Network AI Challenge 2020
https://bnn.upc.edu/challenge2020
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November 2019
Network AI Challenge: What can we learn from Computer Vision?
Computer Vision Challenges

- The Computer Vision community organizes many challenges

Organizers provide:
- Pictures of objects
- Labeled Images

Image → Object

Participants submit:
- Neural Network (NN) trained with the dataset

Organizers Evaluate:
- Participant’s NN with an unlabeled dataset

Organizers Rank:
- Awards are given to the winners.
  (Ranked per MSE)
Computer Vision Challenges

See: https://medium.com/@mohankumar_9393/computer-vision-related-competitions-bba169a0112f
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Network AI Challenge 2020: Datasets

- Topology
- Traffic Matrix
- Network Configuration
- Per-Packet Simulator
  - Event-driven
  - Realistic Traffic Models
  - 1 week per topology
- Performance:
  - Per-flow delay, jitter and losses
Network AI Challenge 2020: Datasets

- Dataset is roughly 60GB
- A set of topologies (tens to hundreds of nodes)
- Datasets are being simulated right now, see example in [1]
- We also provide a Python API

Network AI Challenge: Challenge

Build a **Neural Network** that

given an **unseen** network topology, configuration and traffic matrix

is able to **estimate** the per-flow delay, jitter and losses.
Network AI Challenge: Baseline

• We provide RouteNet [1] as a baseline/benchmark
• RouteNet is a Graph Neural Network able to generalize to unseen topologies, traffic matrices and configurations
• The challenge datasets contains realistic and complex traffic models

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Vanilla RouteNet has a MSE of ~46% (lower is better)

Network AI Challenge: Use-Cases

Should we also consider management use-cases, as an example:

Find the **optimal** network configuration given an **unseen** network topology and traffic matrix by **means** of a Neural Network

(*) Optimal meaning that fulfills a certain SLA (for example)
Network AI Challenge: Other

• Dates
  • Dataset Available: Spring 2020
  • Participants submit NN: Summer 2020
  • Award: Summer 2020

• Dissemination
  • IETF/IRTF
  • Academic mailing lists (EDAS, TCCCM, etc)
  • Challenge websites (Kaggle, etc)
  • Academic workshop (SIGCOMM, etc)
Network AI Challenge: Other

• Target Audience
  • We target two different communities
  • Machine Learning → Participants can win by smart RouteNet hyper-parameter optimization
  • Network → Participants can provide new NN architectures

• Academic paper
  • After the award, we will submit an academic paper discussing the experience co-authored by participants.
Discussion:
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Network AI Challenge: Other

• Are use-cases relevant?
• Volunteers to co-organize?
• Is NMRG interested in hosting the challenge?
• Is ANRW interested?
• Should we find a cloud provider to sponsor and offload some of the training resources?
• Any other topics?