Agricultural applications of IOT

Aalisha Nandwani ,Tanvi Khairnar, Jyotl Adani, Sejal Sali

Students of Polytechnic

Guru Gobind Singh Polytechnic, Nashik, Maharashtra, India.

Abstract:

Internet of Things (IoT) plays a crucial role in smart agriculture. Smart farming is an emerging concept, because IoT sensors capable of providing information about their agriculture fields. The paper aims making use of evolving technology i.e. IoT and smart agriculture using automation. Monitoring environmental factors is the major factor to improve the yield of the efficient crops. The feature of this paper includes monitoring temperature and humidity in agricultural field through sensors using CC3200 single chip. Camera is interfaced with CC3200 to capture images and send that pictures through MMS to farmers mobile using Wi-Fi.

Points to Learn….

- What is IOT?

- IOT in agriculture

- Applications

- Implemented method

- Advantages and disadvantages

- Conclusion

What is IOT?
- ➢ The Internet of Things(IOT) is inter-networking of physical devices. This system has ability to

transfer data over a network without requiring human-to-human or human-to-computer

interaction.

> IOT is short for Internet of Things.

The Internet of things (IoT) is the most efficient and important techniques for development of solutions to the problems. IoT evolve from different building blocks which includes lots of sensors, software's, network components and other electronic devices. Also it makes data more effective. IoT allows to exchange the data over the network without human human involvement. In Internet of things, we can represent things with natural way just like normal human being, like sensor, like car driver etc. This thing is assigned an ip address so that it can transfer data over a network. As per the report generated by Garner, at the end of 2016 there will be 30% rise in count of connected devices as compared to 2015. He further says that, this count will increase to 26 billion by 2020[1]. The IoT technology is more efficient due to following reasons: 1. Global Connectivity through any devices. 2. Minimum human efforts 3. Faster Access 4. Time Efficiency 5. Efficient Communication

Due to enormous growth in technologies, farming has become more popular and significant. Different tools and techniques are available for development of farming. According to the UN Food and Agriculture Organization, in order to feed the growing population of the Earth, the world will need to produce 70% more food in 2050 than it did in 2006[3]. To meet this demand, farmers and agricultural companies are turning to the Internet of Things for analytics and greater production capabilities. Internet of Things (IoT) can play big role in increasing productivity, obtaining huge global market, idea about recent trends of crops. IoT is a network of interconnected devices which can transfer data efficiently without human involvement. Today many agricultural industries turned to adopt IoT technology for smart farming to enhance efficiency, productivity, global market and other features such as minimum human intervention, time and cost etc. The advancement in the technology ensures that the sensors are getting smaller, sophisticated and more economic. The networks are also easily accessible globally so that smart farming can be achieved with full pledge. Focusing on encouraging innovation in agriculture, smart farming is the answer to the problems that this industry is currently facing. All this can be done using smart phones and IoT devices. Farmer can get any required data or information as well can monitor his agricultural sector.

IOT IN AGRICULTURE

- Today, India ranks second in the world in farm output 64% of cultivated land dependent on monsoons.

- Irrigation accounts for 55-75% of water usage in India.

Nearly 60% of the water used in irrigation is wasted.

- we conserve water by using soil moisture sensors.

Smart Agriculture Using IOT Agriculture is the main backbone of India's Economical growth. The most important barrier that arises in traditional farming is climatic change. The number of effects of climatic change includes heavy rainfall, most intense storm and heat waves, less rainfall etc. Due to these the productivity decreases to major extent. Climatic change also raises the environmental consequences such as seasonal changes in life cycle of plants. To boost the productivity and minimize the barriers in agriculture field, there is need to use innovative technology and techniques called Internet of Things. Today, the Internet of Things (IoT) is transforming towards agriculture industry and enabling farmers to compete with the enormous challenges they face. Farmers can get huge information and knowledge about recent trends and technology using IoT.

The smart agriculture market is expected to reach $18.45 Billion in 2022, at a CAGR of 13.8%. BI estimates that 75 million IoT devices will be shipped for agricultural uses in 2020, at a CAGR of 20%. IoT devices can be of great help in enhancing the production and yield in the agriculture sector since these devices can be used to monitor soil acidity level, temperature, and other variables. Moreover, smart agriculture will help in monitoring livestock productivity and health as well. IoT sensors are capable of providing farmers with information about crop yields, rainfall, pest infestation, and soil nutrition are invaluable to production and offer precise data which can be used to improve farming techniques over time. Internet of things, with its real-time, accurate and shared characteristics, will bring great changes to the agricultural supply chain and provide a critical technology for establishing a smooth flow of agricultural logistics [4] . The key advantages of using IoT in enhancing farming are as follows: 1. Water management can be efficiently done using IoT with no wastage of water using sensors. 2. IoT helps to continuous monitor the land so that precautions can be taken at early stage. 3. It increases productivity, reduce manual work, reduce time and makes farming more efficient. 4. Crop monitoring can be easily done to observe the growth of crop . 5. Soil management such as PH level, Moisture content etc can be identified easily so that farmer can sown seeds according to soil level. 6. Sensors and RFID chips aids to recognize the diseases occurred in plants and crops. RFID tags send the EPC (information) to the reader and are shared across the internet. The farmer or scientist can access this information from a remote place and take necessary actions, Automatically crops can be protected from coming diseases[2]. 7. Crop sales will be increased in global market. Farmer can easily connected to the global market without restriction of any geographical area.

IOT APPLICATION IN AGRICULTURE

- ❑ Crop water management.

- ❑ Pest management and control works.

- ❑ Precision agriculture.

- ❑ Food production and safety etc.

CROP WATER MANAGEMENT

- • Usually the farmer pumps the water more or less to cultivate the land.

- • This may result in wastage of water or insufficiency to the crops.

- • Sends an alerting message to the farmer when   the moisture level increases or decreases.

PEST MANAGEMENT AND CONTROL WORKS

Often farmers hardwork are destroyed by predators(pests) that results in huge loss to farmers.

- ➢ To prevent such situation **AGRICULTURE INTERNET OF THINGS** has a system that detects the motion

of predators using PIR sensors.

- ➢ This information can be used by the farmers to reduce damage done by predators.

Advantages

- ➢ Cost effective method

- ➢ Optimize water use

- ➢ Sustain high-yielding

- ➢ High quality crop production

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Disadvantages

➢ Need for each soil type is calibrated

Conclusion:

• We can predict soil moisture level and motion of predators.

• Irrigation system can be monitored .

• Damage caused by predators is reduced.

• Increased productivity.

• Water conservation.

• Profit to farmers.

Farming will play vital role in next few years in country. Thus there is need of smart farming. Internet of Things will help to enhance smart farming. IoT works in different domains of farming to improve time efficiency, water management, crop monitoring, soil management, control of insecticides and pesticides etc. It also minimizes human efforts, simplifies techniques of farming and helps to gain smart farming. Along with these features smart farming can help to grow the market for farmer with single touch and minimum efforts.

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