Dhananjay Ashok

PhD Student at the University of Southern California

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FOCUS: Factually Grounded Language Model and Multimodal Model Systems

EDUCATION

Ph.D. in Computer Science, University of Southern California (Ongoing)
Researching Factual Grounding in LLMs and Multimodal LMs
Supervisor: Prof. Jonathan May

M.Sc. in Machine Learning, Carnegie Mellon University
Researched Distribution Shift and LLMs for Science
Supervisor: Prof. Zack Lipton

B.Sc. CS and Econ, University of Toronto

Researched Robotic Control and Neurosymbolic-AI
Supervisors: Prof. Animesh Garg, Prof. Vijay Ganesh

AWARDS

- Annenberg Fellowship, USC
- Valerie Brooks Scholarship
- William Kingston Scholarship

SKILLS

- Algorithms, Data Structures
- Python, C/C++, Bash,
- PyTorch, TensorFlow, Deep Learning
- HuggingFace, Accelerate, DeepSpeed, Natural Language Processing
- Multi-GPU Parallelization and Quantization of LLMs
- Fine-tuning + LoRA, Tuning LLMs via Reinforcement Learning
- Independent research

DEBATE

First speaker from a developing country to be judged Best Speaker at the World School Debating Championship

INDUSTRY EXPERIENCE

Applied Science Intern, Amazon Core Search (Summer 2025)
- Developed a state-of-the-art zero-shot dense retrieval algorithm
- Applied method to internal data, operating at an Amazon Marketplace scale

Machine Learning Research Engineer, Apple Inc. (Summer 2023)
- Developed systems for automated understanding and processing of log files
- Implemented MultiAgent RL Solutions to 6G Cellular Networking Problems

Accelerate AI Research Intern, Borealis AI (Summer 2022)
- Developed new algorithms for gradient free training of Neural Networks
- Created GDSolver, the first Hybrid Solver+GD Framework for Fine-tuning NNs

RESEARCH EXPERIENCE

CUTELABNAME, Prof. Jonathan May (2024-Current)
- Investigating problems related to Factual Grounding of Language Model systems

AutonLab, Prof. Barnabas Poczos (2022-2024)
- Researched Scientific Error Correction, developing a method that outperformed GPT3 despite having only 0.1% as many parameters

ACMI Lab, Prof. Zachary Chase Lipton (2022-2024)
- Created a State-of-the-art Few Shot NER System using LLMs
- Developed a principled Distribution Shift detection and mitigation method

Vector Institute, Prof. Animesh Garg (2019-2022)
- Applied methods from causal discovery for robotic manipulation and control

SELECTED FIRST AUTHOR PUBLICATIONS

A Little Human Data Goes A Long Way: **ACL 2025**
- Observed that performance declines associated with replacing human generated data with synthetic data is most chronic only after crossing 90% replacement.
- Showed that the best way to use synthetic data is in conjunction with humans

Language Models Can Predict Their Own Behavior: **NeurIPS 2025**
- Established that the internal states of LLMs can robustly predict how they will behave on particular inputs and developed an algorithm to extract precise signals.
- Used these signals to construct precise and trustworthy early warning system for jailbreaking, alignment failures, low confidence responses, reasoning gaps etc.

Can VLMs Recall Factual Associations From Visual References? **EMNLP 2025**
- Curated a controlled benchmark to isolate and establish the failure of Vision Language Models to recall factual information from visual representations.
- Investigated the internal activations using methods from mechanistic interpretability to identify distinct patterns associated with degenerative behavior
- Created a diagnostic system to alert users in cases where the VLM has failed to properly access information regarding entities present in the input image