

MULTIVERSE CROW CONSCIOUS CLUSTERING ROUTING AND COVERAGE OPTIMIZATION HEALTH MONITORING ALGORITHM DURING COVID-19 PANDEMIC

Cosmena Mahapatra^{1,2*}, Ashish Payal^{1†} and Meenu Chopra^{2‡}

¹*University School of Information Communication and Technology, Guru Gobind Singh
Indraprastha University, Delhi, India*

²*Information Technology, Vivekananda Institute of Professional Studies, Delhi, India*

Abstract

Covid-19 crisis has put the healthcare system under stress due to the shortage of healthcare workers in hospitals, the hour of the need is a highly flexible but dependable as well as a system which can alert hospital authorities immediately through centralized relay about the status of a patient if he/she becomes critical. Such a system may be built using a Big Data enabled Wireless Sensor Networks, which may be set up to monitor patients inside a hospital which shall be monitored through live channel feed by hospital monitoring authorities. The data from the sensors, through big data monitoring and analytics layer, will give crucial and timely results which will surely save many patients lives. In order to implement such a robust system, there is a need to build constant coverage and optimized clustering and routing algorithms which would solve this vital problem. This paper presents a novel energy-conscious clustering routing and coverage algorithm for both equal and unequal distribution in the wireless sensor system and is called as Multiverse Crow Conscious Clustering Routing and Coverage Optimization Algorithm. The algorithm has been able to successfully attain the equilibrium of Wireless Sensor Network community energy consumption, enhance energy efficiency, and extend lifespan of the entire network. From the coverage point of view, the algorithm has been able to attain the distribution optimization at a greater rate with a decrease cost, and increase the efficacy of this algorithm. To prove its effectiveness, we have compared the proposed algorithms to multiple Nature Inspired Optimized WSN scenarios.

Keywords: WSN, MVO, Crow Search, Hybrid Optimization, QoS, Coverage Area

Introduction

Constant positive research has led to the increase in efficiency of wireless sensor nodes which in turn is leading to the building of various critical wireless sensor networks (WSN) applications which require the random and dense deployment of battery-powered sensor nodes in a system which is often left un-monitored to their sensing functionality Rashid and Rehmani (2016); Zou (2020); Mukherjee and Das (2020). The issue of coverage area connectivity magnifies many would if the application is based on Directional WSN (DWSN) Jia et al. (2017). These WSN specialize in sending the video of the area being monitored thus scope in various applications such as smart city management, monitoring of highly vulnerable terrain or it may be used for monitoring industrial applications. These directional sensors are powered by lithium batteries having limited energy. This means that if the nodes' energy is prematurely used up, the Quality of service (QoS) of the new network is hit greatly. It must be emphasized here that having data coverage connectivity and preservation would be the most indispensable function to ensure QoS in WSN in addition to the need for ensuring low energy intake. Thus, there arises a need for creating a balance the need for optimum coverage by reducing blind coverage areas and coverage area overlapping, but also to prolong the life of wireless sensor networks by using optimum Cluster formulation and data routing techniques. It has been noticed by various researchers that DWSN sensors have a huge redundancy ratio due to its rotating nature of the sensory direction. Redundancy ratio is directly proportional to the area covered by the coverage