ABSTRACT

Device-to-Device (D2D) communication is a form of communication between two devices without the need to go through a Base Station. This method is implemented to reduce the workload of the base station and to increase data rates, coverage area, and reduce network latency. In the future, D2D communication will provide solutions as the demand for smartphone-based communication continues to grow. This could lead to an increase in data rates and impact power efficiency. In D2D systems, unlike Cellular User (CU) systems, devices must transmit signals through a base station in Long Term Evolution (LTE) communication, which requires significant power.

Resource allocation technology enables the connection of D2D device pairs without the need to transmit signals to the base station. However, this technology can also experience interference. Therefore, a resource allocation process with water-filling power control is necessary to allow simultaneous use while maintaining Quality of Service (QoS) in D2D communication. To reduce interference, resource allocation distribution is implemented to improve data rate performance and spectral efficiency.

In this final project, a genetic algorithm with a Water-Filling Power Control scheme is used as the resource allocation algorithm. It is then compared with a Particle Swarm Optimization (PSO) algorithm using the same Water-Filling Power Control scheme. After all resources have been successfully allocated, performance parameters such as Average User Throughput, Spectral Efficiency, and D2D fairness are calculated.

Key Word: Device to Device, Genetic Algorithm, PSO Algorithm, Water Filling Power Control