

# Mohammadreza Kouchaki

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## SUMMARY

Network AI Engineer and Computer Science graduate student with hands-on experience developing AI and machine learning solutions for wireless network modeling, optimization, and performance analysis in 5G/O-RAN and cloud environments. Built LLM-nased Agents, RAG, AI-assisted automation pipelines using Python, AWS, Kubernetes, and Prometheus/Grafana, including reinforcement learning (RL) and large language model (LLM)-driven control loops for resource scheduling and anomaly detection in large-scale network systems.

## EXPERIENCE

### Mississippi State University

*Network Intelligence & Optimization R&D (Graduate Research) (2022 – Present)*

- **Architected an LLM-based Meta-Controller AI Agent** interacting with RL agent for anomaly-aware network scheduling, enabling failure analysis, self-optimization, and adaptive resource allocation.
- **Fine-tuned LLMs** using supervised fine-tuning (SFT), PPO, and DPO for network anomaly detection and scheduling tasks; hands-on experience with RAG, LangChain, vLLM, Hugging Face, and API integrations.
- **Developed a production-grade near real-time anomaly detection** system using custom Transformers and RNN autoencoders, reducing false positives in network intrusion detection; leveraged GANs and VAEs to generate synthetic time-series data for model robustness.
- **Deployed Reinforcement Learning agents** within a Kubernetes-based O-RAN environment to dynamically optimize radio resource scheduling, resulting in a measurable improvement in network throughput and latency reduction.
- **Developed federated neuroevolution** framework to optimize Deep Reinforcement Learning xApps in O-RAN, integrating evolutionary algorithms for policy optimization using distributed computing.
- **Built Network Performance Analyzer Testbed** for evaluating xApp performance in O-RAN networks, facilitating in-depth analysis of AI-driven resource allocation and security mechanisms.
- **Developed Python-based data pipelines** to ingest and clean high-volume network traffic batch and time-series data.

## OFFICIAL CERTIFICATIONS

- AWS Certified Solutions Architect – Associate
- AWS Certified Machine Learning – Specialty
- Certified Kubernetes Application Developer (CKAD)
- OCI Generative AI Certified Professional
- OCI Certified Data Science Professional
- Cisco Certified Network Associate (CCNA)

## Tools & Systems

- **Programming:** Python (TensorFlow, Keras, PyTorch), MATLAB
- **ML/Deep Learning:** Supervised & Unsupervised learning, Reinforcement Learning, DRL, LLM, Autoencoders, Transformers, CNN, LSTM, GNN
- **System:** Linux, Kubernetes, Docker, CI/CD (GitHub Actions), CUDA, SDR
- **Visualization:** Tableau, Plotly, Grafana
- **Cloud Platforms:** AWS, GCP, Azure, Oracle
- **Data Processing:** NumPy, SciPy, Pandas
- **Database:** SQL (MySQL, PostgreSQL), NoSQL
- **Backhaul/RAN:** 4G, 5G, O-RAN, Equipment(Huawei RTN, OTN, E-band, Ericsson MINI-LINK, BTS 3900)
- **IP/MPLS:** PRTG, SolarWinds NPM, Wireshark, **NMS/OSS:** Huawei U2000/T2000

## EDUCATION

Mississippi State University - Computer & Electrical Engineering (Major), Computer Science (Minor)