

# Minkyu Choi

AI RESEARCH SCIENTIST · AI RESEARCH ENGINEER

Austin, TX

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## Education

### The University of Texas at Austin

Ph.D. in Electrical and Computer Engineering (Advisor: [Sandeep Chinchali](#))

2023 - Present

Austin, TX

- **Research Interest:** Neuro-symbolic AI, Computer Vision, Computer Vision Assurance, Video Understanding
- **Courses:** Probability and Stochastic Processes, Generative Models in ML, Grounded NLP, Adv. Computer Vision

### Georgia Institute of Technology

M.S. in Analytics

2018 - 2021

Atlanta, GA

- **Courses:** Deep Learning, Simulation, Big Data Analy, Computational Data Analy, High-Dimensional Data Analy

### Baruch College

B.B.A in Computer Information System

2014 - 2017

New York, NY

## Publication

### Conference

- [CoRL] **M. Choi\***, Y. Yang\*, N. P. Bhatt\*, K. Gupta, S. Shah, A. Rai, D. Fridovich-Keil, U. Topcu, and S. Chinchali. "Privacy-Constrained Video Streaming." (Under Review) 2024
- [ECCV] **M. Choi**, H. Goel, M. Omama, Y. Yang, Sahil Shah, and S. Chinchali. "Towards Neuro-Symbolic Video Understanding." [Project][PDF][Code] 2024
- [IROS] 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." [PDF][Code] 2024
- [CoDIT] T. T. Walker, J. S. Ide, **M. Choi**, M. Guarino, and K. Alcedo. "Multi-Agent Reinforcement Learning with Epistemic Priors." [PDF] 2023
- [ICUAS] **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." [PDF] 2022

### Preprint

- [arXiv] 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." [PDF] 2024

## Experience

### Lockheed Martin

Senior AI Research Engineer

2021 - Present

Remote, USA

- Led research and development of LLM applications for tactical operations and planning, investigating advanced techniques (e.g., task decomposition, planning, reflection, memory, symbolic extraction); developed a real-time Retrieval Augmented Generation (RAG) system featuring multimodal sensory inputs and collaborative tools to support human operators in dynamic environments; managed +10 engineers
- Architected intelligent cognitive system with RL agents for UAS, integrating Computer Vision System and Cognitive Signal System; developed agents for Man and Unman Teaming (MUM-T) ISR tasks; designed in-house RL distributed training engine
- Developed a neuro-symbolic radar target classification system for automated inference of behaviors and intentions across radar tracks

### Chief Digital and Artificial Intelligence Office

Subject Matter Expert in AI

2019 - 2021

Washington, D.C.

- **Architected and implemented DoD AI/ML infrastructure:** Designed the foundation for DoD's AI/ML platform, formulated AI/ML OPS strategy incorporating DevSecOps best practices, and developed sustainable end-to-end data and machine learning pipelines to automate data engineering and model development processes across multiple cloud environments (AWS, Azure) for various security levels. [JCF101] [JCF Video]
- **Developed AI/ML applications in critical DoD missions:** Supported US Army and Marine Corps' predictive maintenance initiatives, provided technical guidance on AI/ML implementation across 5+ DoD Mission Areas, and developed the data strategy for the Joint Common Foundation (JCF), showcasing expertise in applying AI solutions to diverse military operations.
- **Established enterprise-wide data governance and security frameworks:** Designed and developed multi-cloud data ingestion pipelines to meet stringent data security requirements across different network levels, produced an Enterprise Data Governance Framework for the Joint Artificial Intelligence Center (JAIC) aligned with DoD CIO and CDO data strategies, ensuring cohesive and secure data management. [News]

## TechField LLC

2018 - 2019

Big Data Engineer & Data Scientist

Atlanta, GA

- Managed +10 consultants in the big data and data science team, supporting projects such as a cloud data pipeline solution and an automated application platform with a machine learning system
- Worked with Fortune 500 clients in order to accomplish a goal of the data pipeline project for the entire batch and streaming processing and achieved a cost reduction and efficient processing time

## Endpoint Clinical

2018

Data Engineer

Remote, USA

- Worked as a back-end database developer of IRT system – providing integrated solutions of clinical trials (e.g., patient record, drug supply management, and site management) in order to provide technical solution for large size of pharmaceutical clients

## Argus Information and Advisory Services

2016 - 2017

Data Analyst Intern

White Plains, New York

- Developed strategies, best practices, and technical requirements to improve data manipulation and analysis by querying millions of rows of data across multiple databases, using MS SQL Server to identify and resolve data issues, and leveraging large sets of data to define benchmark models to enable client's objectives to better manage data and drive insights

## Research Project

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|------|--|-------------|
| 2024 | <b>Diffusion Based Adaptive Video Compression [PDF]</b> , The University of Texas at Austin                | Austin, GA  |
| 2019 | <b>Rule-based Phenotyping vs Unsupervised Phenotyping via Clustering</b> , Georgia Institute of Technology | Atlanta, GA |
| 2018 | <b>Mortality Prediction – Classification</b> , Georgia Institute of Technology                             | Atlanta, GA |

## Award

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| 2023-25 | <b>Cockrell School of Engineering Fellowship</b> , The University of Texas at Austin | Austin, TX |
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## Presentation

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### LG AI Tech Connect

2024

Research Spotlight Presentation

San Francisco, CA

### Korea Polytechnic University

2023

Roadmap to Becoming an Artificial Intelligence Researcher

Incheon, S. Korea

### AI Summit at Lockheed Martin

2023

Incorporating Terrain into Mission Planning using LLM Agents

Remote, USA

Deploying Field of view Control RL agent to UAS

## Skill

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<b>AI/ML</b>	Pytorch, TensorFlow, Jax, OpenCV, OpenAI Gym, Ray
<b>Dev &amp; ML Ops</b>	AWS, Azure, Docker, Podman, Kubernetes, CI/CD, Airflow, Kubeflow
<b>Data Engineering</b>	Hortonworks, Cloudera, RDBMS, NoSQL (Cassandra, HBase, Elasticsearch, DynamoDB, MongoDB), Spark, Kafka, Flink, Flume, HDFS, MapReduce, Hive, Sqoop, Oozie, Airflow, Nifi, Kibana
<b>Programming</b>	Python, R, Scala, Java, LaTeX

## Service

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**Reviewing** ICRA (2024), CASE (2024)