May 2022

Mega AI, an internal investment at Pacific Northwest National Laboratory (PNNL), aims to develop next-generation artificial intelligence (AI) capabilities unique to the Department of Energy's national laboratories, to address research gaps in large-scale multimodal representation learning, multitask inferences, and the need for increased generalizability, rapid adaptivity, and usability of AI technologies. In this newsletter, we highlight recent developments in the research community on next-generation AI technologies that focus on massive-scale model development, deployment and evaluation, data and code availability, model interactions, and new features and capabilities that are relevant to Mega AI's goals and science and security applications.

NEW MODELS AND CAPABILITIES

- **March 30 | Blog**: *Meta AI Team Open-Sources Mephisto: A New Platform for Open and Collaborative Way of Collecting Data to Train ML Models.* READ MORE
- **April 1 | Blog**: *New Scaling Laws for Large Language Models*. READ MORE
- **April 1 | Article**: *Generating New Molecules with Graph Grammar.* READ MORE
- **April 4 | Blog**: *Pathways Language Model (PaLM): Scaling to 540 billion Parameters for Breakthrough Performance*. READ MORE
- **April 28 | Article**: *Flamingo: A Visual Language Model for Few-Shot Learning*. READ MORE

NEW CODE

- **GitHub | Code**: TorchMultimodal— PyTorch Library-Based State-of-the-Art Multimodal Multitask Model Training at Scale. LEARN MORE

NEW REPORTS AND STUDIES

- **May 4 | Publication**: *A Systematic Evaluation of Large Language Models of Code*. READ MORE
- **March 16 | Publication***: Memory-Assisted Prompt Editing to Improve GPT-3 after Deployment*. READ MORE, CODE
- **March 22 | Article**: *DeepMind Proposes Symmetry-Based Representations as a Fundamental Principle for Learning Good Representations in General Intelligence*. READ MORE
- **March 29 | Publication**: *Training Compute-Optimal Large Language Models*. READ MORE
- **April 12 | Publication**: *What Language Model Architecture and Pretraining Objective Work Best for Zero-Shot Generalization?* READ MORE
- **Publication**: *Unsupervised Word Embeddings Capture Latent Knowledge from Materials Science Literature*. READ MORE
- **Publication**: *Vision Models Are More Robust and Fair When Pretrained On Uncurated Images Without Supervision*. READ MORE

COMMUNITY DISCUSSION

- **March 24 | Announcement**: Department of Energy Announces $10 Million for Artificial Intelligence Research for High Energy Physics. READ MORE

EVENTS

- Pacific Northwest National Laboratory's Mega AI Innovator Series LEARN MORE
  - **March 30**: *Advances in Machine Learning for Cyber-Safety*
    Srijan Kumar, Georgia Institute of Technology
    View on YouTube
  - **March 16**: *Integrating Theory and Subject Matter Expertise into Computational Methods for Social Systems*
    Asmeret Naugle, Sandia National Laboratories
    View on YouTube
  - **March 2**: *Toward Robust, Knowledge-Rich Natural Language Processing*
    Hanna Hajishirzi, University of Washington
    View on YouTube

For more information, contact:

Svitlana Volkova, svitlana.volkova@pnnl.gov
Mega AI Investment Lead

Maria Glenski, maria.glenski@pnnl.gov
Mega AI Deputy