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Paul S. Scotti, Ph.D

scottibrain@gmail.com | www.paulscotti.com | www.medarc.ai/fmri

EXPERIENCE & EDUCATION

Stability AI Nov. 2023 – Present

Head of NeuroAI, Principal Investigator of the MedARC Neuroimaging & AI Lab (https://medarc.ai/fmri)

Published in NeurIPS and ICML, reconstructing seen images from fMRI brain activity using contrastive learning and denoising diffusion models. Fine-tuned the Stable Diffusion XL model to attain SOTA unCLIP performance.

Princeton Neuroscience Institute

Visiting research scientist Nov. 2023 – Present

Postdoctoral research associate (PI: Dr. Ken Norman) Apr. 2022 – Nov. 2023

Collaborating with Princeton labs on open research AI projects, training a foundation model on large-scale brain data.

GRANTS, FELLOWSHIPS, & AWARDS

- Princeton Innovation Fund for New Industrial Collaborations ($250,000)
- NSF Graduate Research Fellowship ($102,000)
- OSU University Fellowship ($26,316)
- Luther Rice Undergraduate Research Fellowship

PRESS

- Cognitive Revolution Podcast on mind reading
- Established industrial partnership between Stability AI x Princeton University to support neuroAI
- Our work mentioned in US Senate hearing on AI and Intellectual Property

PROJECTS (curated selection)

MindEye2: Shared-Subject Models Enable fMRI-To-Image With 1 Hour of Data

First-author publication in ICML 2024

- SOTA performance in reconstruction of seen images from fMRI brain activity
- Novel approach to shared-subject modeling enables high-quality results with 40x less training data
- Fine-tuned Stable Diffusion XL to support SOTA unCLIP performance

AI Alibis: Multi-Agent LLM Murder Mystery

Short interactive browser game demonstrating how novel prompting techniques bypass the pink elephant problem in LLMs

Reconstructing the Mind's Eye: fMRI-to-Image with Contrastive Learning and Diffusion Priors

First-author publication in NeurIPS 2023 (spotlight)

- Novel soft contrastive loss inspired by knowledge distillation
- Large-scale FAISS retrieval from brain embeddings to image embeddings nearest neighbor

EduCortex: Browser-Based 3D Brain Visualization of fMRI Meta-Analysis Maps

First-author publication in JOSE 2020

- Browser-based visualization of human brain to help users understand brain anatomy and functional specialization

Enhanced Inverted Encoding Modeling for Neural Reconstructions

- Python package used for neuroimaging stimulus reconstructions (PyPI)

SKILLS

- Python, PyTorch
  - neural networks, large language models, denoising diffusion models, encoding/decoding models
  - multi-node / multi-gpu distributed training (DDP, FSDP, Deepspeed)
- HPC computing / cloud computing
  - Slurm HPCs, Amazon ECS, Microsoft Azure
  - created webdataset format large-scale datasets stored on AWS s3 to support large-scale model training
- Computational neuroimaging (fMRI and behavioral)
  - designing experiments, collecting data, pre-/post-processing; SPM, FSL, AFNI, Nipype, Freesurfer, Fmriprep
- Front-end web development (HTML, CSS, JavaScript, Node.js, React)