

Prathan Somboon 2012: Jamming Avoidance Algorithm in Wireless Sensor Networks Using Channel Surfing from Spectral Multiplexing. Master of Engineering (Computer Engineering), Major Field: Computer Engineering, Department of Computer Engineering. Thesis Advisor: Assistant Professor Chaiporn Jaikaeo, Ph.D. 60 pages.

Communication within wireless sensor networks is usually multi-hop. If a communication channel of any node on a path from a source to a corresponding sink is intentionally disrupted, e.g., via jamming attack, proper data delivery is no longer guaranteed, resulting in unreliable services. This research proposes a method to avoid jamming attack by improving an existing channel surfing technique based on spectral multiplexing. When a node detects jamming on its current communication channel, it will change the channel to another undisturbed channel on a predetermined pseudorandom sequence in order to reestablish communication with its adjacent nodes. To avoid unnecessary channel switching, only nodes being jammed or located at the edge of disturbed regions, called boundary nodes, not all nodes in the entire network, will undergo channel surfing. To achieve the highest performance in communication, these boundary nodes will synchronously switch to different communication channels. Compared to an existing method, the proposed method can increase the amount of information transferred and greatly reduce the amount of overhead.

Experiments with 14 sensor nodes equipped with IEEE 802.15.4 transceivers showed that the proposed method, on average, can increase the packet delivery ratio over the existing method by 12.97 percents. The message overhead per data packet received generated by both methods, are not significantly different.

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