Thesis B.Sc.

Thesis M.Sc.
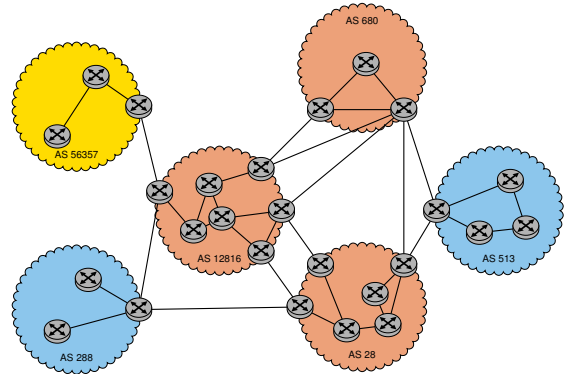
IDP, Guided Research

Autonomous System Models using BGP Data and GNNs

Motivation

The Internet consists of a collection of independently operated networks, called Autonomous Systems (ASs). The Border Gateway Protocol (BGP) is used to route communication between ASs. Each AS has a number of properties, which might not be publicly available [1,2].

Graph Neural Networks (GNNs) [3] are a machine-learning approach that works directly on graph structured data using a message passing method.

Combining GNNs and information obtained from BGP can be used to model AS behavior and derive AS properties. This work will implement and evaluate such an approach.

[1] https://www.caida.org/catalog/datasets/as-classification/
[2] https://www.peeringdb.com/
[3] https://distill.pub/2021/gnn-intro/

Your Task

- Familiarize yourself with BGP and GNNs
- Create datasets representing ASs based on BGP data
- Apply a GNN approach to predict AS level properties
- Evaluate the quality of the approach

Requirements

- Hands-on experience with machine learning, preferably PyTorch
- Basic knowledge of BGP and Internet structure
- Experience in Python
- Self motivated work approach

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