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Empirical Analysis of Energy Harvesting and Clustering Methods for D2D Communication Systems

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Abstract:

Unmanned Aerial vehicle (UAV)-based post-disaster communications face significant problems due to their energy consumption and operational range. Energy harvesting is used to overcome these problems by providing power for communication during disasters and extending the lifespan of wireless communication for networks. In order to expand the network's overall coverage and offer continuous connection during the disaster and post-disaster periods, Device-to-Device (D2D) communication and clustering methods were used. And Emergency Communication System (ECS) that uses the best Cluster Head (CH) technology to increase transfer energy effectiveness for long-term connectivity of the network. The clustering method and reinforcement learning in D2D connections are able to collect energy to extend the network lifespan with the help of UAV model. These strategies are predicted to increase the network's constancy during the emergency situations. The enhanced features with the use of the best CHs, and the path loss was significantly decreased. Hence, it reduces the computing complexity of network architecture to recover from natural disasters and also save numerous lives.

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I. Introduction

In recent years, frequency spectrum resource has becoming more and more rare, make its effective usage essential for developing a new communication system. With a limited quantity of bandwidth, Long Term Evaluation (LTE) 4G+ and Dynamic Spectrum Access (DSA) networks has to be capable of meeting a wide range of customer demands. D2D communication has the ability to address the capacity constraint issue as well as the limited bandwidth. In order to manage low power devices and maintain energy conservation, D2D communication is implemented in LTE 4G+ to improve network performance was described in LTE and WiMAX [1]. It is better way to improve the bandwidth and energy efficiency of Fifth-Generation (5G) cellular networks. Users are exposed to significant interference from local Base Stations (BS), which is completely dependent on user location and BS transmission power. Therefore, BS transmission power optimization and demonstrate a high configuration for D2D users, and way to increased performance. Additionally, by optimizing resource and power allocations for D2D users, interference can be minimized to improve overall network performance [2]. D2D communications will increase capacity utilization and power efficiency to providing services for public health and safety. Using a D2D architecture, communications from a disaster area to a working department would be allowed dependent on certain fundamental data like the locations and battery levels of victims' electronic devices. Users in a disaster zone are divided into clusters by using this structure, which are utilized by a ground station in a functional area in a given portal.

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