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Authors:
Norhan Abdel-hamid, Labib M. Labib, Abdelhameed Ibrahim, Hesham A. Ali

Abstract

Wireless Sensor Networks (WSNs), considered as one of the successfully distributed applications that are currently used to acquire knowledge and collect information from the wirelessly devices seamlessly. The distinctive architecture of WSNs contributed to deploy it in an extensive range of modern industrial applications such as surveillance, monitoring, predicted, and automated control systems which can help in bridging the divide between user requirements and technologies. Moreover, WSNs face several challenges such as Topology control, Robustness, Placement, Power consuming, Scalability, Reliability, Resource Utilization, QoS, Data availability and Security. The main objective of this paper can be classified into two parts; the first one is to illustrate WSNs architecture, applications, challenges, and recent research directions. The second one is highlighting on routing and security design issues, security threats, countermeasures against network layer attacks to achieve secure routing, as the efficiency of the communication process is mainly based on determining the best path between nodes. We also highlight the advantages and performance issues of each secure
routing technique. At the end of this paper the possible future research areas are concluded.

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Index Terms

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Keywords

WSNs; automated control systems; routing; security; attacks.