FIELDS OF APPLICATION OF WIRELESS SENSOR NETWORKS

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Abstact: This work provides detailed information about wireless networks and their advantages in transmitting information in various environments. Also, the network architecture for the establishement of the wireless network has been illustarated along with describing and explaining stages which are indispensably important in terms of organising the wireless network structure. Since the trasmitting data is gaining popularity, the thorough emphasis has been put on the collecting data from different sensors wirelessly and collecting them in one place for further process. OSI model layers involved in most of the networks have been also touched on, making its importance obvious in terms of network establishment.

Key words: Wireless Sensor Network, Open Systems Interconnection, protocol, sisot, meliorative.

A wireless sensor network (WSN) is a group of spatially distributed and isolated sensors to monitor and record the physical state of the environment and organize the collected data in a central location. The network of wireless sensors is designed to measure environmental conditions such as temperature, sound, pollution level, humidity, wind, etc.

Its architecture is based on the OSI model. Basically, sensor network consists of five layers: application layer, transport layer, network layer, data layer and physical layer. In addition, there are 3 levels of operation used for network management and sensor interoperability. These are the power management layer, the traffic management layer and the task management layer. These layers perform the following functions.

Traffic control layer-detects the movement of sensor nodes, power control layer-node can monitor neighbors and power level (for power balance), control layer-task control plane: schedule sensitive tasks to a certain area. Determine which nodes are disabled and which are enabled. Figure 1 shows the architecture of a wireless sensor network.

Wireless sensor network architecture follows the OSI model and differs from it in several ways.

Each tier has its own functions, for example, the application tier is responsible for traffic management and software for various applications that translate data into an understandable form or send requests to retrieve specific data. supplies.

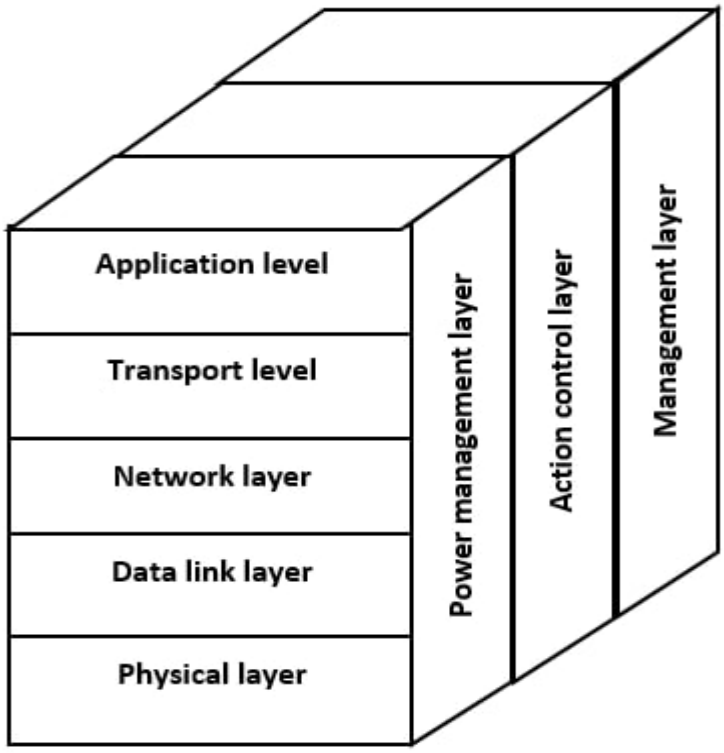

Figure 1. Wireless sensor network architecture.

Transport level: The function of this layer is reliability and congestion prevention, where many protocols designed to provide this function are used upstream or downstream. This step is especially necessary when the system is configured to access other networks.

Network level: The main function of this layer is routing. The basic idea of a routing protocol is to determine reliable paths and redundant paths according to a certain scale called a metric, which varies from protocol to protocol.

Data link layer: It is suitable for data stream multiplexing, data addressing, MAC and error management, providing point-to-point or point-to-multipoint reliability.

Physical layer: It can provide an interface to transmit a stream of bits over a physical medium. Responsible for frequency selection, carrier frequency generation, signal detection, modulation and data encryption.

The architecture of wireless sensor networks is of great importance in ensuring the operation of the entire system. Design problems, protocols, or network integration algorithms are conducted. Using wireless sensor technology in any application requires a good understanding of network architecture.

Wireless sensor networks are widely used autonomous sensors that monitor physical or environmental conditions such as temperature, sound, pressure, etc. and transmit their data to the main location through the network. Today, such networks are used in many industrial and consumer applications, for example, industrial process monitoring and control, machine configuration control, etc. In particular, it is possible to establish a network of sensor nodes in the forest. Sensors can be attached to nodes to measure temperature, humidity and gases produced by fires in trees or vegetation. As a result, thanks to wireless sensor networks, the fire brigade knows when a fire is lit and how it spreads. Also, water monitoring and control of water quality and level includes many activities such as checking the quality of underground or surface water and ensuring the country's water infrastructure for the benefit of humans and animals. This, in turn, can be used to prevent water wastage.

In the case of wireless sensor networks, it is possible to collect and transmit data to the center from devices that allow online monitoring of seepage water level and mineralization level in reclamation monitoring wells (Fig. 2).

Figure 2. Monitoring device for melioration monitoring well

References

1. M.Erdelj., Nathalie Mitton., Enrico Natalizio. "Applications of Industrial Wireless Sensor Networks" HAL Id: hal-00788629 Submitted on June 12, 2013 https://hal.inria.fr/hal-00788629

2. Akyildiz, I.F., Su, W., Sankarasubramaniam, y., Cyirci, E., Wireless sensor networks: a survey. Computer Networks, Vol. 38 no.4: p. 393-422, 2002.

3. A.Alkhatib "Wireless Sensor Network Architecture" 2012 International Conference on Computer Networks and Communication Systems Singapore. CNCS 2012

4. Tom Karygiannis, Les Owens, "Wireless Network Security", NIST Special Publication 800-48

5. Appenzeller, G., Roussopoulos, M., and Baker, M. "User- Friendly Access Control for Public Network Ports". Proceedings of IEEE Infocom 1999, March, 1999,699-707.