

Role of IOT based Indian Agriculture Sector

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Abstract: Internet of Things (IoT) based Agriculture sector in India is diminishing day by day which affects the production capacity of ecosystem. Agriculture is most important aspect of human civilization. The Agriculture Application based on the framework consisting of KM-Knowledge base and Monitoring modules. To make profitable decisions, farmers need information throughout the entire farming cycle. A knowledge dataflow model is constructed connecting various scattered sources to the crop structures. IoT plays role in the development of agricultural sector. This paper aims at to make agriculture sector using automation ,cultivation and IoT Technologies.

Keywords: Internet, information technology, sensing, control, precision farming ,food chains, consumer information.

1.INTRODUCTION

Farmers need agricultural information and pertinent knowledge to make knowledgeable decisions and to satisfy informational needs. In agriculture domain through the development of a knowledge management system, enquiries of farmers can be answered with the help of multimedia which is easily accessible. The application of Information and Communication Technology (ICT) has proven for widening the opportunities to promote agriculture on several aspects and domains in developing countries. Technology has crossed hurdles by using wireless technology, networking, mobile etc. to overcome the utilization of energy, power and cost consuming equipments which was helpful in the agricultural development. At present, the key issue in the current domain is utilization of resources like man-power and water which is lacking in many parts of the country. Agricultural system needs to be monitored on a regular basis. The use of the developed framework is to reduce wastage by automation the entire agricultural system. Farmer can get any required data or information as well as monitor on agricultural sector. IoT is a network of interconnected devices which can be transfer data efficiently without human involvement. All farming sector can be done using smart phones and IoT devices.

2.LITERATURE REVIEW

Agricultural production can take decreasing water tables, drying up of rivers and tanks, unpredictable environment present an urgent need of proper utilization of water. They use of technology in the field of agriculture plays important role in increasing the production as well as in reducing the extra man power efforts. Some of the research attempts are made done for betterment of farmers which provides the systems that use technologies helpful for increasing the agricultural yield. Internet of Things (IoT) in agriculture and food were found in the Scopus database until 2015. The first conference papers were published in 2010 and the number of publications has increased rapidly to 43 papers in 2014. In 2015 slightly fewer publications were found, while the number of journal papers increased. This might indicate that the research on IoT in agriculture and food starts to mature. The journal papers include both generic journals on information technology research and domain-specific journals on agriculture and food research. The first journal paper was published in the Journal of Software in 2011. The Transactions of the Chinese Society of Agricultural Machinery published by far most of the journal papers , followed by the Advance Journal of Food Science and Technology.

3. ROLE OF IOT IN AGRICULTURE

Agriculture is the main occupation of India's Economical growth. The life cycle of agriculture sector, viz. cultivation, water management, harvest, storage, processing, transportation, export and sales. The most important carrier that arises in traditional farming is climate changes. Due to these the productivity decreases to major extent. Climatic change also arises of environmental cost such as seasonal changes in life cycle of plants. Farmers can get huge information and knowledge about the recently trends and technology using IoT. The three most important necessities of humans are food, air and water (of course after smart phone and WiFi). The increasing consumption needs of a global population is expected to grow by 70% by 2050 as quoted by UN food. This means there has to be a production of 70 times more than we have it now. Global climate change, estimates of cropland reductions from 10 to 50 percent. Food losses and waste amounts to roughly US\$ 680 billion in industrialized countries and US\$ 310 billion in developing countries. Harvest and post-harvest loss of India's major agricultural produce is estimated at Rs 92651 crore (\$13 billion the farming industry will become arguably more important than ever before in the next few decades.

IoT device of BI intelligence in installations of the agriculture world will increase from 30 million in 2015 to 75 million in 2020, for a compound annual growth rate of 20%. In order to maximize the efficiency, collecting and analyzing big data by implementing IoT will be fruitful. This implementation not only drills IoT in agriculture but also helps in smart village planning.

3.1 Water management

Water management can possibly conserve 50 billion gallons of new water in a year. Sufficient water supply is basic for cultivation; yields can be harmed by either water abundance or deficiency. It is a sub-set of water cycle management. As with other resource management, this is rarely possible in practice.

3.2 Soil Monitoring

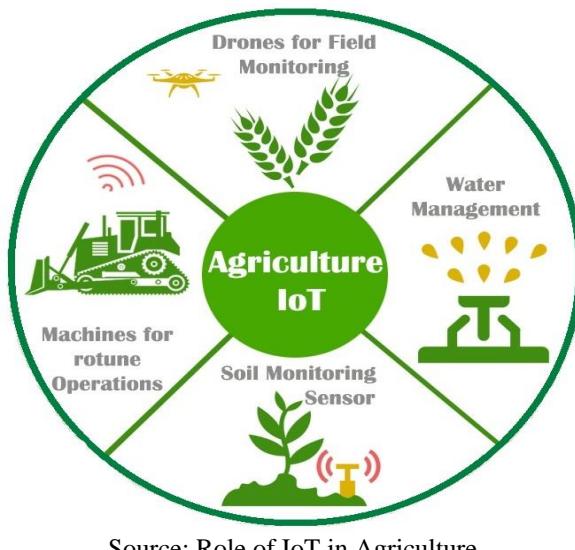
Internet of Things (IoT) for an agricultural environment. temperature and moisture along with other factors can be of significance. A conventional approach to compute these factors in a farming atmosphere meant farmers physically taking measurements and examine them at various times.

3.3 Drones for Field Monitoring

Wireless sensor system and sensors of various sorts are utilized to gather the data of yield conditions and natural changes and these data is transmitted through system to the agriculturist that starts remedial activities. Ranchers are associated and mindful of the states of the agriculture field at whenever and anywhere on the planet. The internal control of production includes mandatory monitoring of fields with the help of drones monitoring system. Our technical specialists use the drone DJI Phantom 4 Pro. The drone goes up to 450 meters and the modern camera makes it possible to examine large areas and to monitor fields and crops not moderately but on the whole area. The information recorded by the drone is sent to the Company's agronomic service for analysis.

3.4 Machines For Routine Operations

Farmers will be able to perceive many diseases in the season's crop through mobile phones, because of smart wireless sensors used in field and also using small drones to recognize the diseases of plants by using sensors & WSNs in a drone. Then information will send to ranchers mobiles regarding the information about the disease of a plant.



4. IOT APPLICATIONS IN AGRICULTURE

4.1 Monitoring and control systems

IoT based systems have been proposed for monitoring and control of environmental conditions in greenhouses and monitoring and decision support systems for agriculture field application . A WSN based precision agriculture architecture was proposed for sensing vital parameters of soil.WSN based solutions have also been proposed for environmental monitoring, precision agriculture, machines and process control.

4.2 Smart Irrigation system

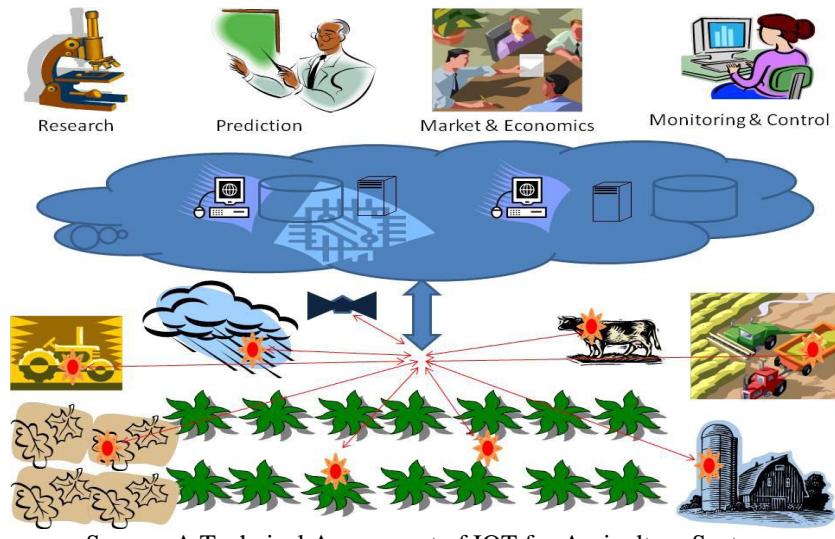
Agriculture production take water is a critical input for agriculture yield in nearby all its aspects. Without optimal water, even good seeds and fertilizer fail to achieve their full potential. India has about 4% of the world fresh water



resources with about 17% of the world's population. But in terms of water use efficiency, India uses 2 to 3 times the water used in countries like China, Brazil and USA to produce one tonne of grain.

4.3 Agri-produce and Agri resource management

RFID tags or sensor node can be attached to the agricultural produce and the agriculture resources for effective tracking and management. Uses of RFIDs have been proposed for identification and tracking of livestock, Agro-produce, farm machinery, etc. Similarly, real time monitoring of products stored or transported under controlled environment is also a possible scenario. Further IoT and cloud based platforms can be helpful in intelligent scheduling of expensive agricultural machinery.



5. ADVANTAGES OF IOT

- i) Water management can be efficiently done using IoT with no wastage of water using sensors.
- ii) IoT helps to continuously monitor the land so that precautions can be taken at early stage.
- iii) Crop monitoring can be easily done to observe the growth of crop.
- iv) Soil management such as PH level, Moisture content etc can be identified easily so that farmer can sow seeds according to soil level.
- v) Sensors and RFID chips help to recognize the diseases occurred in plants and crops.
- vi) Crop sales will be increased in global market. Farmer can easily connect to the global market without restriction of any geographical area.

6.CONCLUSION

Indian economy Agriculture plays an important role. For the increase in crop production efficiency and farmer life, IoT plays a vital role. For the efficient and better decisions for farmers, educating them with visual alerts is necessary. The data points can be analyzed by different devices connected with each other. The soil properties and the best crop suited for the soil, these things Indian farmers are still unfamiliar with. To enhance the yield, IoT device can be used which can easily know details of the soil, fertilizer and water level that are required for the field. The visual alert in the farmers own language helps in weather forecasting and theft protection which is another advantage. Further, the aim is to develop and actual implement this product on a particular agricultural land. The major challenge is to spread the knowledge and awareness about such systems to the various stakeholders, particularly to the farmers.

REFERENCES

- [1] Deepak Sharma, MIS Division, CSIR-Central Scientific Instruments Organisation, Sector-30C, Chandigarh-160030(India);E-mail: deepaksharma@csio.res.in.
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