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A Literature on Wireless Sensor network Applications

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***Abstract*---- Introduction of sensor technology such as Micro Electro Mechanical Systems (MEMS), wireless communications, embedded systems, remote computing, and wireless sensor implementations has recently led to a major transformation of the Wireless Sensor Network (WSN). It assists and improves work performance in industry as well as in our everyday life. Wireless Sensor Network has been commonly used in many areas especially for tracking and monitoring in agriculture and monitoring of biodiversity. Environmental surveillance has become an important area of management and security, providing real-time communication system and interaction with the physical world. A smart and intelligent Wireless Sensor Network system can capture and process large amounts of data from the start of tracking and controlling air quality, traffic patterns, to weather situations. This paper explore and analyze technologies for the environmental monitoring of wireless sensor networks. There are several standards to be met to incorporate a reliable monitoring system. Studies have shown that it is an alternative way to replace the conventional method which uses men to force monitoring of the environment. It is also established that these methods can improve the performance of the program, provide a simple and efficient method and can also satisfy practical needs.**

***Keywords*--- Wireless Sensor Network; Environment Monitoring; Monitoring Applications**

I. INTRODUCTION

New advances in wireless communications and electronics have put into existence the Wireless Sensor Network (WSN) dream which has accelerated the development of low-cost, low-power, and multi-functional sensors that are small in size and can interact in short range. Each node is made up of microcontrollers, memory, and transceivers. The microcontrollers are used to perform tasks, process data and assist other component functionality within the sensor node. It is primarily used for data storage for the memory while the transceiver acts from the combination of transmitter and receiver functions.

Sensors collect data on natural phenomena such as temperature, illumination, sound and motion, and then send it to a server. These nodes powered by batteries are used from remote locations to monitor and control the physical environment. Wireless Sensor Network's technologies have been extensively used and used in medical, military, manufacturing, agriculture, and environmental monitoring over the last few years. Figure 1 shows the design of the Wireless Sensor Network used in environmental monitoring that involves sensor nodes, device nodes and sink nodes. Sensor nodes must connect with each other and transmit the data transmitted over a wireless communication to sink nodes. Sink node collects data from all nodes and transmits the data examined via the Internet to the user. Wireless Sensor Network has been used in various fields for the past few years, and mostly in applications for environmental monitoring. Environmental management is the primary control that can add significant effects. The unpredictable weather conditions recently showed how necessary it is for human beings to have a deep understanding of our environment and its growth. This paper discusses Wireless Sensor Network application study in environmental monitoring. The majority of this article is split into Environmental Monitoring Program Systems, and Conclusion.

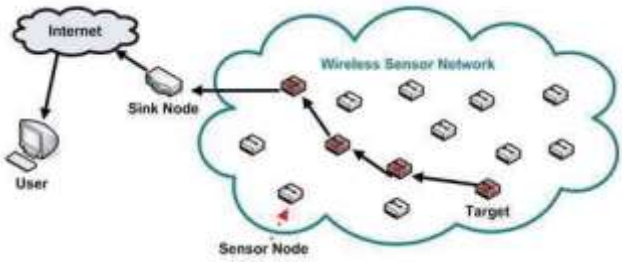

Figure 1. Shows the design of the Wireless Sensor Network

Environment Monitoring System

Environmental tracking was an important part of applications to the Wireless Sensor Network. It is rising broadly along with recent technology growth. In addition,

the monitoring system for the atmosphere regulates and measures environmental factors such as temperature, humidity, light and strain. Several studies focus in applications for environmental monitoring. Many studies incorporate the fault tolerant and analyze the relationship between the cost of the device and the lifespan of the sensor network to insure that the fault tolerance is in the three-dimensional settings and established multi-hop communication applications, which ensures that the temperature and humidity data will be sent to the neighboring node and then sent to the end user PC. The data calculation of the environmental parameter should show the output using Java and interpret the data into a graph and chart. So the requirements for the development of monitoring applications need to be understood [1].

Autonomy
Ensuring that the battery used is able to function properly throughout the installation is important, as the radio transceiver is a strong energy collector and the network must be security-wise.

Reliability
Easy management and consistent operations are needed to avoid unpredictable machine crashes. In addition, each person's maintenance should be prevented because end users can lack the networking expertise and also shifts in the area of interest that often arise during the transfer of packet data. Hence, reliability is important to prevent packet loss during bad weather conditions.

Robustness
To encounter problems including hardware failure and low signal reception the network has to be reliable. For example, humidity influence may trigger short circuit problem and lead to device reboot.

Flexibility
User must be able to add, switch or modify stations at any point, based on station specifications. For example, the stations ' current location may be out of range for the nodes to send a signal, or the consumer may want to add new stations to increase the point of interest for the nodes. These specifications are therefore necessary to incorporate a good and stable monitoring system while implementing a network.

Environment Monitoring System Applications
The implementation of an environmental monitoring program has increasingly been implemented in many ways to assist people in their jobs and to reduce costs and time. Environmental monitoring technologies have grown rapidly in the fields of field monitoring, ecosystem monitoring, indoor monitoring, greenhouse monitoring, temperature monitoring and forest monitoring. It's a good effort which provides rewards as the society has recognized the value of wireless network sensor technology in their lives.

Agricultural Monitoring
Agricultural control is always mainly focused on the farming area. Many reports describe animal monitoring as surveillance of livestock, but the definition is the same. There are methodologies to apply to get well-defined for the entire life cycle through each step. Animal-human interaction has been established and accepted for decades. Animals ' commitment to affection, true-hearted, and live integrity can have a positive impact on both physical and mental society. Nowadays, though, many species lack proper care and there are also instances where there is no diagnosis of the diseases of these animals. It is therefore critical that there be a monitoring system for tracking animal behavior in real time.
There are many detection approaches in animal health control, but some of them often struggle or lag in and reliability and are not user-friendly as well. The RFID-based Mobile Monitoring System (RFID-MMS) design helps users control animal behavior and motion suggested to monitor wildlife surveillance collars. It will monitor habitat, movement pattern and animal behavior. Natural lynxes are used as prey species or canines. The sensor nodes installed around the collars store the GPS location and multimodal sensor data and are transmitted to the client via the network. From experiments carried out, it indicates that the signal transmission frequency can be extended from 200 to 250 meters and this should be taken into account in order to develop a self-sustainable system that will be more effective in the future. Build an agricultural environment control system that includes the hardware design of the sensor nodes and the software development that consists of the flowchart. The system proved to have consumed low power from the test conducted but provides high reliability, which can control real-time monitoring for unprotected monitoring of agriculture and the environment.
The poultry monitoring system also contributes a great advantage to users, particularly farmers, who have proposed and established a web-based poultry monitoring system. Uses TelosB motes from Crossbow which can be combined with the sensors to measure the chicken's temperature and humidity. They achieve full signal range up to 40 meters at the end of the study with tolerable 5 per cent packet failure. They inferred, from the test, that the system is capable of identifying environmental abnormalities in the chicken farm. This method of surveillance is applicable not only to the poultry but also

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to cattle tracking.

Habitat Monitoring
The protection of ecosystems is one of the essential components of environmental monitoring. Habitat denotes a location where an animal or plant develops or resides naturally. Habitat surveillance is therefore important to ensure that their ecosystems are independent and to avoid any animal and plant ecological disruption. Pollution can have detrimental effects on health and the ecological balance. It is therefore important to manage a system that can monitor pollution so that a web-based graphical user interface is developed under control to manage pollution data effectively. The sensor nodes are used to interpret the reading of new sensors and continue to improve the performance of the sensor technology by obtaining reliable contact at the end of the study, even though the average lifetime of the sensors has declined due to the latency requirement.

Greenhouse Monitoring
The greenhouse effect happens when the sun-heat solar radiation is absorbed in the atmosphere of the planet by the gasses and reflected back from the surface. It will therefore heat up the earth's atmosphere and lead to global warming. Hence, the greenhouse monitoring system is important to ensure that the environment stabilizes. Greenhouse monitoring system may also be a web-based system (remote system) allowing user access, control and tracking of the greenhouse lab utilizing Internet connection. The customer, who are the pupils, excel in enhancing their learning skills and strengthening their practical skills in designing and operating the simulator laboratory as they can easily access their home system. The network hardware comprises of several components which are the integral part of the system, such as the sensor board, processor board and console control, while the Sun SPOT systems are used as their software platforms for temperature monitoring and light calculation.

Forest Monitoring
Forests are essential biodiversity outlets and an ecological balance. They provide other advantages and are the key roles for water and soil protection, plant and animal genetic capital, and also source of timber supply and other forest products. Recently, however, no ethical activities such as illegal logging and also country development activities have interrupted the green forest environment, which decrease the benefits of the forest contribution.

II. LITERATURE REVIEW

This analysis discuss several representative healthcare applications and explain the challenges they pose to wireless sensor networks due to the level of trustworthiness needed and the need to protect the privacy and security of the medical data. The resource scarcity found in wireless sensor network architectures exacerbates certain problems. They describe conceptual solutions addressing topics from clinical and movement control to large-scale physiological and behavioral experiments [2]. This paper discusses numerous WSN applications with the aim of disseminating diverse WSN applications for a better understanding of the research community to extend WSN in additional groundbreaking fields. Wireless Sensor Networks (WSNs) are autonomous spatially dispersed sensors for detecting physical objects or measuring environmental data, and jointly transmitting data to the master transmitter. WSN is used in a wide range of fields, including livestock tracking, precision breeding, environmental monitoring, protection and security, smart cities, health care, etc. [3]. This paper designs a wireless sensor network-based agricultural environment monitoring system and provides the hardware design of sensor nodes and software flowchart. Experiments have shown that the device is low power consumption and has a reliable operating and high precision which can provide remote real-time monitoring for unattended monitoring of the agricultural climate [4]. This paper is a WSN virtualization survey. This offers an in-depth review of the state of the art and an in-depth overview of the study problems. Through carefully selected examples, incorporate the fundamentals to WSN virtualization, and inspire its importance. Existing plays are described in depth and analyzed objectively using a set of demands extracted from the scenarios. It also checks relevant research proposals. Some study problems are also addressed and recommendations on how to solve them [5]. This paper presents WSN for rehabilitation supervision with a focus on key scientific and technical challenges that have been addressed, as well as on open interdisciplinary challenges and thoroughly review existing projects undertaken in this exciting field by several research communities. This paper also discuss the open research issues and giving directions for future research work. Our goal is to collect information that inspires developers, clinicians and computer scientists to work together to tackle the problems that occur in this field [6]. This paper describes a wireless network sensor system that is developed using open source hardware platforms, Arduino and Raspberry Pi. The system is low-cost and highly scalable, both in terms of sensor type and number of sensor nodes, making it well suited for a wide variety of environmental monitoring applications. Overall system configuration and the specification of hardware and software elements are discussed in depth in this article.

There are also some sample deployment and measurement results presented to demonstrate the system's utility [7]. This paper provides a general overview of reported clustering algorithms and their taxonomy and also analyze the clustering schemes based on convergence intensity, cluster overlap, cluster consistency, node mobility and responsiveness to venue. The study focused on the Wireless Sensor Network (WSN). Wireless Sensor Network (WSN) systems have reached nearly any field of modern day life. Ubiquitous sensing allowed by WSN measures its environment from various ecologies to urban environments, especially in unattended environments where sensors are in large numbers and operate independently. Sensor nodes are grouped into non-overlapping and disconnecting clusters to support scalability [8]. This paper provides a model for localizing real life. To check positioning algorithms a small scale network based on Xbee transceivers is used. The system of localization is based on RSSI; the algorithms used for position are estimate of maximum likelihood, weighted centroid location, Malguki spring, modified multidimensional scaling and iterative trilateration. The efficiency of the algorithm is measured on the basis of the positioning error and its processing period. An criteria for optimization is being suggested [9]. In this paper we explore design of sensor nodes and their implementations, different techniques of localization and few possible future directions of study. A sensor network has the important function of gathering and transmitting data to destination. Understanding the position of gathered data is very relevant. This type of information can be obtained from wireless sensor networks (WSNs) using localization technique. Localization is a way to determine sensor node position. Sensor node localization is an important area of research, and many experiments have been performed so far. Designing low-cost, scalable and efficient localization mechanisms for WSNs is highly desirable [10].

III. CONCLUSION

This paper explores technologies for wireless sensor networks that focus primarily on the environmental monitoring framework. Such devices have low power consumption and low cost, and are a simple way to monitor vulnerable crops and biodiversity in real time. It can also be extended to indoor control of living conditions, greenhouse management, temperature monitoring, and woodland monitoring. Such methods have been shown to be an innovative way of replacing the traditional method that uses people to track the atmosphere and improve performance, robustness and monitoring device output.

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