

A Review Paper on Wireless Sensor Networks and its Applications in Smart Farming

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ABSTRACT: *The survival of human life in society is a major challenge without the farming. Agriculture plays a vital role in human civilization's development, growing population, lack of resources and ecological degradation. Food imports have triggered shortages and sustainability concerns across the globe. Most farmers also adopt conventional farming practices in developed and developing countries. There is a transition from traditional agriculture to modern agriculture practice at the beginning of this decade which is also called the smart farming. This paper offers insight into different wireless sensor technology needs, wireless sensor networks used in agriculture, and problems associated with the implementation of the wireless sensor network (WSN). In the field of agriculture, smart farming (SF) has played a major role in growing development.*

KEYWORDS: *Agriculture, Cost, Food, Smart Farming, Wireless Sensor Networks, Intelligent circuits..*

INTRODUCTION

Agriculture plays a very essential role in the enlargement of an agricultural nation such as India. As the population soars from today's 1.3 billion to an estimated 2 billion by 2050, the demand for food is expected to more than double. In the smart farming the primary objective of the farmers are to achieve increased yield at the minimal cost. The number of factors affecting the farm is high which complicates the decision-making process. The forces of innovation currently driving smart dairy farming fall in the three primary sectors. The first is robotic milking, the second is automated feeding, and the third is concerned with the overall subject of quality: quality of product and quality of life for the animals. In order to minimize the labor costs through automation and intelligent software is the primary motivation for many industries, and large-scale farming is no different [1].

This article offers an overview of recent advances in wireless sensor technology and wireless communications protocols in the field of wireless sensors. Examples of wireless sensors and sensor networks used in agriculture and food production are provided for environmental monitoring, precision farming, machine and process control based on M2M, automation of buildings and facilities, and traceability systems based on RFID [2]. The article also addresses the benefits of wireless sensors and barriers that hinder their rapid adoption. Finally, the paper addresses potential developments in the application of wireless sensor technology in agriculture and the food industry, based on an overview of market growth [3]. Researchers

had developed and used various devices for detecting and collecting soil and environment conditions in order to determine various parameters. Figure 1 depicts the architecture of the wireless sensor network. Table 1 shows the traditional and smart farming comparison.

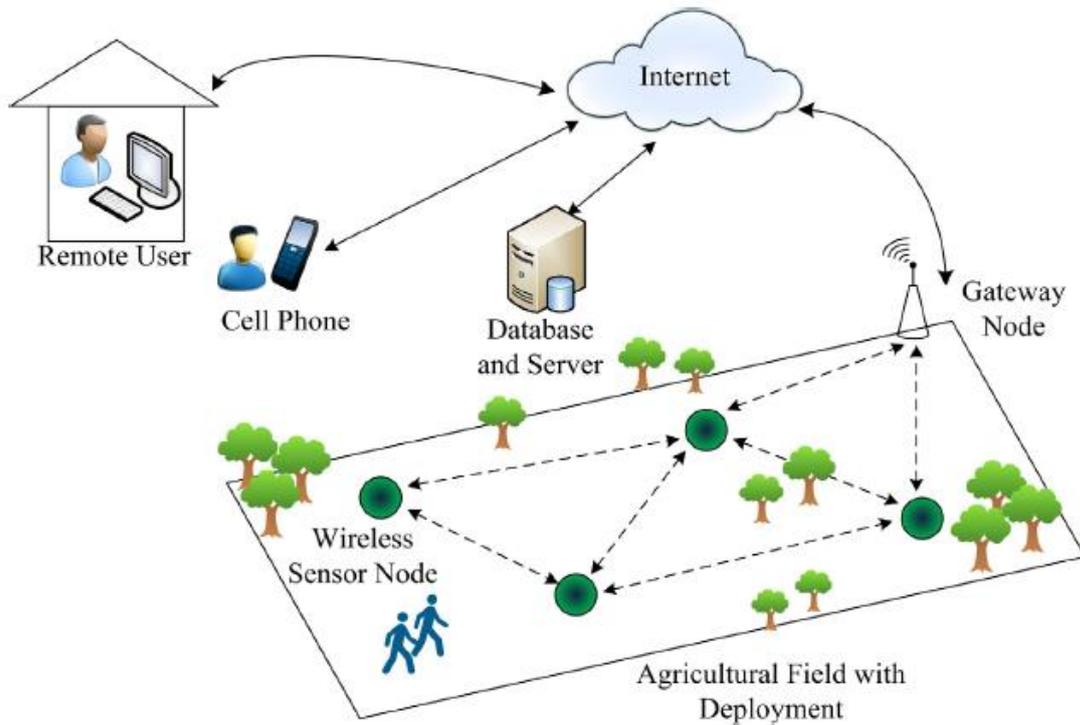


Figure 1: Illustrates the connectivity through the wireless sensor networks

Table 1: Illustrates the traditional and smart farming comparison.

Sl. No.	Agricultural Requirements	Traditional Farming	Smart Farming
1	Need of staffing	Yes	No
2	Water Utilization	High	Low
3	Field Monitoring	High	Low
4	Data Acquisition	Low	High
5	Cost	High	Low
6	Yield	Low	High
7	Time	More	Less

LITERATURE REVIEW

Akyildiz et al. conducted another paper on wireless multimedia sensor networks. In recent years, the growing interest in the wireless sensor network (WSN) has resulted in thousands of peer-reviewed publications [5]. Most of this research focuses on scalar sensor networks that measure physical phenomena such as temperature, pressure, humidity or object position that can be transmitted through low bandwidth and delay-tolerant data streams. The emphasis has recently shifted to research aimed at revisiting the paradigm of the sensor network to allow multimedia content, such as audio and video streams and still images, as well as scalar data [4].

Al-Karaki et al. conducted another survey on the routing techniques in wireless sensor networks. Wireless sensor networks consist of small nodes with capabilities for sensing, computing and wireless communications. Many protocols for routing, power management, and data dissemination were specifically designed for WSNs where energy knowledge is an important problem of design. Depending on the application and network architecture, routing protocols in WSNs could differ. In addition, these protocols can, depending on the protocol operation, be categorized into multipath-based, query-based, negotiation-based, QoS-based, and coherent-based. In any routing paradigm, we research the architecture trade-offs between energy and communication overhead savings[5].

DISCUSSION AND CONCLUSION

The present paper highlights the benefits of smart farming over traditional farming and various technologies and applications of the smart farming. By deploying the smart farming, farmers may obtain the more profit, high yield, ease in the agricultural land monitoring as well as the effective utilization of the water. There are various deployment threats of WSN in agriculture are highlighted and still there are certain issues that demand to be fixed in WSN applications globally. Finally, different WSN and various approach for autonomous irrigation has been presented towards agriculture domain.

In the future, overall agriculture system can be automated to make the sustainable agriculture by utilizing the technologies like as Internet of things, fog computing, wireless sensor networks as well as the cloud computing that minimizes the time consumption and utilization of the resource. Moreover, these technologies offers the remote control farm management, warehouse management as well as the intelligent decision-making in order to improve the farmer's profit. Farmers can also determines the yield of crop and compute the profit utilizing the machine learning and deep learning methods that make the agriculture profitable.

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