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.

References

16. Azade Nazi1, Mayank Raj, Mario Di Francesco, Preetam Ghosh, Sajal K. Das, 2014,


20. S. Sangeetha Mariammala, J. Gayathri, 2015, Ensuring higher security for gathering and economically distributing the data in social wireless sensor networks. Procedia Computer Science 47, 408-416.

21. Sergio F. Ochoa, Rodrigo Santos, 2015, Human-centric wireless sensor networks to improve information availability during urban search and rescue activities. Information Fusion 22, (March 2015), 71-84.


33. Rajendra Prasad Mahapatra, Rakesh Kumar Yadav, 2015, Descendant of LEACH


49. AnandMotwani, VimalDhote, 2016, Optimized AODV Routing for Effective Attack


64. Wenliang Wu, Naixue Xiong, Chunxue Wu, 2017, Improved clustering algorithm based on energy consumption in wireless sensor networks. IET Networks, The Institution of
Engineering and Technology, 1-7.


**Index Terms**

Computer Science  
Wireless

**Keywords**

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