# Wrap-up of the AI side meeting

## NMRG 57 - 22 November 2019

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# Starting point

- List of Topics identified in Prague:
  - Feature Engineering and Embeddings
  - Accountability and Explainability
  - Datasets and Benchmarking
  - ML Architecture & Use-Cases
  - Distributed AI

- Objectives of the side meeting@IETF106:
  - Continue maturing our vision on the coupling between network and AI with the aim to start writing a converged roadmap
  - Need to define/refine the motivation = tentative research challenges in this area
    - why do we need AI in networks?
    - differences when applying AI in our domain? (simply take any AI toolbox and use it! no?)
    - at any level: scientific, technical, methodological, business, legal…

# Research challenge 1: Lightweight AI

- Embed AI algorithms into small devices
  - Reduce the need and cost for AI-specific infrastructure
  - Closer to where the data is (avoid large communication overhead)
- Relationship with network and potential research
  - Lightweight devices might be network device
    - In-network AI, COINRG
  - Related to distributed AI / swarm intelligence
    - Need for synchronization ⇨ communication
    - Network as a support for AI ⇨ new network solutions for supporting/empowering AI

# Research challenge 2: Data

- Recurrent discussions when talking about using AI for networking
  - No access to proper data for the learning (testbed vs operational data, public vs private data, no interface to get data…)
  - Data patterns are dynamic and change over time
    - Limited validity of the learned model
    - No possible generalization of the inferred knowledge (techniques tailored to a too specific use case or even dataset)

- Potential research directions
  - Comprehensive description of data
  - Use AI to generate datasets and particular situations (coverage)
  - Data identification driven by the AI technique (AI-driven telemetry)
  - Transfer knowledge between domains

# Research challenge 3: “Problems”

- No need for AI for everything
  - What problems cannot be solved without AI?
  - Mapping between data – problem – algorithm
- Potential research directions
  - Avoid static mapping (hard to extend, generalize) ⇨ Identify the right set of attributes to define/classify an AI and a network problem + a method to associate them together

# Research challenge 4: Trustworhthiness/Exploitability

- Network experts ≠ AI experts
  - AI must be easy to use (properly)
  - AI results must be reliable and explainable
  - AI must not induce an additional overhead but simplify the job of human users
- Network “problems” are various, complex and distributed
  - All data cannot be in a single location
  - A unique technique cannot solve everything
  - Even for a single problem, the possible decision outputs may be very large
- Potential research directions
  - AI for actions (Full automation) and AI to assist humans
  - Orchestration / composition of network AI services (data-gathering, knowledge extraction, fusion, inference, transfer,…)

# Steps to progress

- More formal definition of the research challenges
  - A public document starting from presented challenges
  - Need some efforts (feedbacks and **INPUTS**) ␣ volunteers?
- Clarify the position of AI in NMRG
- Have more diverse and valuable inputs
  - AI experts not necessarily working in networking area
  - AI experts in operational environment