

## Abstract

Wireless communication has become an integral part of our daily lives. The success of a wireless network largely depends on its ability to transmit data with high accuracy, efficiency, and efficiencies. Signal recovery is a critical aspect in overcoming these challenges, where Compressive Sensing (CS) emerges as a potential solution. In the context of Large Intelligent Surfaces (LIS), which involve the use of intelligent surfaces with a large number of passive and active elements, signal recovery becomes more complex. Therefore, a smarter and more efficient approach is needed to address the issue.

Over time, data storage and environmental adaptation techniques have become increasingly crucial. Gated Recurrent Unit (GRU), a type of recurrent neural network model, has been identified as a promising solution to address these challenges. GRU enables sequential data modeling and intelligent adaptation to environmental changes, making it highly suitable for applications in LIS.

This study was conducted using MATLAB-based simulations utilizing the DeepMIMO dataset to train and test the developed system. Testing was done by measuring the “achievable rate” that the system can achieve. The best results obtained by the GRU method were achieved in the GRU Layer 20 configuration and 5000 training data, followed by the GRU Layer 30 configuration and 20000 training data, and the GRU Layer 10 configuration and 5000 training data.

**Keywords:** Recovery, GRU, LIS, CS, Achievable level, Matlab