U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Challenges to Applying AI in Government – Department of Energy Perspectives

Brian Valentine

DOE EERE Advanced Manufacturing Office

DOE – At Forefront of AI R&D for 60 years

- DOE – Comprises 3 major technology programs:
  - Sciences – Basic physical, mathematical, biological
  - Defense – NNSA responsible for entire defense nuclear enterprise
  - Energy/Applied Programs – Includes electricity/grid programs, nuclear, fossil, renewable energy R&D
- AI research began under Atomic Energy Commission support of basic sciences at National Labs (LANL, Sandia, etc)
- AI has been applied extensively to research within the DOE enterprise – only recently applied in cooperation with external research partners

DOE supporting extensive research in and applications of AI within DOE and other Federal agencies

- Major challenge is coordinating all the activities!
- AI Technology Office AITO recently established in DOE to coordinate internal/external AI activities
- Capabilities of AI applications largely within DOE National Lab system
- Technology challenges described by AITO addressed by partnering with other agencies and research institutions
- DOE missions in AI: "to strengthen national security and cybersecurity; improve grid resilience; increase environmental sustainability; allow for smarter cities; improve water resource management; speed the discovery of new materials and compounds; and accelerate the understanding, prediction and treatment of new disease."

Recent AI Initiatives within DOE – *Extracting Knowledge from Data!*

- Electric Grid Resiliency – with DOE Office of Electricity Delivery and SLAC
- Biomedical – Neurosciences – Partnership with UCLA, others
- Veteran Health – Partnership with VA
- Cybersecurity – Partnership with numerous agencies
- Seismic research – working to predict earthquake
- Cancer research – partnership with NCI, others
- Materials research – Innumerable AI activities throughout DOE