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## Survey on Sensors Based Wireless Sensor Network

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**ABSTRACT:** Sensor networks are newly fast improving analysis area in wireless communications and distributed network. Sensor network is a slowly arranged wireless network of little, low rate sensor, which can be used in various applications like health monitoring, environmental surrounding monitoring, military, home, gathering and sensing information in hospital area, remote location monitoring and control environmental condition over wireless sensor network. Sensor nodes undergo several strength and competition constraints for their low rate function and ad hoc arrangement guideline process. Various application sensor networks be found in several technical issues and researchers are resend shedding their lights to redetermination these difficult. The various outstanding efficiency are there such as energy routing deficiency, protocols, localization and system method.

**KEYWORDS:** Sensor network, Wireless communication, Wireless sensor network

### I. INTRODUCTION

#### 1.1 WIRELESS NETWORK

In recent Year, Wireless technology has improved at a faster face. WPAN(wireless personal area network)common to one to many point communication. Four protocol standards on wireless communication primarily determine for Bluetooth, ultra-wideband, ZigBee and Wi-Fi. Our point of view, Bluetooth is wireless technology used to communicate with other Bluetooth devices, ZigBee and wifi is a standard wireless network technology. ZigBee for control network and sensor network and Wi-Fi is alternative to wired technology [3].

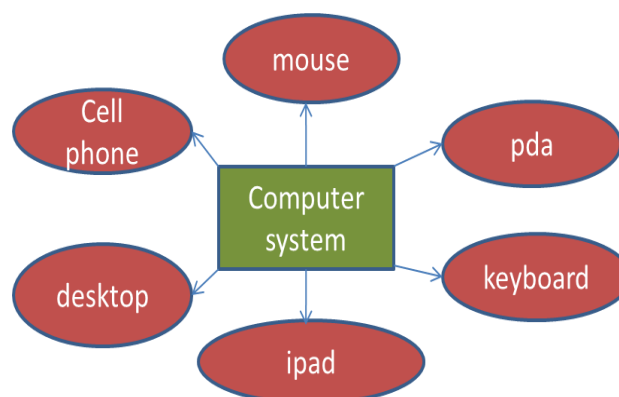


Fig.1. Wireless communication

#### 1.2 WIRELESS SENSOR NETWORK

The wireless sensor network builds hundreds or thousands of nodes together. Each node is connected to a server. Wireless sensor network is used to monitor large number of individual sensor nodes that collects data from various

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environments. The collected data can be grouped using gateway sensor node from which the data will be stored in a repository, likewise various sensors such as temperature sensor, pressure sensor, sound sensor, etc., will mutually send their data over the network to a particular repository. The WSN consists of several components such as antenna, radio transceiver, a microcontroller, battery small device sensor nodes are mainly focus on four functions like processing, sensing, communication and power. Base station can give connection to the wired network where the data is collect, analyse and present on various application. Wireless sensor network are passed down over real and virtual environment [2].

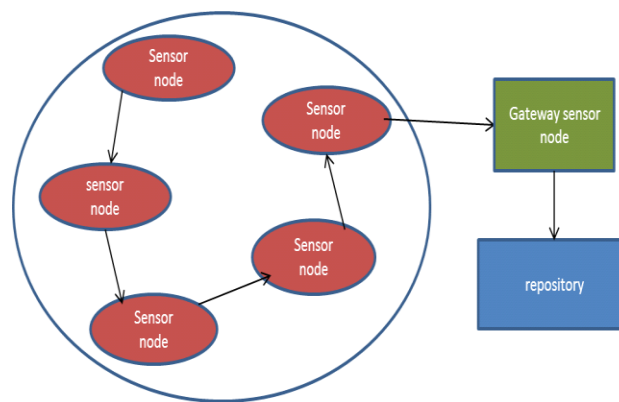


Figure.2. wireless sensor network

Wireless sensor networks prepare advance applications and desire non-convention guideline for protocol arrangement due to various pressure. Due to the specification for below device complication well organised with small expenditure. An appropriate equality midway communication and signal and data processing capabilities need to be created. Wireless sensor networks develop a high level activity from industrial and research relative important. A WSN can be normally delivered as a network of nodes that collective feel and be allowed to control the surrounding prepare interaction midway human or system and the surrounding neighbourhood. WSN prepare advance applications and thus new deliverable markets, the arrangement is damaged by various pressure that calling for advanced guideline. Absolutely, the enterprise of processing, sensing, communication and power held down define amount of energy. Joint contribution of several cross layers such as signal and data processing, medium access control, and communication protocols.

## II. APPLICATION OF WIRELESS SENSOR NETWORK

Wireless sensor network prepare guideline for science of analysing consisted authority of the wide range of application such as agriculture, environmental and earth observing, industrial monitoring.

### 2.1 AGRICULTURE

Wireless sensor networks means a facilitate technology for low-power wireless measure and control applications. The rejections of lead wires contribute powerful cost savings further creating upgraded accuracy for alive with long term control applications. Wireless sensor networks implemented absolutely advance capacity for measure and control applications. Section of the reasoning for that is the wireless communication itself. Adapt area to be gathered or control with wireless networks can empower long-term data transmission at range and decision that are problematic, appropriate, to purchase any other way.

Commonly, Wireless sensor networks subsist of a many number of slowly expand little sensor nodes with sensing, computation and wireless communication accuracy. Sensor nodes do not adsorb an environment. They make a network freely, externally any outer audience or direction. Wireless sensor network various surrounding environment



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application are there likewise precision agriculture, air and water pollution, flood detection, bio complexity mapping of environment, forest fire detection.

## 2.2 ENVIRONMENTAL AND EARTH

Generally, Environment and earth observation have various functions such as air pollution monitoring, forest fire detection, landslide detection, water quality monitoring and natural disaster prevention. Air pollution in many cities wireless sensor network used to monitoring the dangerous gases. It has an advantage rather the wired connection. Forest fire detection sensor node network placed on forest to detect anywhere fire will be started. Node can be equated with sensor to determine temperature, gas, humidity, landslide detection, landslide detection method using to monitoring the grass and landscape before landslide. Water quality monitoring can analysing the water level in dam, river, lake, ocean and underground water level. Natural disaster prevention wireless sensor network can monitoring the natural disaster like flood etc.

## 2.3 INDUSTRIAL MONITORING

Several function can be analysing in industrial monitoring such as machine health monitoring, data logging, water and waste water monitoring, structural health monitoring.

### III. WIRELESS SENSOR NETWORK PROTOCOL STACK

Energy consumption of each sensor node is determined by the arrangement of protocol layers and the way separate layer take care the sensing data. The protocol layers stack utilized by the sensor nodes and base station in a period the network add the application layer, transport layer, network layer, data link layer, physical layer, power management, mobility management and task management plane.

The application layer contains a variety of application-layer protocol to generate various sensor network applications. The transport layer is responsible for reliable data delivery required by the application layer. The network layer is responsible for routing the data from the transport layer. The data link layer is primarily responsible for data stream multiplexing, data frame transmission and reception, medium access, and error control. The physical layer is responsible for signal transmission and reception over a physical communication medium, including frequency generation, signal modulation, transmission and reception, data encryption, and so on.

On the other hand, the protocol stack can be divided into a group of management planes across each layer, including power, connection, and task management planes. The power management plane is responsible for managing the power level of a sensor node for sensing, processing, and transmission and reception, which can be implemented by employing efficient power management mechanisms at different protocol layer. For example, at the MAC layer, a sensor node can turn off its transceiver when there is no data to transmit and receive. At the network layer, a sensor node may select a neighbour node with the most residual energy as its next hop to the sink. The connection management plane is responsible for the configuration and reconfiguration of sensor node to establish and maintain the connectivity of a network in the case of deployment and topology change due to node addition, node failure, node movement, and so on. The task management plane is responsible for task distribution among sensor nodes in a sensing region in order to improve energy efficiency and prolong network lifetime. Since sensor nodes in the sensing region are required to perform the same sensing task. Therefore, a task management mechanism can be used to perform task distribution among multiple sensors.

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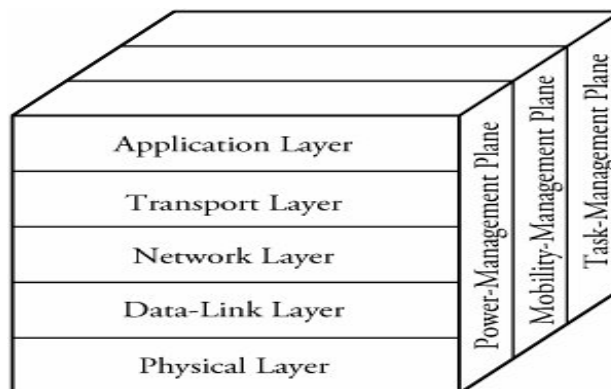


Figure.3. Wireless sensor network protocol stack

### 3.1 APPLICATION LAYER

Application layer guide various software for applications involving on the sensing task. Three several of protocols layers are there such as SMP (Sensor Management Protocol), TADAP (Task Assignment and Data Advertisement Protocol) and SQDDP (Sensor Query and Data Dissemination Protocol).

### 3.2 NETWORK LAYER

Network layer grant routing of data over the wireless communication channel. Various strategies to route data like routing power cost with applicable energy depend on the energy metric and data centric routing depend on interest dissemination and attribute based naming.

### 3.3 DATALINK LAYER

This layer is important for the multiplexing of data stream, frame detection, medium access control and error detection and correction. The architecture concern of the layer protocol must take into account the various function like wise power conservation, mobility management and recovery failure strategies.

### 3.4 PHYSICAL LAYER

This layer is the minimum better layer and is important for frequency selection, carrier frequency generation, signal detection, modulation and data encryption.

## IV. ADVANTAGES OF SENSOR NETWORK

As the various applications wireless sensor network have change the world around us. They are enhancing integral part of our activity. Subsequent is an agenda of the advantage of wireless sensor networks.

### 4.1 ROBUSTNESS TO WITHSTAND ROUGH ENVIRONMENTAL CONDITIONS

As modest capacity of sensor nodes they have the capacity to communicate over several of materials and also architecture to oppose in weather environment. Wireless sensor network can be utilised in a large amount of applications in environment such as forest fire detection or seismic monitoring.



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## **4.2 EASY OF DEVELOPMENT**

Sensor network large number of nodes can be expanding in remote or dangerous environment. These nodes are little in size and economical, throwing of large number of sensors from a plane closed a remote or dangerous area grand extracting information is like a way that could not have been possible any other way.

## **4.3 FAULT TOLERANCE**

Wireless sensor networks several sensor nodes are expand adjacent one by one. They are adequate to affected node failures, resulting of expand or sleep nodes by little using a different routing path. For example during war, if an enemy consume a care sensor node, this cannot disturb the whole network.

## **4.4 ABILITY TO COVER WIDE AND DANGEROUS AREAS**

Various areas, Surrounding environment and social action avoid wired networks from being used. Connection of a wired network on a front line would not be possible. Wireless sensor network can overcome this gap as long as their lack of infrastructure and their low setup costs.

## **4.5 MOBILITY OF NODES**

Various areas, Surrounding environment and social action avoid wired networks from being used. Connection of a wired network on a front line would not be possible. Wireless sensor network can overcome this gap as long as their lack of infrastructure and their low setup costs.

## **4.6 UNATTENDED OPERATION**

Wireless sensor network are adequate to work neglected which will decision in break working time and minimal the effort that has to be complete to administrate these systems. This is beneficial to discipline home implement, industrial monitoring and control etc.

## **4.7 IMPROVED LIFETIME**

These sensor nodes are placed near to one by one. They be combined each other. From this combination only each node can be utilized in a round robin fashion to monitor data and send to base station. It will add to the lifetime.

## **4.8 IMPROVED ACCURACY**

Wireless sensor network, the strictly located sensor nodes sensing and monitoring the data about the double event will conclusion in correct accuracy and minimize uncorrelated noise.

## **V. CHALLENGES OF WIRELESS SENSOR NETWORK**

With the advance micro electromechanical systems the main attraction and large communication function of sensors has deployed their ubiquitous and invisible deployment any place at any time constrain. Sensor network is a surrounding environment comprised of sensing, computing and communication elements that allow a user the ability to observe instrument and proceed to events and phenomena in a detail surrounding environment.

### **5.1 LIMITED FUNCTIONAL CAPABILITIES**

A sensor node has little end processor, small memory and amount of stored energy. These edge several of the functional capacity in each phrase of transform and communication. A better algorithm makes use of common resources in a period of organizational structure, while communicative into account on each node abilities.

### **5.2 LIMITED ENERGY**

A sensor node has very small amount of energy. For this purpose, ability to use of this energy will be important in assurance the length of application for those sensor networks. In various guidelines, renewing energy is not appropriate or also impossible. Sensors are usually unattended in the field. The limited energy in sensor nodes must be considered as proper consumption or utilization that can reduce the overall energy uses in a network.



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## 5.3 LATENCY

Latency assigns to delay from when a sender sends a packet before the coming the packet is strongly accepted by the receiver. The sensor data has a mortal time interval in which it is accurate, since the nature of the environment changes accurately, it is therefore important to accept the data in a timely appearance.

## VI. RELATED WORKS

In the wireless sensor network various applications can be verified on experimentally. This is effective and more accurate.

### 6.1 SMART HOME MONITORING AND CONTROL SYSTEM

Smart home monitoring and control systems utilizing the microcontrollers. Wireless irrigation system for a home garden that can be combined with actual smart home control systems. System consists of slave nodes and a master station each of these connected with a wireless microcontroller. Each slave node is actual with a sensor (temperature, soil), awater pipes, a microcontroller and a zigbee transceiver [5], [6]. The master station over zigbee ad-hoc network and the slave node go over and built the temperature of this surrounding garden grass and trees likewise soil moisture. The master station has a fixed with fuzzy logic irrigation algorithm to water the grass and trees based on a some set of rules. And also here using the home web server to controlling and monitoring the irrigation system. Home owners can irrigate their garden grass and trees mutually or automatically via regional control or remote control using the Internet. Here operate the switch manual and also automatic operation mode. Two ways for wireless communication (server, master, slave). Monitoring periodic and historic sensor array data of one by one slave. Grant operation ended the internet and smartpone.it should be mobile, cost, effective, reliable and secure [3].

#### 6.1.1 SLAVE MODULE

Temperature, soil moisture sensor, single chip microcontroller, zigbee transceiver and awater pipes are the slave mode. Microcontroller gathering data from temperature and soil moisture sensors and function the water pipes used on embedded irrigation system algorithm. All gathering data over the microcontroller are transmitted to master node based on wireless zigbee network [6].

#### 6.1.2 MASTER MODULE

Master mode gathered all the data from slave mode, slave mode reads the temperature, grass and tree sensor automatically and operate the water pipes turns on and off automatically.

#### 6.1.3 FUZZY LOGIC

Zigbee protocol based wireless sensor network master node communicates with slave node [6]. The operation of slave nodes is automatically coordinated via the master node. Master node gathered all slave node sensor data and then process the water pipe automatically based on fuzzy logic. In one by one slave node have two fuzzy logic function algorithm.

6.1.3.1 Two function for the input and then one function for the output.

6.1.3.2 The input function has sensors (temperature, soil moisture) and the output function has operated a water pipes.

Some steps involved in fuzzy logic such as fuzzification, rule based inference engine and defuzzification.



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## 6.2 CONTINUOUS MONITORING OF HEALTH CHANGES

Continuous monitoring in the home for the target of determines early health changes [7], [8]. Sensor nested in the environment is used to collect action and movement arrangement for the purpose of detecting health changes. periodic detection in the key push health separate and segment of the people age. one dimensional alert algorithm was resolve to bring about health alerts. Using health change detection model build these result and clinical expertise.

One dimensional algorithm health alert used to analyse health condition and these clinician analyse one by one alert using on electronic health record and an connected web interface for anticipate sensor data.

## VII. CONCLUSION

In this paper, Wireless sensor network technology has been determined. The following various advantages, challenges, application on the wireless sensor network. The applications give some key function that determines the driving force behind research on wireless sensor network. There are various challenges but due to the secure energy resources of sensors, energy sufficient is one of the major challenges in the architecture of protocols for wireless sensor network. The main determination back of the arrangement is to keeping the sensors life time as long as sufficient.

## REFERENCES

1. Sanjeev Kumar Gupta., and Poonam Sinha., "International Journal of Advanced Research in Computer and Communication Engineering", Overview of Wireless Sensor Network a Survey, vol.3, Jan 2014.
2. Chiara Buratti., Andrea Conti., Davide Dardari., and Roberto Verdone., An Overview on Wireless Sensor Networks Technology and Evolution, Aug 2009.
3. A. R. Al-Ali., Murad Qasaimeh., Mamoun Al-Mardinia., Suresh Radder., and I.A. Zualkernan., Zigbee Based Irrigation System For Home Gardens, IEEE 2015
4. Francisco G. Montoya., Julio Gomez., Alejandro Cama., Antonio Zapata Sierr., Felipe Martinez., Jose Luis De La Cruz., and Francisco Manzano Agugliaroa., "Computer and Electronics in Agriculture", Monitoring System For Intensive Agriculture based on Mesh networks and the android system, Volume 99, pp. 14-20, 2013
5. User's Manual, Fuzzy Logic Toolbox, User's Guide [http://www.mathworks.com/help/pdf\\_doc/fuzzy/fuzzy.pdf](http://www.mathworks.com/help/pdf_doc/fuzzy/fuzzy.pdf), 2013
6. K. S. Boockvar., and M. S. Lachs., "J. Amer. Geriatrics Soc", Predictive Value of Nonspecific Symptoms For Acute illness in nursing Home Residents, vol. 51, no. 8, pp. 1111-1115, 2003,
7. S. Ridley., "Ann. Roy. College Surgeons England", The Recognition and Early Management of Critical Illness, vol. 87, no. 5, pp. 315-322, 2005.