ABSTRACT

Cognitive Radio Network (CRN) is a network that utilizes a spectrum gap channel from network. CRN can be built practically through Software Defined Radio (SDR), which makes it possible to address the sudden needs of communication networks. Disaster management is one of the conditions that require communication networks. In disaster-affected areas, the communication network infrastructure is often damaged. Therefore, CRN can be a solution to the needs of emergency networks in disaster-affected areas.

This thesis analyzes the performance of Quality of Services (QoS) from the application of the Traditional Reinforcement Learning (TRL) Algorithm in channel selection on CRN. The measured QOS are throughput, packet delivery ratio, and delay with parameters that include changes in the learning rate, the number of primary users in the network, and the type of propagation on the network.

TRL test result shows the characteristics of TRL, where the higher the learning rate, the agent will be more precise to determine the route selection. this is because the number of Q-Value is getting higher, reaching 0.8323 when the learning rate value is 0.9. In the scenario of USRP, Network Simulator 2 (NS2) and Matlab application calculations, the TRL has a pretty good performance with a throughput of up to 740 Kbps when the data rate is 1 Mbps, delays up to 161.8 ms and the packet delivery ratio (PDR) reaches 100%. Test results and calculations show that the TRL algorithm is suitable for CRN to address the needs of emergency networks in disaster-affected areas.

Keywords: *Cognitive Radio, Software Defined Radio, Traditional Reinforcement Learning, Quality of Services*