Sachin Grover

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Professional Experience

- **Research Scientist, SRI, PARC**
  Palo Alto, CA, USA *August 2022 – June 2024*
  - Created a demo for Natural Language Understanding using LLMs for embodied agents.
  - Created an end-to-end pipeline for training a medium sized GPT. Wrote various fine-tuning techniques to evaluate them on standardized datasets.
  - Created LLM based function calling demos for carbon capture using StreamLit API.
  - Recently won, DARPA AIE, EMHAT, to design evaluation methods for digital twins and AI agent teaming based on LLMs. Developing the system for Pandemic, a multi-agent collaborative game.
  - Worked on DARPA project SAIL-ON, to design and develop Open-world AI based agent and evaluated it on Polycraft (Minecraft based simulator), Cartpole++ (3D inverted pendulum) and Angry Birds game.
  - DARPA KMASS for Knowledge MAnagement at Speed and Scale to develop a dynamic knowledge base for 20,000 documents and design update methods to scale to millions of documents.
  - Part of industrial projects with Panasonic to evaluate smart factory development for their production plants.

- **Applied Scientist Intern, Amazon** Mentor: Ross McGowan
  Alexa NLP team, Pittsburgh, USA *May 2021 – August 2021*
  - Learn knowledge graph for text data using Graph Convolutional Networks.
  - Incorporate the learned embedding for intents and slots for improving end-to-end SLU model accuracy.
  - Showed upto 2% relative improvement compared to baseline model for internal Amazon dataset.

- **Applied Scientist Intern, Amazon** Mentor: Grant Strimel
  Alexa NLP team, Pittsburgh, USA *May 2018 – August 2018*
  - Design post processing techniques to decrease memory size of cloud based NLP models.
  - Implemented an optimization model to to decrease memory footprint by 25% without effecting accuracy.
  - Patent – Compression of machine learned models. (Feb, 2020) U.S. Non-Provisional Patent Appl. No. 16/355,338.

- **Research Assistant** Advisor: Prof. Subbarao Khambampati
  Arizona State University *October 2016 – July 2022*
  - Understand the effects of Human-in-the-loop scenarios on current AI techniques. Design seamless interaction techniques for cooperation between human and robotic agents.
  - **Languages used**: Python

- **Research Assistant** Advisor: Prof. Kurt VanLehn
  Arizona State University *January 2014 – May 2018*
  - Developed TopoMath, an Intelligent Tutoring System, used to teach arithmetic to high-school students.
  - Developed Dragoon, an Intelligent Tutoring System, which teaches students modeling dynamic systems.
  - **Languages used**: JavaScript (Dojo framework based on AMD), PHP and MySQL.

Education

- **Arizona State University, Tempe** Advisor: Prof. Subbarao Kambhampati
  Ph.D. in Computer Science & Engineering *Completed July 2022*
- **Arizona State University, Tempe** Advisor: Prof. Kurt VanLehn
  Master of Science in Computer Science & Engineering *Completed December 2015*

Publications & Patents

- **Grover, S.**, Mohan, S. (2024), A Demonstration of Natural Language Understanding in Embodied Planning Agents using LLMs. ICAPS Demonstrations.
- Piotrowski, W., Chao, J., **Grover, S.**, Stern, R., Mohan, S., Douglas, J. (2024). Open World Adaptation in High Fidelity Simulated Environment. ICAPS Demonstrations.
- Piotrowski, W., **Grover, S.**, Perez, A. (2024). Nyx: Domain Independent PDDL+ planner for Classic Control Problems. ICAPS, KEPS workshop. Also submitted to KR conference.

- Piotrowski, W., Stern, R., **Grover, S.**, Mohan, S. (2024). Self-monitoring Adaptive AI Agents Operating in Open Worlds. AAAI Spring Symposium on User-Aligned Assessment of Adaptive AI Systems.
- Mohan, S., Piotrowski, W., Stern, R., **Grover, S.**, Kim, S., Le, J., Sher, Y., de Kleer, J. (2023). A Framework for Agents Operating in Open, Mixed Discrete-Continuous Worlds. AI Journal, Special track on open worlds in AI Journal.
- Piotrowski, W., Sher, Y., **Grover, S.**, Stern, R., Mohan, S.(2023). Heuristic Search For Physics-Based Problems: Angry Birds in PDDL+. ICAPS, Application Track. Also presented at SOCS 2023.
- **Grover, S.**. (2022). Human-Aware AI Methods for Active Teaming. Arizona State University, Ph.D. Thesis.
- Agarwal, M., Chakraborti, T., **Grover, S.**, Chaudhary, A. (2021). COVID-19 India Dataset: Parsing Detailed COVID-19 Data in Daily Health Bulletins from States in India. *Neurips MLPH* Workshop.
- Strimel, G., **Grover, S.** (2021).Compression of machine learned models. U.S. Patent No 10,970,470. Washington, DC: U.S. Patent and Trademark Office.
- **Grover, S.**, Smith, D., Kambhampati, S. (2020). Model Elicitation through Direct Questioning. *ICAPS XAIP*.
- **Grover, S.**, Sengupta, S., Chakraborti, T., Prasad, A.M., Kambhampati, S., (2020). RADAR: Automated Task Planning for Proactive Decision Support. HCI (Special Issue on Unifying Human Computer Interaction and Artificial Intelligence). Also presented at *ICAPS, Journal Track*.
- Strimel, G., **Grover, S.** (2020).Compression of machine learned models. U.S. Patent No 10,558,738. Washington, DC: U.S. Patent and Trademark Office.
- **Grover, S.**, Sengupta, S., Chakraborti, T., Prasad, A.M., Kambhampati, S., (2019). iPass: A Case Study of the Effectiveness of Automated Planning for Decision Support. *NDM*, 2019
- Chakraborti, T., Sreedharan, S., **Grover, S.** and Kambhampati, S., (2019). Plan Explanations as Model Reconciliation–An Empirical Study. arXiv preprint arXiv:1802.01013. *HRI*, 2019.
- **Grover, S.**, Chakraborti, T. and Kambhampati, S., (2018). What can Automated Planning do for Intelligent Tutoring Systems?. *ICAPS SPARK*
- **Grover, S.**, Wetzel, J. and VanLehn, K., (2018, June). How Should Knowledge Composed of Schemas be Represented in Order to Optimize Student Model Accuracy?. In *AIED* (pp. 127-139). Springer, Cham.
- VanLehn, K., Chung, G., **Grover, S.**, Madni, A. & Wetzel, J. (2016). Learning science by constructing models: Can Dragoon increase learning without increasing the time required? *International Journal of Artificial Intelligence in Education*, pp. 1-36
- VanLehn, K., Wetzel, J, **Grover, S.** & van de Sande, B. (2016). Learning how to construct models of dynamic systems: An initial evaluation of the Dragoon intelligent tutoring system. *IEEE Transactions Learning Technology*
- **Grover, S**. (2015). Online Embedded Assessment for Dragoon, Intelligent Tutoring System. Arizona State University, Master's thesis.
- Wetzel, J., VanLehn, K., Chaudhari, P., Desai, A., Feng, J., **Grover, S.**, Joiner, R., Kong-Silvert, M., Patade, V., Samala, R., Tiwari, M. & van de Sande, B. (2016). The design and development of the Dragoon intelligent tutoring system for model construction: Lessons learned. *Interactive Learning Environments*, pp.1-21.
- **Grover, S.**, Arora, K., Mitra, S.K., Text Extraction from Document Images Using Edge Information, In *2009 Annual IEEE India Conference* (pp. 1-4). IEEE

Research Experience & Relevant Projects

- **Planning for Intelligent Tutoring Systems** Advisor: Prof. Subbarao Khambampati
  YoChan Lab Project, ASU *June 2017 – March 2018*
  - Learning 2.0 paradigm is about providing personalized technologies for growing population.
  - Incorporated planning techniques, to give feedback through active participation of the planner, create personalized curriculum, and create dynamic group using estimated student models.
- **Online Assessment of Student Learning - Dragoon** Advisor: Prof. Kurt VanLehn
  Masters Thesis, ASU, R, Matlab, JavaScript, PHP *November 2014 – November 2015*
  - Dragoon is a tutoring software which teaches students to build models of dynamic systems.
  - Implemented *Bayesian Knowledge Tracing* (BKT), to assess student's work in Dragoon problems.
  - Implemented algorithm to calibrate BKT and use problem difficulty, to improve accuracy.
- **System of equation solver** Advisor: Prof. Kurt VanLehn
  Dragoon Lab, JavaScript *May 2017 – July 2017*
  - Implemented API for matrices with operations like inversion using LU decomposition.
  - Implemented Newton Raphson method to create a solver for system of equations, which is being used in TopoMath tutoring system.