Wireless Sensor Network Technology and Networking Algorithms for Wireless Sensor Network Applications: A Survey

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Abstract: Recent advances in the electronics technologies results into revolutionary developments in fields of science and technology. Due to relentless efforts of scientists and technologists the fields such as Embedded Technology, Integration technology, communication technology, smart sensor design technology etc are pervasively growing and evolving innovative fields for research and developments. On confluence of embedded technology and communication technology with computer technology, a novel field called Wireless Sensor Network is emerged. Wireless sensor network provides new paradigm for sensing and disseminating information from various environments with a great potential to serve many and diverse applications. The monitoring of various physical parameters such as temperature, fluid level, relative humidity, intensity of light, concentration of gasses dissolved in the atmosphere, vibrations, strain, soil moisture, industrial process parameters, pH and salinity of water etc plays commendable role in various sectors such as environmental pollution monitoring, high-tech agriculture, structural engineering, chemical and physical industries, transportation, military and defense, healthcare, forestry etc. The WSN is the network of smart sensor nodes, wherein the standard protocols such as Zigbee, Bluetooth, wifi, GSM etc technologies are employed to establish the RF communication. The distributed sensor nodes must be routed in the network to ensure cooperative collection of the data. Different routing protocols have been studied for their suitability to use in the WSN. It is found that, to establish the WSN, different routing protocols have been reported. Therefore, in present paper wireless sensor network technology and networking algorithms used in wireless sensor network for diverse applications are discussed.
Keywords- Wireless Sensor Node, Wireless Sensor Networks, Network Protocols, Base Station.

I. INTRODUCTION

Recent advances in the electronics technologies results into revolutionary developments in fields of science and technology. Due to relentless efforts of scientists and technologists the fields such as Embedded Technology, Integration technology, communication technology, smart sensor design technology etc are pervasively growing and evolving innovative fields for research and developments [1-2]. On confluence of embedded technology and communication technology with computer technology, a novel field called Wireless Sensor Network is emerged [3]. Wireless sensor network provides new paradigm for sensing and disseminating information from various environments with a great potential to serve many and diverse applications [4]. The monitoring of various physical parameters such as temperature, fluid level, relative humidity, intensity of light, concentration of gasses dissolved in the atmosphere, vibrations, strain, soil moisture, industrial process parameters, pH and salinity of water etc plays commendable role in various sectors such as environmental pollution monitoring, high-tech agriculture, structural engineering, chemical and physical industries, transportation, military and defense, healthcare, forestry etc [5-9]. These physico-chemical parameters are depicting Site Specific Variability (SSV) and monitoring of such widely distributed parameters is challenging task. During early days, the wired networks have been deployed for monitoring of such parameters. However, the wired networks are not only infeasible for typical environment but also shows high cost, hardware complexity, hard to debug and upgrade. The wireless sensor network provides suitable solution to overcome the limitations of the wired system. The WSN is the application specific establishment of smart sensor nodes. The sensor nodes are systematically distributed over a geographical area of interest. The sensor nodes are intelligent and have capabilities such as sensing of physical environment, signal processing and wireless communication. Recently, an embedded technology, wherein smart devices such as microcontrollers of promising features are deployed as computing unit, helps to enhance the intelligence of the sensor nodes. Therefore, it becomes possible to design the intelligent, autonomous and energy efficient sensor nodes to facilitate the desired WSN. Moreover, dramatic reduction in the cost of design and deployment the WSN shows wide