Ahmad Khan

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Education

ETH Zürich
M.Sc. in Computer Science *Sep. 2023 - Nov. 2025*
- Specialization in Artificial Intelligence
- Minor in Data Management Systems

Carnegie Mellon University
B.Sc. in Computer Science (3.93/4.0) *Aug. 2017 - May. 2021*
- Minor in Business Administration
- Awarded Qatar Foundation Scholarship

Work Experience

IBM Research
Zürich, Switzerland
Machine Learning Engineer (Master's Thesis) *May. 2025 - Present*
- Investigating aggressive model compression for on-premise deployment of custom LLMs for clients.
- Created a novel quantization framework utilizing <5 full precision weights with ternary quantization.
- Evaluated the effectiveness of the framework on various models, involving setting up efficient fine-tuning and evaluation pipeline.

IVIA Lab - ETH Zürich
Zürich, Switzerland
Software Engineer (Part-time) *Aug. 2024 - May 2025*
- Built backend capabilities and set up devOps pipeline from the ground up for a system to connect students with industry partners for thesis/internships.
- Enabled authentication and authorization including SSO for ETH users through Keycloak integration across the stack.

Qatar Computing Research Institute
Doha, Qatar
Software Engineer *Oct. 2021 - Sep. 2023*
- Built MVP solutions for various commercialization efforts of research projects at QCRI.
- Mentored and managed 6 interns.

Allama - GPT based chatbot using Langchain on Qatar ministry data
- Set up a pipeline to automatically crawl, parse, embed, and populate data into vector DB to keep chatbot up to date.
- Configured CI/CD using Azure Pipelines and Docker Swarm.

JUDO - Web-based interactive traffic microsimulation based on SUMO
- Built a web-based visualization system for SUMO simulations, including various performance critical features such as visual clustering of vehicles, frame dropping, and intelligent memory management to avoid buffering, taking fps from <3 to 30 when scaling to over 1 million vehicles.
- Dockerized QarSUMO and created an API to access it to easy deployment and scalability.

SIHA - platform to extract, unify, and provide health data from various wearable devices
- Took ownership of the SIHA mobile app, migrating it to null-safety and BLOC architecture pattern, updated screen designs to match new brand identity, and developed new Team Competitions feature.
- Implemented a YAML interface for TASRIF, an open-source tool for processing time-series data.
- Created an on-premise deployment script for SIHA that pulls all the relevant images from MS azure, allowing deployment without loading sensitive code.

Quickbyte
Doha, Qatar
Software Engineer *Dec. 2020 - June. 2021*
- Part of the founding engineering team at Quickbyte, a food delivery startup in Qatar.
- Built an admin dashboard for managing restaurants and menus using React and NodeJS to streamline previously manual processes, removing developer interventions entirely.
- A/B tested and implemented group ordering and chat based ordering features.
- Created indexes in MongoDB to optimize DB queries, reducing query times by 12x.

Computional Biology Lab, Carnegie Mellon University
Doha, Qatar
Research Engineer *Oct. 2018 - Aug. 2020*
- Built a dashboard for visualizing data generated from breast cancer databases using React, NodeJS and MongoDB fulfilling a deliverable for the lab's research grant.
- Compiled a database on Minor Intron Containing Genes (MIGs) to help investigate their role in regulating oncogenes, including computational prediction of how minor intron retention impacts protein synthesis using an automated process.
- Developed an RNA-Seq pipeline that performs read alignment, mapping, and calculates gene abundance for analyzing lab-generated data.

Projects

Quriosity: Analyzing Human Questioning Behavior and Causal Inquiry through Curiosity-Driven Queries

SUBMITTED TO EMNLP FOR REVIEW. PREPRINT AT HTTPS://ARXIV.ORG/PDF/2405.20318   *2025*
- Investigated human querying behavior across different channels including Human to Search Engines, LLMs, and other humans.
- Analyzed causal nature of these queries and trained a router based system of fine-tuned models to answer causal queries.

Loss of Plasticity in Recurrent Models

CODEBASE AVAILABLE AT HTTPS://GITHUB.COM/MAK2508/RECURRENT-LOP   *2025*
- Explored the existence of Loss of Plasticity in Recurrent models and evaluated the effectiveness of mitigation strategies.

Exploiting Backdoor Vulnerabilities in Communication Based Multi-Agent Reinforcement Learning

CODEBASE AVAILABLE AT HTTPS://GITHUB.COM/MAK2508/RECURRENT-LOP   *2024*
- Explored backdoor vulnerabilities in communication based CMARL systems, specifically a traffic environment.
- Showed that a trigger can be inserted inside a message sent by agents in communication-based MARL.

A Probalistic Implementation of Rational-Speech-Act Framework for Presupposition

CODEBASE AVAILABLE AT HTTPS://GITHUB.COM/MAK2508/PROB_RSA   *2024*
- Developed the first probabilistic Rational Speech Act (RSA) model of presupposition triggering using the Pyro prob- abilistic programming framework, simplifying posterior distribution computations for more complex interactions.
- Formally proving a faster linear runtime, compared to previous exponential runtime.

Honors & Awards

2021	**Andrew Carnegie Society Scholar**, Carnegie Mellon University	*Pittsburgh, U.S.A*
2021	**Qatar Campus Scholar**, Carnegie Mellon University	*Doha, Qatar*
2021	**Student Leadership Award with Distinction**, Carnegie Mellon University	*Doha, Qatar*
2020	**Best Design award**, CarnegieApps Hackathon	*Doha, Qatar*
2019	**First Place**, Oman Collegiate Programming Competition	*Muscat, Oman*
2019	**First Place**, CMU Programming Competition	*Doha, Qatar*
2019	**First Place**, Qatar University Cybersecurity Competition organized by Thales	*Doha, Qatar*
2018	**Best Technology Prize**, CarnegieApps Hacakthon	*Doha, Qatar*
All Semesters	**Dean's Honors List**, Carnegie Mellon University	*Doha, Qatar*

Leadership

Carnegie Mellon University   *Doha, Qatar*

HEAD ORIENTATION COUNSELOR   *Jun. 2020 - Aug. 2020*
- Designed and delivered online orientation for 130 incoming students, centralizing resources for academic and campus life.
- Led the first cross-campus orientation event to facilitate broader Education City community building, partnering with 3 other universities.
- Introduced Tartan Bridge Buddies initiative: 1:1 pairing between first-years and upperclass mentors.
- Planned and facilitated training for 70 orientation volunteers focused on effective communication and student support.

Carnegie Mellon University   *Doha, Qatar*

TRIP LEADER FOR ENVIRONMENT SERVICE PROJECT   *Sep. 2019 - Mar. 2020*
- Managed $\sim$ $22k budget; led 9-student service-learning project under Tartans Without Borders initiative.
- Drove campus engagement through outreach campaigns; achieved 60 applications (record for TWB).
- Led pre-departure training on ethical volunteering and teaching practices.

Carnegie Mellon University   *Doha, Qatar*

CS SOCIETY PRESIDENT   *Aug. 2019 - May. 2020*
- Hosted alumni talks and social events to strengthen the CS community.
- Co-led a GameDev hackathon in partnership with alumni.

Carnegie Mellon University   *Doha, Qatar*

THOUGHT CLUB VICE-PRESIDENT   *Aug. 2019 - May. 2020*
- Led monthly discussions on various topics including ethics, philosophy, and social issues.