## ABSTRACT

Nowadays, technology is experiencing very rapid development, especially in the field of telecommunications. Utilization of telecommunications, especially in the cognitive radio sector. Cognitive Radio Network (CRN) or radio cognitive networks exist as a solution to increase the use of resource allocation. Radio cognitive network research focuses on resource allocation using optimized resource allocation. The main problem is handling cellular network requests, by minimizing maintenance, low power usage and small interference to get maximum value and focusing on high *data rate* values in order to achieve the best performance.

Cognitive Radio Network was developed because primary users (PU) and secondary users (SU) do not need to use the medium to communicate with each other. This concept is very useful for the future even though it has problems in terms of interference resulting from PU and SU because in the same cell. This can cause Quality of Service (QoS) performance in CRN. Therefore, resource allocation is needed that can improve QoS performance such as increasing *data rate*, power usage and low interference. Then, the *Reweight Message Passing* (ReMPA) algorithm is used to support this performance.

Reweight Message Passing algorithm in this final project can be a solution for PU and SU by producing an increase in the number of rates of performance of 3.73% from the Mean Greedy algorithm and 2.15% from the Random algorithm in scenario one for ReMPA Surmate. In the second scenario, ReMPA Sumrate experienced a decrease in the total performance rate of 2.15% from the Mean Greedy and 21.74% from Random. ReMPA Fairness experienced an increase in fairness performance by 13.03% from the Mean Greedy and 18.64% from Random in scenario one.

**Keywords:** Cognitive Radio Network, Algortima Reweight Message Passing, Primary User, Secondary User.