

Wireless Sensors Using Microprocessor

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ABSTRACT

Smart sensors with microprocessors and wireless communication links have the potential to change fundamentally the way infrastructure systems are monitored, controlled, and maintained. Devices can be managed in remote places by using smart sensors and wireless network which are used to get the best performance from the system with the good reliability and control. Smart environments based on Wireless Sensor Networks represent the next evolutionary development in engineering like Industrial automation, surveillance, traffic monitoring, and robotics. Sensory data come from multiple networks of interconnected sensors with complex distributed locations. Wireless Sensor Networks are used in many civilian applications. On the other side, the high volume demands of human civilization and society progress have given giant feedback to wireless sensor networks. This paper will give the idea about the basic construction, working, applications and recent developments in smart sensor technology in different fields.

Keywords: Smart sensor, Radio Frequency Identification (RFID), A/D converter.

1. INTRODUCTION

The designing and construction of the smart devices is one of the difficult and ultimate challenges to engineers nowadays. Smart sensor has the function of combining the sensing technology and computing devices which are in interconnection with the wireless network [1].

By using of the wireless sensor we are able to continuously by monitor and have the real time check over the safety of public. In industry the smart sensing can be used to lower risk factor by the ability to detect the damages at an early stage. Smart Sensor are used in the networks of environmental and pollution data collection, tracking. Sensor networks can also be used for supporting and preventing rapid response during various events and post recovery along with analysis after event has occurred [2].

2. METHODOLOGY

2.1 Building of Smart Sensor

The component of smart sensor consist of sensing unit, signal conditioning, A/D converter, Application program, Memory and User interface. Sensing unit senses the change in the parameter, the signal condition circuit is used to generate the digital signal from the electrical signal, the analog signal is converted to the digital signal using A/D converter [1].

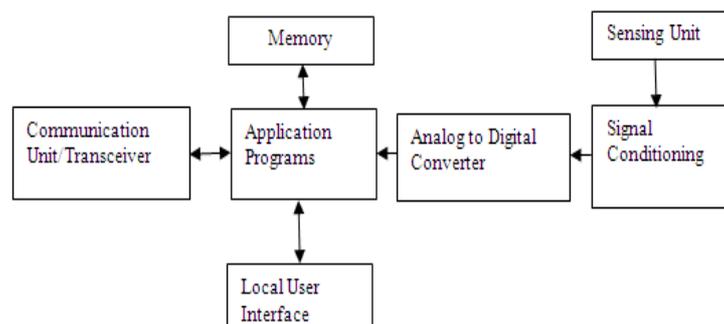


Figure1. Block Diagram of Smart Sensor

A sensor node typically consists of five main parts. A sensor gathers data from the surrounding. The central unit in the form of a microprocessor manages the tasks. A transceiver communicates with the surrounding and memory is used to store temporary data or generated data during process. The battery supplies power to all parts. To assure a sufficiently long network lifetime, energy efficiency in all component of the network is necessary. Due to this need, data processing tasks are often spread over the network, i.e. nodes co-operate in transmitting data to the sinks.

2.2 Architecture of Sensor Node

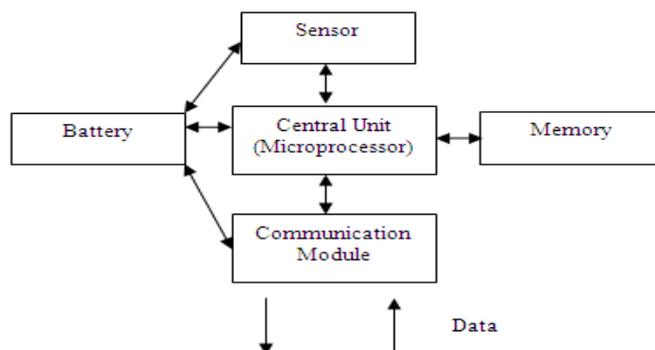


Figure2. Architecture of sensor node

Five main parts of sensor node are:

1. **Central unit:** It is the microprocessor which manages the tasks.
2. **Battery:** Is the source of energy.
3. **Transceiver:** Interacts with the environment and collects data.
4. **Memory:** Used as storage media for storing data or processing data.
5. **Communication module:** It includes transmitter and forwards data and from communication module. Energy efficiency in parts of sensor network is very crucial for network life. Nodes in the sensor network cooperate and spread the data processing task and send the processed information to sinks. For reducing the overhead of power supply, Radio Frequency Identification (RFID) chipset with no batteries are developed. Sensors are used to monitoring of different parameters related to lighting, noise, levels, humidity, vehicle movement, soil makeup, mechanical stress levels, presence or absence of certain type of objects and other properties.

3. APPLICATION

1. **Industrial:** Smart sensor have got the great significance in the industrial aspect. In industrial field by using smart sensor, machines are monitored and are use to controll pressure,temperature, level and density etc. When information about any parameter is achieved the nodes communicates with each other and sends the information to network where it is analyzed and then predictive measure is carried out according to the changes required.
2. **Environment:** Environmental monitoring is the very important application of wireless smart sensor of the weather forecast sensing at very large area and analyzing of the environmental threat. Environmental monitoring system involves acquiring of information at a large geographical area at real time observation.
3. **Precision animal and agriculture tracking:** The modern technology is used to measure the soil, water level in tube wells and diseases/insect monitoring of plants and animal [1].
4. **Urban terrain tracking and civil structure monitoring:** The smart sensor is used in modern world for the real time traffic control and monitoring of the building and infrastructures like indoor climate control structure.
5. **Security and Safety:** The Smart sensor are used for the security surveillance for real time monitoring and safety purpose like fire detection, Gas detection etc.

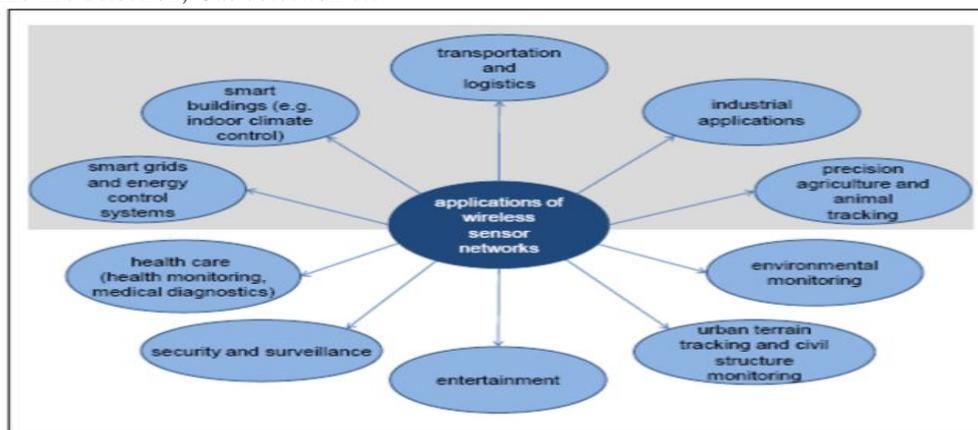


Figure3. Application of Wireless Sensor

4.CONCLUSION

The emerging trends and technology development of smart sensor used in various applications in different fields of engineering have been discussed in this paper. In this paper we have to study the building and architecture of wireless smart sensor. Experimental results show that the proposed system is used to recent development in wireless smart sensor. The proposed system is compared with the existing system.

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