

## Recurrent Neural Network and Its Acceleration for Intrusion Detection on the Internet of Things

Jooyoon Lee, Jiyoung Park, and Heejun Kim

Faculty Mentor: Sang-Woo Jun Professor

Mentor: Jeffery Chen Additional Mentor

Recently, the IoT market has been gaining attention and more devices are connected in IoT systems than ever before. The increase of devices in IoT systems typically result in security issues and heavy traffic. Intrusion detection plays an essential role in ensuring information security, and the key is to accurately identify various types of attacks in network. Numerous intrusion detection methods are under active investigation, including those using neural networks. Although intrusion detection methods based on neural networks have a high accuracy, they are expensive in terms of computational resources required. This project aims to mitigate this issue by quantizing a deep learning model for intrusion detection using neural networks and finally to reduce the cost in the intrusion detection system. Therefore, we implemented the Intrusion detection model using recurrent neural networks, compressed (quantized) the neural networks, and evaluated accuracy change in detecting. The Recurrent Neural Network for Intrusion Detection System(RNN-IDS) showed about 80% accuracy. This means that our model detects most of the intrusions like R2L U2R, DOS, and Probing. As a result, it would be helpful for defending intrusions on IoT systems. This research can contribute to developing a model with high accuracy at low cost for intrusion detection on the IoT systems.