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Wireless Sensor Network

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Abstract:

The Wireless Sensor Network (WSN) is a distributed Ad-hoc network that consists of numerous and ubiquitous mini sensor nodes with the capabilities of wireless communicating and computing. The WSN is an "intelligent" system that enables self-fulfillment of assigned tasks according to specific environments. It integrates the technologies for wireless communication and distributed information processing as well as for sensors . The WSN is different from either traditional wireless networks (such as 2G and 3G mobile communication networks) or the wireless Local Area Network (LAN). The design goal of the traditional wireless networks is to optimize the utilization of bandwidth in the high-speed mobility conditions by the strategy of resource management while offer certain Quality of Service Service . The wireless LAN enables a heavy data throughput through routing optimization and high-efficient resource management protocols. Moreover, it supports communication of static and low-speed nodes. However, the WSN aims at transporting data. It is not required to support a high-speed data transmission rate. In addition, most nodes of the WSN are static. These nodes usually work in atrocious or even dangerous environments where humans are unable to arrive.

Introduction:

A wireless sensor node is a good example for a System on Chip (SoC) that has communication, computation, sensing and storage capabilities. A wireless sensor network consists of spatially distributed autonomous sensors to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants. These miniaturized nodes have stringent constraints in terms of available resources like processing power, battery power, program memory, available bandwidth. Basically,each node comprises of a micro-controller, power source, Radio Frequency (RF) transceiver, external memory,and sensors. In addition to one or more sensors, each node in a sensor network is typically equipped with a radio transceiver or other wireless communications device, a small microcontroller and an energy source, usually a battery.These sensor nodes collectively form a Wireless Sensor Network (WSN), which are used in wide variety of applications now a days. A WSN typically consists of hundreds or thousands of sensor nodes. These nodes have the capability to communicate with each other using Multihopcommunication.

Operation:

The sensor is a device which functions to convert physical quantities into physical

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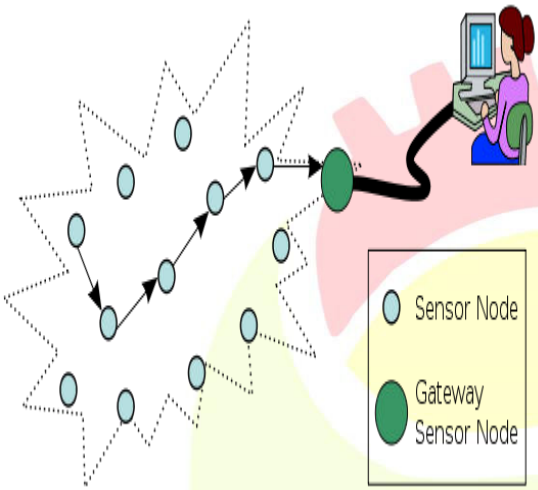
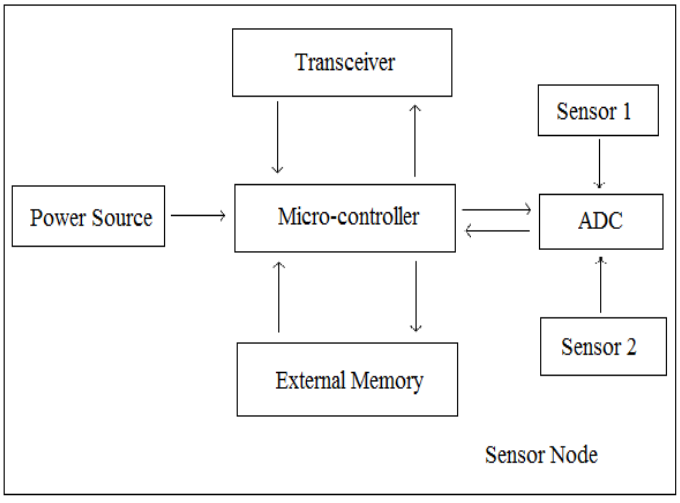
quantities such as electricity. A sensor system in industrial automation is the part that is not likely to be separated. The



sensor is useful to investigate the extent to which the error between set point and the value of the sensing to the control system.

Wireless sensor was developed from common sensors that are able to enhance the practical side, flexibility, and mobility of a sensor. With a wireless sensor, the sensor could be placed in a Hazardous Area, and difficult area.

Wireless Sensor Network (WSN) is a wireless network consisting of multiple sensors (sensor nodes) are placed in place – a different place for monitoring the condition of a plan. wireless sensor network consists of a microcontroller system that has a sensor unit and a transceiver unit (transmitter and receivers), transmitters and receivers to transmit data to receive data.



In addition to one or more sensors, each node in a sensor network is typically equipped with a radio transceiver or other wireless communications device, a small microcontroller, and an energy source, usually a battery. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning "motes" of genuine microscopic dimensions have yet to be created. The cost of sensor nodes is similarly variable, ranging from hundreds of dollars to a few pennies, depending on the size of the sensor network and the complexity required of individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed and bandwidth.

Application:

The development of wireless sensor networks was motivated by military applications such as battlefield surveillance and are now used in many industrial and civilian application areas, including industrial process monitoring and control, machine health monitoring, environment and habitat monitoring, healthcare applications, home automation, and traffic control.

Now we are going to discuss about the applications in home automation and military applications such as battlefield surveillance.

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Home automation for the elderly and disabled person

The form of home automation called **assistive domotics** focuses on making it possible for the elderly and disabled to remain at home, safe and comfortable. Home automation is very useful for the elderly and disabled person who would prefer to stay in the comfort of their homes rather than move to a healthcare facility. This field uses much of the same technology and equipment as home automation for security, entertainment, and energy conservation

There are two basic forms of home automation systems for the elderly and disabled person. They are **embedded health systems** and **private health networks**. Embedded health systems integrate sensors and microprocessors in appliances, furniture, and clothing which collect data that is analyzed and can be used to diagnose diseases and recognize risk patterns. Private health networks implement wireless technology to connect portable devices and store data in a household health database

Smart homes can provide both the elderly and disabled with many different types of emergency assistance systems, security features, fall prevention, automated timers, and alerts. These systems allow for the individual to feel secure in their homes knowing that help is only minutes away. Smart home systems will make it possible for family members to monitor their loved ones from anywhere with an internet connection.

Home automation may include centralized control of lighting, HVAC (heating, ventilation and air conditioning), appliances, and other systems, to provide improved convenience, comfort, energy efficiency and security.A home automation system integrates electrical devices in a house with each other. The techniques employed in home automation include those in building automation as well as the control of domestic activities, such as home entertainment systems, houseplant and yard watering, pet feeding. Devices may be connected through a computer network to allow control by a personal computer, and may allow remote access from the internet.

Wireless systems are commonly installed when outfitting a pre-existing house, as they reduce wiring changes. These communicate through the existing power wiring, radio, or infrared signals with a central controller. Network sockets may be installed in every room like AC power receptacles.

Systems

Home automation for healthcare can range from very simple alerts to lavish computer controlled network interfaces. Some of the monitoring or safety devices that can be installed in a home include lighting and motion sensors, environmental controls, video cameras, automated timers, emergency assistance systems, and alerts.

Security

In order to maintain the security of the home many home automation systems integrate features such as remote keyless entry systems which will allow seniors to view who is at the door and then remotely open the door. Home networks can also be programmed to automatically lock doors

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and shut blinds in order to maintain privacy.

Emergency assistance systems and tools

Emergency assistance for the elderly and disabled can be classified into three categories: First, Second, and Third Generation emergency assistance systems or tools.

Early generation

These simple systems and tools include personal alarm systems and emergency response telephones that do not have to be integrated into a smart home system.A typical system consists of a small wireless pendant transceiver to be worn around the neck or wrist.Generally the control centre speaks to the user and identifies that help is required e.g. Emergency services are dispatched.

Present generation

These types of systems would help the elderly and disabled deal with loneliness and depression by connecting them with other elderly or disabled individuals through the Internet, reducing their sense of isolation .

Overview and benefits

In modern construction in industrialized nations, homes have been wired for electrical power, telephones, TV outlets (cable or antenna), and a doorbell.

Many household tasks were automated by the development of special appliances. For instance, automatic washing machines were developed to reduce the manual labour of cleaning clothes, and water heaters reduced the labour necessary for bathing.

When a person enter into a room automatically turns on the lights. In advanced installations, rooms can sense not only the presence of a person inside but know who that person is and perhaps set appropriate lighting, temperature, music levels or television channels etc Home automation can also provide a remote interface to home appliances or the automation system itself, via telephone line, wireless transmission or the internet, to provide control and monitoring An example of a remote monitoring in home automation could be when a smoke detector detects a fire or smoke condition, then all lights in the house will blink to alert any occupants of the house to the possible fire. If the house is equipped with a home theatre, a home automation system can shut down all audio and video components to avoid distractions, or make an audible announcement. The system could also call the home owner on their mobile phone to alert them, or call the fire department or alarm monitoring company.

Military Applications

* Monitoring Friendly Forces, Equipments and Ammunition

* Battlefield Surveillance

* Targeting

* Battle Damage Assessment

* Nuclear, Biological and Chemical Attack Detection

Wireless sensor networks in military applications

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HC Network Security Wireless sensor networks can help achieve effective battlefield situational awareness, to meet the operational forces "know ourselves" requirements.

Information Technology Is driving a new revolution in military affairs. Information warfare combat system requirements "could understand, quick, and hit the" Who in the information acquisition, transmission, processing an advantage (to obtain information superiority), who will be able to grasp the initiative in war. Wireless sensor networks with its unique advantages, in many occasions to meet the military's real-time access to information, accuracy, comprehensiveness, etc. requirements.

Wireless sensor networks can help achieve effective battlefield situational awareness, to meet the operational forces "know ourselves" requirements. Typical idea is to use aircraft to a large number of micro sensor nodes scattered in the vast battlefield area, the composition of these nodes from the network side of the battlefield information collection, transmission side, edge integration units for the war, "picking" intelligence service. According to the White House's information technology

Expert Introduction, computer, communications and technology advances are leading a small U.S. military into a new era in defense technology have a "revolutionary" effect. Office of the President under the national information technology research and development of a comprehensive Office of David? Nelson said wireless sensor network technology, herald the battlefield brought new Electronic Eye And electronic ears "can change in the coming decades battlefield environment."

As wireless sensor networks with intensive, random distribution of features, makes it suitable for harsh battlefield environment, it is very suitable for harsh battlefield environment, including enemy reconnaissance, Monitor Troops, equipment and materials used to judge various biochemical attacks. Friendly forces, equipment, ammunition allocation Monitoring ; Theater control; enemy military reconnaissance; target tracking; war damage assessment; nuclear, biological and chemical attack detection and reconnaissance.

View of the wireless sensor network applications in the great role of the military, caused the military sector in many countries, industry and academia of great concern. Natural Science Foundation of the United States in 2003 developed a sensor network research project, investment 34 million U.S. dollars support the related basic research. U.S. Department of Defense and military departments of the sensor network to a high degree of importance on the basis of the C4ISR C4KISR proposed plan, which emphasizes the perception of the battlefield intelligence capabilities, information integration capabilities and the ability to use information to sensor networks as an important area of research, the establishment of a series of military sensor network research projects. U.S. Intel Company The United States and other information industry giant Microsoft have begun the work of the sensor network, have set up or start the corresponding action plan. Japan, Britain, Italy, Brazil and other countries on the sensor network

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has shown the greatest interest, and are taking research in this field.

Typical application of wireless sensor network model can be divided into two categories, the sensor nodes to monitor changes in environmental conditions or events, the events or changes in the status report to the management center; One is by the management Centre issued an order to a region of sensor nodes, sensor nodes to execute commands and return the corresponding monitoring data. By contrast, a sensor network has two main modes of communication, one sensor to collect the data transmitted to the management center, to a communication mode known as the more; one management center to the sensor nodes within the region released command, as one or more modes of communication. The former mode of communication data volume, the latter is relatively small.

Present here a collection of some Western countries (mainly the United States) in military applications of wireless sensor networks the main study:

1) smart dust (smartdust)

Smart dust (smartdust) is a function of the ultra-miniature computer sensors, which consists of the microprocessor, the radio transceiver device and to enable them to form a common form of wireless networking software. Some of the dust scattered on a certain range, they can locate each other, the collection of data to the base station to transmit information. In recent years, as silicon technology and the rapid production process, integrated with sensors, computing circuits, bidirectional wireless communication module and power module the size of the dust components have shrunk to the size of a grain of sand, but from the information it contains collection, information processing to send information all the components necessary. Even the future of smart dust suspended in the air a few hours, the collection, processing, launch information, it can only rely on micro-battery for many years. Smart dust of remote sensor chip to track enemy's military action, a lot of smart dust can be installed in the publicity materials, bullets or shells in place of Sala in the target down to form a tight surveillance network, an enemy's military forces and personnel, clear about the flow of natural materials.

Unique characteristics of a WSN include:

- Limited power they can harvest or store
- Ability to withstand harsh environmental conditions
- Ability to cope with node failures
- Mobility of nodes
- Dynamic network topology
- Communication failures
- Heterogeneity of nodes
- Large scale of deployment
- Unattended operation
- Node capacity is scalable,only limited by bandwidth of gateway node.

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WSN Advantages:

Wireless sensor networks are ideally suited as a foundation for smart healthcare in AlarmNet, due to several inherent qualities:

Portability and unobtrusiveness: Small devices collect data and communicate

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wirelessly, operating with minimal patient input. They may be carried on the body or deeply embedded in the environment. Unobtrusiveness helps with patient acceptance and minimizes confounding measurement effects. Since monitoring is done in the living space, the patient travels less often, which is safer and more convenient.

Ease of deployment and scalability: Devices can be deployed in potentially large quantities with dramatically less complexity and cost compared to wired networks. Existing structures, particularly dilapidated ones, can be easily augmented with a WSN network whereas wired installations would be expensive and impractical. Devices are placed in the living space and turned on, self-organizing and calibrating automatically.

Real-time and always-on: Physiological and environmental data can be monitored continuously, allowing real-time response by emergency or healthcare workers. The data collected form a health journal, and are valuable for filling in gaps in the traditional patient history. Even though the network as a whole is always-on, individual sensors still must conserve energy through smart power management.

Reconfigurability and self-organization: Since there is no fixed installation, adding and removing sensors instantly reconfigures the network. Doctors may re-target the mission of the network as medical needs change. Sensors self-organize to form routing paths, collaborate on data processing, and establish hierarchies.

Conclusion:

Hence there is no doubt the application of the WSN(Wireless Sensor Network) will play an important role in forthcoming years. Hence the lives of the people will be secured for a long time without any risks.

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References:

1.http://www.smartcomputing.com/editorial/article.asp?article=articles%2F1995%2Fmar95%2Fpcn0323%2Fpcn0323.asp retrieved 2010 09 02

2. "U.S. Patent 613809: Method of and apparatus for controlling mechanism of moving vessels and vehicles". United States Patent and Trademark Office. 1898-11-08. http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=/netahtml/PTO/srchnum.htm&r=1&f=G&l=50&s1=0613809.PN.&OS=PN/0613809&RS=PN/0613809. Retrieved 2010-06-16.

3. William C. Mann (ed.) Smart technology for aging, disability and independence : the state of the science,John Wiley and Sons, 2005 0-471-69694-3, pp. 34-66

4. Thomas Haenselmann (2006-04-05). Sensornetworks. GFDL Wireless Sensor

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Network textbook. http://pi4.informatik.uni-mannheim.de/~haensel/sn_book. Retrieved 2006-08-29.