

## **Artificial neural network approach in radar target classification**

### **ABSTRACT**

**Problem statement:** This study unveils the potential and utilization of Neural Network (NN) in radar applications for target classification. The radar system under test is a special of it kinds and known as Forward Scattering Radar (FSR). In this study the target is a ground vehicle which is represented by typical public road transport. The features from raw radar signal were extracted manually prior to classification process using Neural Network (NN). Features given to the proposed network model are identified through radar theoretical analysis. Multi-Layer Perceptron (MLP) back-propagation neural network trained with three back-propagation algorithm was implemented and analyzed. In NN classifier, the unknown target is sent to the network trained by the known targets to attain the accurate output. **Approach:** Two types of classifications were analyzed. The first one is to classify the exact type of vehicle, four vehicle types were selected. The second objective is to grouped vehicle into their categories. The proposed NN architecture is compared to the K Nearest Neighbor classifier and the performance is evaluated. **Results:** Based on the results, the proposed NN provides a higher percentage of successful classification than the KNN classifier. **Conclusion/Recommendation:** The result presented here show that NN can be effectively employed in radar classification applications.

**Keyword:** Forward scattering radar; Neural network; Target classification; Target recognition