge loss to the country and farmers. So this loss could be encountered by using IoT and latest technologies for crop yielding and its development. Different form of sensors, tools, software's, support of different cloud computing and various tools as a methodology in a systematic manner could leads to positive results. Various examination resulted positive support for farmers all over the world. Farmers could get a strong support using IoT and its technologies with little training at the initial stages and could suppress lots of challenges faced in crop yielding stages. Various government and few private sectors contributed much more in the initial policy making and decision stages indirectly to the farmers but indeed if it showed more intense of interest by the government and private sectors that could reach more numbers of famers by user friendly will leads to much more advancement and its development stages. Overall review of the examinations revealed that economical way of approach to the crop yielding and its development using IoT makes an systematic methodologies and its changes.

Keywords : *Agriculture, Crop, Farmers, IoT, Methodology, Parameters, Yielding.*

1 INTRODUCTION

The contribution of agriculture in GDP's of the country is increasing day by day in every nation of the world. The emerging population in the world and for its survival by basic means for food production is most important area of the content. Most of the countries entirely depend on agriculture crops for their survival and some countries import or export their crop for balancing of the survival in the society. The developments of the agriculture depend on various factors for the fertile products. Most of times famers faces challenges in growing agriculture crop's like natural disasters, difficulties caused for degradation of the crop due to environmental effects. These calamities must be monitored by famer's for a successful crop, but being faced more difficulties in farmer's journey, economically and other conditions. Being a successful farmer executing more and profitable crops in terms of magnitude plays a important role in successful agriculture Generally farmers based on their experience measures in approximate view of studying the soil, environment and other parameters and utilize or manipulate using fertilizers, pesticides and other chemical inert elements. The monitoring without human intervention in studying and planning accordingly IoT plays a vital role. Many researchers have studied the monitoring of crops, Chemical control, disease, control of irrigation, soil management and others. Different tools and techniques giving the output where farmer needs to observe the outputs and balance his crop growing and maintaining the systematic way of maintaining. Our intense was to review all the IoT based articles or work carried out. The positive and negative effects are studied detailed below [1] [6] [7] [10][11].

2. OBJECTIVE

The objective of the study is to find the social issues agriculture products and process is facing. The application and improvement in technology via IoT based agriculture is a vital content in our objective of study. Studied conducted results are reviewed in a systematic manner.[1] [3] [10][11].

3. SCOPE

The scope of the present study is concentrated on advancement of technology. The measure of crop outputs and farmers way of smoothening the process will be examined. The analysis of study was planned and designed based on the prior works performed and published. The frequency of technological focus was limited to the standard of references chosen [1] [6].

4. LITERATURE REVIEW

Advancement in agriculture leads to the successful GDP of the country. Agriculture is a method of growing crops for human and animal survival, where animals, plants, earth and human parameters are connected inter relatively. Agriculture crop loss or lower crop yield is due to the natural disaster, weather environmental changes which is inevitable by the farmers. The level of loss can be controlled by measuring different parameters by using different sensors, Aurdino and IoT technologies. Many researchers and government sector still today examines the quality of soil available with proper nutrient. This methodology helps in getting better crop by supplying right amount of fertilizers. Most of the researchers were focused on method of irrigation where different methodologies are still using from past decades. But the application of IoT in irrigation i.e. Crop Water Stress Index (CWSI) has increased the efficiency of crop yield. A most executed methodology for better crop yield is fertilizer. IoT in fertilization by studying the crop behaviors with the help of satellite images simultaneously balancing the required amount of fertilizers, Normalized Difference Vegetation Index (NDVI) is the fertilizer approach of methodology. Most common steps ahead were in studying the disease control related technology in agriculture. Even IoT was helpful in designing the stages of capturing the image data's and identifying the crop disease by physical observation. This output saves a crop from over loaded medicines (chemicals) in the form of chemicals. Yield monitoring is the important stages of crop growing process, where IoT helps in finding the required data via cloud computing and by analyzing the data's the required observation were made using satellite images. Most of technology development showed positive results. [2][4][6][7][9][10].

5. APPLICATION MODELS UTILIZED (Tables) Ref [2][4][6][7].

Monitoring of Crop	Chemical Control	Disease	Control of Irrigation	Supply Chain Traceability	Soil Management	Others

Table:1 Environmental application in smart agriculture.

Disease Prevention	Waste Management	Chemical Control	Monitoring of Crops	Soil Management	Machineries and Vehicles	Control of Irrigation

Table:2 Implantation of UAVS in IoT.

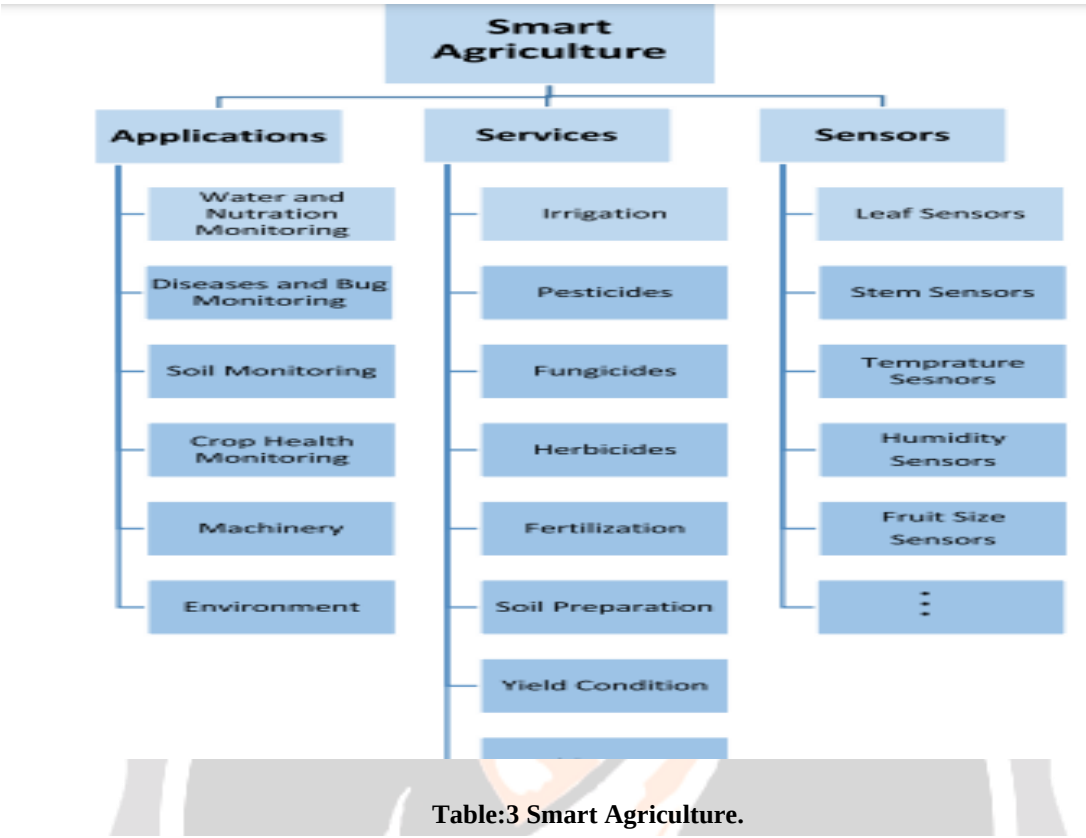

Table:3 Smart Agriculture.

Communication/ Data type	Possible application	Expected Data size	Power consumption (active mode)
Small sized data and low power consumption	(1) Air temperature/ humidity/ direction / speed (2) Soil temperature/ humidity (3) Leaf thickness/color (chlorophyll) (4) Trunk thickness/flux flow (5) Fruit size	100s of bytes	Less than a mA (Fractions of mA)
Medium sized data and medium power consumption	(1) Still picture camera (2) Multi or hyper spectral camera (3) Acoustic sensors	10s of Mb	10s of mA
Large sized data and large power consumption	Video streaming cameras	10s of Mb per minute	50 A

Table:4 Power Specification of data and sensors used in Agriculture.

Sensor/ System	Target/Placed				Considered Purpose/Parameters							
	Plant	Equipment	Soil	Weather	Yield	Temp	Moisture	Location/Tracking	Wind	Pollution (Co2	Water	Fruit/ Stem Size
Loup 8000i [137]		✓			✓		✓					
XH-M214 [138]			✓				✓					
Ag Premium Weather [139]		✓		✓		✓		✓	✓			
FI-MM [140]	✓											✓
PYCNO [141]			✓	✓		✓	✓				✓	
MP406 [142]			✓			✓	✓					
DEERE 2630 [143]		✓			✓		✓					
Sol Chip Com (SCC) [144]				✓						✓	✓	
SenseH2TM [145]	✓								✓	✓		
DEX70 [146]	✓											✓
Piccolo ATX [147]		✓						✓				
CI-340 [148]	✓						✓			✓		
Wind Sentry 03002 [149]				✓					✓			
AQM-65 [150]				✓						✓		
POGO Portable [151]			✓			✓	✓				✓	
SF-4/5 [152]	✓											✓
Met Station One [153]				✓					✓			
SD-6P [154]	✓											✓
B-102 [155]		✓						✓				
YieldTrakk [156]		✓			✓		✓	✓				

Table: 5 Sensors types.

6. CONCLUSION

Based on our examination, various researchers has conducted work considering different parameters for successful cropped yielding using IoT and its advancement. Based on the environmental factors monitoring of crop is an important initiation and its methodology using different embedded systems, different controllers, sensors and satellite image methodology. Time to time inspection and everything under control in a small computer helps in understanding the parameters relationship of imaging technology and increase in the efficiency of the crop. Study of the soil at the initial stage and its frequent monitoring its variations helps in balancing the conditions and increasing the yield. The identification of the irrigation and its water base using latest technology helps in maintaining the balance of the crop. Studying the parameters via IoT technology help farmers to frequently observe the development of crop and balance the positive and negative variations in its yielding. Different sensors are used to study the environmental parameters like, temperature, humidity, and velocity of air, chemical content in the atmosphere, soil ingredients and its increase or decrease in soil parameters. Based on the data's measured and interconnecting all the variations observed to the growth of crops and its controlling agents. Output parameters, executions and other changes to be encountered for crop development, farmer's lots of hard work and expense could be reduced. Imaging technology is used to study the growth, disease and other parameters. Most of the work

was an overview of examination conducted using IoT in agriculture crops. But the economical way of achieving and incorporating these IoT technologies could be more expensive. Government sectors and interested private sectors if showed an interest in investing these types of changes it could resolve lots of social issues related to the farmers and agriculture products. Since the amount of contribution by the agriculture market and human survival must be an important focus of study and its development in future. Parameters considered in this work ref table number 1 to 5.

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