



Master thesis No. 1065

Adapting and Implementing GradCAM Visualization for ML-based Network Routing



Methods

Deep Learning
Visualization Techniques

Topics

Network control
Explainable AI

Background

Modern network routing has become increasingly complex, with ML models making critical routing decisions. However, these models often act as black boxes, making it difficult to understand their decision-making process. GradCAM (Gradient-weighted Class Activation Mapping) has emerged as a powerful visualization technique in deep learning, offering insights into model decisions through heat map visualizations. Applying GradCAM to network routing can provide network operators with visual explanations of routing decisions, enhancing trust and enabling better network management.

Problem Description

This thesis focuses on adapting GradCAM for network routing applications. The project consists of the following steps:

- Understand existing ML-based routing algorithms and their architectures
- Adapt GradCam for network-specific features
- Implement GradCAM visualization for network routing decisions
- Develop an interactive visualization interface
- Evaluate the effectiveness of the visualization in explaining routing decisions

Acquired Knowledge and Skills

Through this thesis, you will gain expertise in explainable AI techniques, deep learning architectures, and network routing principles. You will work with modern visualization tools and develop skills in implementing interpretability methods for ML models in networking contexts.

Requirements

Programming Experience
Communication Networks Architecture and Design

Desirable knowledge

Programming Experience in Julia

Contact

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