

ABSTRACT

Device-to-device (D2D) communication is present as a technology that is able to improve several parts of communication services such as reliability, energy efficiency of core network, coverage area and many more. Problems with energy in D2D communication are vital considering that in certain circumstances, such as during a natural disaster, damage to the core network or wasteful energy consumption itself is not a problem that can be ignored. The clustering method can be a solution to this problem by grouping device-to-device user equipment (DUE) or nodes into certain clusters. So that the routing protocol between nodes is more structured, saves energy and extends network life, which is completely dependent on the node battery. Fuzzy c-means (FCM) algorithm is an option in its application in the realm of wireless sensor networks (WSN) in terms of energy efficiency at nodes. The research in this Final Project adopted it into the D2D realm because of the identical work patterns and framework. The final result of this study compares 3 test parameters, namely total energy consumption (Joules), the number of operating nodes and dead nodes. In this study, the authors add several variations of the location of the base station (BS) as input parameters. The results obtained from the research show that the application of the FCM algorithm in the LEACH framework is more efficient in terms of energy consumption with an energy consumption of 96.692 Joules or consumed energy of 96.7 percent of the total energy in the network with a total of 100 nodes compared to other methods such as LEACH without FCM applied with energy consumption of 99.943 Joules or 99.9 percent of the total energy in the network with the same total node.