December 2021

Mega AI, an internal investment at Pacific Northwest National Laboratory, aims to develop next-generation artificial intelligence (AI) capabilities unique to the Department of Energy's national lab system 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 focusing 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

- **October 29 | Blog:** Introducing FLAN: More Generalizable Language Models with Instruction Fine-Tuning. READ MORE
- **October 11 | Blog:** Using DeepSpeed and Megatron to Train Megatron-Turing NLG 530B, the World's Largest and Most Powerful Generative Language Model. READ MORE
- **October 20 | Article:** *Google AI Introduces SimVLM: Simple Visual Language Model Pre-training With Weak Supervision.* READ MORE
- **November 10 | Article:** *Meet M6 — 10 Trillion Parameters at 1% GPT-3's Energy Cost.* READ MORE
- **November 15 | Blog:** MetNet-2: Deep Learning for 12-Hour Precipitation Forecasting. READ MORE

- **November 17 | Article:** *Is BERT the Future of Image Pretraining? ByteDance Team's BERT-like Pretrained Vision Transformer iBOT Achieves New SOTAs*. READ MORE
- **November 21 | Article:** *Baidu AI Research Releases PLATO-XL: World's First Dialogue Generation (NLP) Model Pre-Trained On 11 Billion Parameter.* READ MORE
- **November 30 | Blog:** MURAL: Multimodal, Multi-task Retrieval Across Languages. READ MORE

NEW CODE FOR REPRODUCIBILITY

- **November 14 | Blog:** Introducing Pathways: A next-generation AI architecture. READ MORE
- **Paper & Code:** MEND: Fast Model Editing at Scale. READ MORE

NEW REPORTS AND STUDIES

- **October 21 | Paper:** *Fast Model Editing at Scale.* READ MORE
- **October 23 | Article:** *Nvidia clarifies Megatron-Turing scale claim*. READ MORE
- **October 28 | Article:** *AI Generates Hypotheses Human Scientists Have Not Thought Of.* READ MORE
- **November 23 | Paper:** *ExT5: Towards Extreme Multi-Task Scaling for Transfer Learning*. READ MORE
- **December 2 | Paper:** *Finetuned Language Models are Zero-shot Learners.* READ MORE
- **Project:** A Microsoft AI Cognitive Services initiative, Project Florence is focused on developing a next-generation visual recognition framework and advancing computer vision technologies. LEARN MORE

COMMUNITY DISCUSSION

- **November 3 | Article:** *Warsaw U, OpenAI and Google's Hourglass Hierarchical Transformer Model Outperforms Transformer Baselines.* READ MORE
- **November 14 | Article:** *Reflections of Foundational Models.* READ MORE
- **May 2020 | Article:** *OpenAI and Uber create Virtual Petri Dish to find the best AI model for a task.* READ MORE, PREPRINT (PDF)

- **May 2020 | Article:** *OpenAI begins publicly tracking AI model efficiency.* READ MORE

EVENTS

- Recent talks from the BigScience collaboration:
  - **July 28| BigScience Episode 1:** Co-located with the second European Laboratory for Learning and Intelligent Systems Natural Language Processing Workshop. WATCH
  - **September 30 | BigScience Episode 2:** Co-located with the 14th International Conference on Natural Language Generation. WATCH
- **November 24 | Panel:** Large-scale neural platform models: Opportunities, concerns, and directions (Microsoft Research). WATCH

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