Research Challenges in AI for NM document

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Status 1/2

- [https://docs.google.com/document/d/1dQOzZustI2mkYr_omtiqu3FqUvoqLgaCp7nbRj4ZJyw/edit?usp=sharing](https://docs.google.com/document/d/1dQOzZustI2mkYr_omtiqu3FqUvoqLgaCp7nbRj4ZJyw/edit?usp=sharing)
- Thanks to the (future) contributors: 7+ contributors

Introduction / motivation of the document
- Difficult problems in NM (where AI can help) before objectives of IA in NM (new proposed section)
  - Scalability / accurate issues with heuristics techniques (NP-hard problems)
  - Bottleneck of human-based operations
  - ...
  - Examples provides: resource allocation, traffic forecasting, intent interpretation
- Goals of AI in NM
  - How should this section should be articulated with the previous one?
  - How to organize this section? Classification of objectives per layer? (but need also to have transversal objectives).
  - Use the NSM taxonomy (from COMSOC/CNOM, IFIP)? Try to identify important list of attributes that characterize of goal?
  - Other ideas?
Status 2/2

- Challenge description (AI, Data, NM actions, acceptability)
  - Lightweight AI: Embed AI algorithms
  - Problem type and mapping: “define the right algorithm for a certain problem” too strict. Need first to define parameters that impact the selection of an algorithm to formulate correctly a problem incl. constraints + method to find a good tradeoff
  - Data accessibility: sharing, security and privacy issues
  - Automated network data labelling: for supervised learning, fill the gap between collecting data and feeding the ML algorithms, mapping of labels and objectives is not 1:1
  - Acceptability of AI for NM: interfaces/protocols, scalability, security/safety, explainability and “educational” issue to allow an AI operating a network
  - Online monitoring and control of the quality and properties of estimators: when the learned model are not accurate anymore?
  - IBN-1: interpreting high-level or natural language intents (NLP/NER) and generation of intents (may intent can be generated from current operations? Can it help for diagnosis?), in relation with human in/on the loop challenge
  - IBN-2: planning of actions to produce the desired outcome
  - AI for Exploiting External Events
  - Commercialization of AI-based products and algorithms: how to transfer or generalize knowledge extracted/created from lab to an operational environment
  - Explainability of Network-AI products
Next steps

• Format the document as an individual ID
• Dedicated meetings and editing sessions to be organized
• First consolidated version at IETF 109 (without use cases)