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Energy-efficient routing protocol in wireless sensor networks based on bacterial foraging optimization

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ABSTRACT

Reserve the wireless sensor networks (WSNs) lifetime for as long as possible is a current goal. In WSNs, sensors are often limited in power. However, uneven power consumption (UPC) reduces lifetime, and its deterioration is considered one of the most critical problems. Therefore, balancing the energy consumption is a significant issue in the WSN, necessitating a routing protocol that is energy-efficient that extends the life of the network. A few protocols have been used to balance energy use across network nodes. This paper proposed a routing protocol energy-saving called Bacterial foraging optimization routing protocol (BFORP). BFORP attempts to investigate the problem of the life of WSNs. It can decrease the routing of excessive messages that may result in severe energy waste by recycling the information that frequents the source node into the sink. In the proposed method, the preferable node in the sending routes may be chosen by prioritizing the lowest traffic load, the highest residual energy, and the shortest path to the sink. In comparison to the known protocols used in routing, the results of the simulation have proven the efficacy of the suggested protocol in lowering energy employment and reducing the delay of end-to-end.

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1. INTRODUCTION

Sensor nodes are usually deployed densely in wireless sensor networks (WSNs) to assist in communication, sensation, computing, and data processing. WSNs are used for various functions, applications, and capabilities; for example, any process requires information connection and sensing, such as atmospheric monitoring and video surveillance. WSNs may be placed in open places such as roadways, parks, combat grounds, machines, commercial structures, and human bodies [1]. Generally, these sensor nodes within large-scale operations networks for data collection are powered by small and cheap batteries and are usually low-power [2].

Due to many-to-one traffic patterns and multi-hop routing, WSNs struggle with uneven energy distribution. So this leads to the period of network life being significantly shortened. For data transmission [3], [4], the routing algorithms often choose the optimum route between the source node and the destination node. The sensor node is made up of several parts; a processing part, a sensing part, a power part, and a transmission part. There are elective components such as a mobilizer and position locating system. The sensor construction is depicted in Figure 1. The sensors usually act on their jobs, such as communication, computation data, energy sources, and current information [5]. The sensor can perform two purposes: