Paris Session 2022

Developping Framework & Benchmark for AI

SC C2
PS2 - Question 2.6:
How AI can be harnessed to provide further support ?

Antoine Marot - France

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Latest Developments in AI have been made possible through shared benchmarks and Frameworks & new organisational mindset

- ➔ Renewed AI power mainly relates to Machine Learning developments but is quite demandng in terms of resources (data, compute, digitalization, expertise) and rarely done in isolation but within a community at large
- ➔ Machine Learning & Deep Learning revival in 2010 started through the Imagenet Large DataSet development and the striking result at “Visual Recognition Challenge” in 2012
- ➔ Latest “NLP” and “AlphaFold” AI breakthroughs have been obtained through extensive analog benchmarks and competitions
- ➔ The culture of open-source and framework developments (Tensorflow, Pytorch, many specific reusable libraries, papers-with-code) have driven advances
- ➔ Facilities with Data and Compute Centers in the cloud as well as advance digital and techhnical stack shorten the life-cycle between R&D & deployment
- ➔ Large pre-trained models are available for standard data (Vision, Language, Audio) that can be reused and fine-tune with low compute on power system use cases

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Take inspiration from AI community & work with them

- ➔ The culture of Datasets, benchmark, open-science competitions and open-source should be considered more extensively in the power system community
- ➔ Developing large (synthetic) AI-friendly **datasets & benchmarks** to model and exhibit our use cases and related challenges. Examples:
  - "Learning to run a power network" Series of competitions
  - "Learning Industrial Physical Simulation" Benchmark
  - A multi-scale time-series dataset with Benchmark for ML in decarbonized grids
- ➔ Mutualizing framework development (such as Grid2op) that build on AI tools (such as OpenGym) and power system ones (simulators)
- ➔ Building the necessary technical stack & **platform** in utilities (advance data-management and annotation, cloud deployment, continuous integration with MLOps - example with C3.ai platform) & overall **AI assistant framework**
- ➔ Revise organizations for continous development and feedback between R&D and deployment with shared ressources

Group Discussion Meeting

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- ❖ ***Potential and challenges of AI-powered decision support for short-term system operations,*** *PS1 C2 CIGRE 2022, J. Viebahn, M.Naglic, A. Marot et al.*
- ❖ ***Towards an AI assistant for power grid operators,*** *Hybrid Human AI Conference 2022, A. Marot et al.*