



Wireless Sensor Networks and its Applications

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DESCRIPTION

Wireless Sensor Networks (WSNs) is an infrastructure less wireless network that fixed in a large number of wireless sensors in an adhoc manner that's used to monitor the system, physical or environmental conditions. A wireless sensor network is a group of specialized transducers with a communications infrastructure for monitoring and recording conditions at different locations. Generally monitored parameters are temperature, humidity, pressure, wind direction and speed, illumination intensity, vibration intensity, sound intensity, power- line voltage, chemical concentrations, contaminant levels and vital body functions.

A sensor community consists of multiple of detection stations known as sensor nodes, each of that's small, light- weight and portable. Every sensor node is prepared with a transducer, microcomputer, transceiver and energy source. Transducers generate electric indicators primarily based totally on detected physical effects and phenomena. The microcomputer processes and stores the sensor output. The transceiver gets instructions from central computer and sends data to that computer. Power for each sensor node comes from the battery.

APPLICATIONS

Wireless sensor networks have gained considerable popularity due to their flexibility in solving problems in different operation disciplines and have the eventuality to change our lives in numerous different ways. WSNs have been successfully applied in various applications such as

Health care monitoring

There are several types of sensor networks for medical applications implanted, wearable, and environment embedded. Implantable medical devices are those that are fitted inside the human body. Wearable devices are used on the body surface of a human or just at close proximity of the user. Environment embedded systems employ sensors contained in the environment. Possible operations include body position

measurement, location of persons, overall monitoring of ill patients in hospitals and at home. Devices built into the environment use data from depth camera networks, sensor floors, or other similar devices as input to track a person's physical condition for ongoing health examinations. The Body area network can collect information about human health, fitness and energy expenditure. The confidentiality and reliability of user data is paramount in healthcare applications. In particular, the integration of sensor networks makes user authentication more demanding in the Internet of Things (IoT).

Forest fire detection

A network of Sensor Nodes can be installed during a forest to detect when a fire has started. The nodes can be equipped with sensors to measure temperature, moisture and gases which are produced by fire in the trees or foliage. The early detection is crucial for a successful action of the firefighters; because of Wireless Sensor Networks, the fire army will be able to know when a fire is started and how it's spreading.

Military operations

Wireless sensor networks are provided suitable sensors the system can detect identify and classify threads based on the count, number, type weather it's armored vehicles or men in bottom, type and amount of weapons they carry can be detected before. This system provides reliable real time war picture and better situational awareness. This will further help to enhance the troop readiness and reduce the response time. Using the information collected tactical planning for deploying troops effectively can be done. In case of civil operations economic zones like oil fields, gold mines, can be shielded from intruders and attackers. Industrial complex and production facility can be protected with minimized man power and improved efficiency.

Area monitoring

In area monitoring, the sensor nodes are deployed over a phase in which a few phenomenon is to be monitored. When the sensors detect the event being monitored the event is reported to

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at least one of the base stations, which then takes appropriate action.

Transportation

Real-time traffic information is being collected by WSNs to later feed transportation models and alert drivers of congestion and traffic problems.

Health applications

Some of the health applications for sensor networks are supporting interfaces for the disabled, integrated patient monitoring, diagnostics, and drug administration in hospitals, tele-monitoring of mortal physiological data, and tracking doctors or patients inside a hospital.