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Analysis of hierarchical cluster-based energy-aware routing protocols in WSNs for SDWSN application

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Abstract

Energy consumption is a typical challenge that is inherent in wireless sensors networks (WSN). Despite the proposals and the development of several routing protocols and Software-defined WSN (SDWSN) introduction to address the challenge and others, optimal energy efficiency is far from being achieved. Therefore, this paper reviewed some of the selected relevant studies based on existing energy-efficient routing protocols to identify the protocols applied and the solutions offered to achieve efficient energy utilization in different applications. Findings show that several different energy-aware routing protocols exist in the WSN with subclasses, each having its strengths and weaknesses. Moreover, empirical evaluation was conducted on 3 commonly deployed hierarchical cluster-based protocols, LEACH, DEEC and TEEN to assess their network lifetime abilities. The results show TEEN protocol outperformed other protocols based on the number of alive nodes with an increase in the number of iterations. We, therefore, recommend the use of these protocols in designing an efficient energy-aware protocol for SDWSN controller placement.