Minkyu Choi

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Education

The University of Texas at Austin — Austin, TX
Ph.D. in Electrical and Computer Engineering — *Expected: 2026*

- *Research Interest: Video Generation, Neuro-symbolic AI, Multi-modal Reasoning and Understanding*
- *Advisor: Dr. Sandeep Chinchali*

Georgia Institute of Technology — Atlanta, GA
M.S. in Analytics — *2018 – 2021*

Baruch College — New York, NY
B.B.A. in Computer Information System — *2014 – 2017*

Publication

1. **M. Choi***, S. P. Sharan*, S. Shah, H. Goel, M. Omama, and S. Chinchali. "Neuro-Symbolic Evaluation of Text-to-Video Models using Formal Verification". *arXiv preprint (arXiv:2411.16718 Under Review)*

2. M. Omama, P. Li, H. Goel, **M. Choi**, B. Chalaki, V. Tadiparthi, H. N. Mahjoub, E. M. Pari, and S. Chinchali. "Memory-Efficient Image Retrieval with Text-Enhanced Compression". *Preprint (Under Review)*

3. **M. Choi**, H. Goel, M. Omama, H. Goel Y. Yang, S Shah, and S. Chinchali. "Towards Neuro-Symbolic Video Understanding". 2024 European Conference on Computer Vision (ECCV24), Accepted for oral presentation.

4. **M. Choi***, Y. Yang*, N. Bhatt*K. Gupta, S. Shah, A. Rai, D. Fridovich-Keil, U. Topcu, and S. Chinchali. "Privacy-Constrained Video Streaming". *Preprint (Under Review)*

5. A. Narayanan, P. Kasibhatla, **M. Choi**, P. Li, R. Zhao, and S. Chinchali. "PEERNet: An End-to-End Profiling Tool for Real-Time Networked Robotic Systems". 2024 International Conference on Intelligent Robots and Systems (IROS24).

6. S., Jonathan, S. Wanna, **M. Choi**, and M. Pryor. "Temporal and Semantic Evaluation Metrics for Foundation Models in Post-Hoc Analysis of Robotic Sub-tasks". *arXiv preprint (arXiv:2403.17238 Under Review)*

7. T. T. Walker, J. S. Ide, **M. Choi**, M. Guarino, and K. Alcedo. "Multi-Agent Reinforcement Learning with Epistemic Priors". 2023 9th International Conference on Control, Decision and Information Technologies (CoDIT23)

8. **M. Choi***, M. Filter*, K. Alcedo, T. T. Walker, D. Rosenbluth, and J. S. Ide. "Soft actor-critic with inhibitory networks for retraining UAV controllers faster". 2022 International Conference on Unmanned Aircraft Systems (ICUAS22)

Experience

Staff Research Engineer — 2021 - Present
Lockheed Martin, *Austin, TX*

- Led and managed $5M+ in research projects, including 1) RF signal generative modeling (Diffusion, GAN, etc.), 2) advanced mission planning applications using LLMs and RAG, and 3) multi-agent modeling and systems leveraging multimodal input
- Authored multi-million-dollar research proposals as Principal Investigator for the Defense Advanced Research Projects Agency (DARPA), Air Force Research Laboratory (AFRL), and other agencies, focusing on advanced AI topics
- Architected a cognitive system for UAS by integrating a Computer Vision module and Cognitive Signal Processing system; developed RL agents for Man-Unmanned Teaming ISR tasks and designed an in-house distributed RL training engine
- Developed a radar target classification system for automated inference of behaviors and intentions across radar tracks

Graduate Research Assistant — 2023 - Present
The University of Texas at Austin, *Austin, TX*

- Worked on research focused on neuro-symbolic AI and multimodal reasoning and understanding; trained a large-scale multimodal neural network to develop a neuro-symbolic computer vision system, publishing 6+ papers.

AI/ML Solution Architect — 2019 - 2021
Chief Digital and Artificial Intelligence Office, *Washington, D.C.*

- Architected and implemented DoD AI/ML infrastructure by designing the foundation for the AI/ML platform, formulating AI/ML Ops strategy with DevSecOps best practices, and developing end-to-end pipelines to automate data engineering and model development across multi-cloud environments (AWS, Azure) for various security levels
- Developed AI/ML applications for critical DoD missions, including predictive maintenance for the US Army and Marine Corps, AI implementation across 5+ mission areas, and a data strategy for the Joint Common Foundation (JCF), while establishing enterprise-wide data governance and secure multi-cloud ingestion pipelines aligned with DoD CIO and CDO strategies

Data Engineer 2017 - 2018

TechField LLC, *Atlanta, GA*

- Managed +10 consultants in the big data and data science team, supporting data engineering and machine learning system projects; worked with Fortune 500 clients to accomplish a goal of the data pipeline project for the batch or streaming processing and achieved a cost reduction and efficient processing time

Data Analyst Intern 2016 - 2017

Argus Information and Advisory Services, *White Plains, NY*

Technical Skill

AI/ML Framework: PyTorch, PyTorch Lightning, TensorFlow, Jax, OpenCV, OpenAI Gym, Ray
DevOps & MLOps: AWS, Azure, CI/CD, AirFlow, Podman, Docker, Kubernetes (K8), KubeFlow, MLFlow, Cuda
Data Engineering: Hortonworks, Cloudera, RDBMS, NoSQL (Cassandra, HBase, Elasticsearch, DynamoDB, MongoDB), Spark, Kafka, Flink, Flume, MapReduce, Hive, Sqoop, Oozie, Airflow, Nifi, Kibana
Programming: Python, R, Scala, Java, LaTeX

Presentation

[2024] "Towards Neuro-Symbolic Video Understanding" at the 18th European Conference on Computer Vision, *Milano, Italy*
[2024] "End-To-End Multi-Agent Generative Reward Pipeline (MA-GRPL)" at Lockheed Martin AI Summit, *Remote, USA*
[2024] "Research Spotlight Presentation)" at LG AI Tech Connect, *San Francisco, CA*
[2023] "Roadmap to Becoming an Artificial Intelligence Researcher" at Korea Polytechnic University, *Incheon, S. Korea*
[2023] "Incorporating Terrain into Mission Planning using LLM Agents" at Lockheed Martin AI Summit, *Remote, USA*
[2023] "Deploying Field of View Control RL agent to UAS" at Lockheed Martin AI Summit, *Remote, USA*

Service

[Reviewing] ICRA (2024), CASE (2024)
[Mentoring] Chungbuk National University (2024)
[Military] US Army Reserve, MOS: 92A (2014–2020)

Award

[2023-25] Cockrell School of Engineering Fellowship, *The University of Texas at Austin*
[2024] First Place, General SaaS Section, 4th Ideathon. *Primer Sazze Partners*