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Секретар секції – пров. фахівець Лук'яніхіна А.В.

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СЕКЦІЯ 1

**«Комп'ютерні науки та
кібербезпека»**

Application of Device Classification Based on Security Parameters Using Machine Learning for Intelligent Routing in Softwarized Networks

Mykola Maiba, *TCMM-23-1, student*

Kharkiv National University of Radio Electronics, Kharkiv, Ukraine

The use of intelligent routing methods in software-defined networks is investigated. The importance of incorporating artificial intelligence into network traffic management systems to ensure network Quality of Service and security is emphasized. Different types of machine learning methods are considered, including supervised, unsupervised, reinforcement learning, and various algorithms. Supervised learning was used to implement intelligent decision-making for network traffic management systems.

Different machine learning models were compared, including linear regression, logistic regression, decision trees, and random forest, to determine the best model for the given task. In solving the device classification task based on security parameters, an error matrix was also used to evaluate the model's performance. This allowed us to identify specific classification errors and determine which classes the model classifies best. Model accuracy can be improved by collecting more data to train the models. This will help the models learn the patterns of these classes better and thus improve their classification accuracy. The model performance was tested on a validation dataset not used for model training. This allowed us to determine the degree to which the model can generalize its training on new data.

A software module was developed that uses the predicted data of the trained model to solve the optimization problem. The results of the developed machine learning model are applied to solve a single-path routing problem. It is shown how the devices selected in this way can be used to increase network security by implementing secure single-path routing. The use of different types of metrics for determining the optimal route in the network is considered.

Supervisor: Oleksandra Yeremenko, *Professor, Kharkiv National University of Radio Electronics, Kharkiv, Ukraine*