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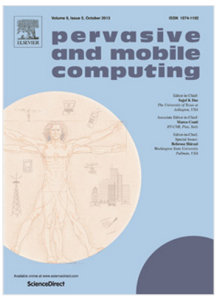

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Survivable Path Routing in WSN for IoT applications

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Abstract

Wireless Sensor Networks (WSN), enhanced communication protocols, distributed intelligence for smart objects, wireless radio frequency systems and several other technologies and communication solutions together enable the promising next generation Internet, called Internet-of-Things. This paper presents a congestion and interference aware energy efficient routing technique for WSN namely, Survivable Path Routing. This protocol is supposed to work in the networks with high traffic because multiple sources try to send their packets to a destination at the same time, which is a typical scenario in IoT applications for remote healthcare monitoring. For selecting the next hop node, the algorithm uses a criterion which is a function of three factors: signal to interference and noise ratio of the link, the survivability factor the path from the next hop node to the destination, and the congestion level at the next hop node. Simulation results suggest that the proposed protocol works better concerning the network throughput, end-to-end delay, packet delivery ratio and the remaining energy level of the nodes. The rate of packet drops is also observed to be lesser in the congested topology scenarios.

Keywords: WSN, Network Survivability, Congestion aware Routing, Path Survivability Factor, SINR, IoT

1. Introduction

The field of microelectronics has been advanced in the recent decades and led to the development of research on wireless networks of low cost, low rate, and low power network devices such as tiny nodes and sensors, etc. Wireless Personal Area Network (WPAN) [1] has a broad range of applications like wireless sensor networks (WSN), underwater acoustic networks, body area networks, industrial wireless networks, radio frequency identification (RFID) systems, machine-to-machine (M2M) communication systems and much more. These sensing, actuating, identification and other various processing devices are combined to form a network that achieves some shared objectives. They interact with the physical world pervasively with the aid of enhanced communication protocols and distributed intelligence, which constitute a novel paradigm called *Internet of Things (IoT)* [2, 3]. "Anytime, anywhere, any media" was the vision for a long time in the past decades that pushed the communication technology into many advancements. Wireless technologies hold a pivotal role in this context. Today the ratio between the humans and radios achieving a value near 1 to 1. But shortly this proportion will increase by orders of magnitude which enables to integrate the radio devices in almost all objects. Then the word "anything" also added to the above vision which is nothing but the concept of IoT. However, these low-power low-rate radio devices are expected to operate autonomously for an extended period with small batteries of limited energy source. Since the unattended nature, replacement of those tiny batteries is impractical; hence the lifetimes of these multi-hop relaying networks directly depend on the residual energy level of its nodes. The actualization

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