Aref **Moqadam Mehr**

Developing Drivers for Next-gen Robotic-Automated Lab | Software Engineer at Automata

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I am an avid learner and technology enthusiast. As a Software Engineer, my area of specialization is in backend technologies. I am passionate about collaborating on projects that involves Machine Learning, Data Science, and DevOps problems. My joy comes from designing systems and architecture that produce clean and maintainable products that can last long beyond my involvement.

Professional Experiences

2023-Present — Sr. Software Engineer, Automata Tech, London, UK link

- Automata provides automated robotic solutions for laboratories to streamline lab processes and reduce the need for human intervention.
- My primary contribution involved the development of high-level drivers for the lab instruments and establishing integration with the backend software.

Python | C# | gRPC | Socket Programming | System Design

2022-2023 — Software Engineer, Sprout AI, London, UK link

- Sprout AI provides advanced machine learning technologies to insurance companies to allow them to process and respond to their claims instantly.
- My focus was to provide the link between the AI core and our clients by writing the necessary automation logic, APIs, and caching system for our algorithm-engine. Fine-tuning them, and uploading and maintaining them on AWS.

Python | FastAPI | Terraform | AWS | PostgreSQL | SQLAlchemy | PyDantic

2018-2020 — Tech Lead, Cafe Bazaar, Tehran, Iran link

- As a Tech-Lead, one of my significant achievements in Cafe Bazaar was leading the system redesign and re-implementation, which increased systems weekly uptime from around 80% up to 99.99%, mainly by employing Micro-service architecture on Kubernetes. Besides, we reduced the system response time by more than 50% for approximately 8,000,000 requests per day.
- As an extra curriculum activity, I have volunteered in the technical recruiting team and interviewed over 120 applicants in the course of two years.

2017-2018 — Sr. Software Engineer, Cafe Bazaar, Tehran, Iran

- As a Software Engineer at Cafe Bazaar, I contributed to the App-Search product, which aimed to offer users a list of relevant apps based on their search inputs. One of my main achievements was the query-prediction system that suggests phrases in the search box. One of the significant challenges we encountered was effectively managing the high volume of queries and ensuring that they were properly cached to improve the product's speed and efficiency.

Python | Django | Kubernetes | docker | RabbitMQ | Redis | PostgreSQL | MongoDB | Grafana

2015-2016 — Team Leader, Biped-Lab, Qazvin, Iran link

- In my role as a team leader, I oversaw a team of 15 members who participated in that year's RoboCup competition. One of the hurdles that we faced was effectively collaborating between individuals with diverse skill sets. To address this, I adopted the use of XP and Scrum methodologies within the team, which proved to be highly successful. As a result, this approach was adopted by several other labs within my university.

2011-2015 — Research Assistant, Biped-Lab, Qazvin, Iran

- As a research assistant, I worked on Computer Vision tasks to detect and recognize objects in the soccer field environment. The primary challenge was the limited onboard processing power on our robots. Consequently, I was able to gain valuable experience in optimizing my algorithms and code syntax to enhance their efficiency and performance.

C++ | System Design | Computer Vision | Machine Learning

2015-2016 | **Co-Founder and Developer, Negar Afarin Barajin**, Qazvin, Iran link

- In the NAB we have developed an automated 3D reconstruction engine that utilizes photogrammetry techniques to create 3D models of an object. And a simple web app enabled the users to access the engine.

C# C++ JavaScript Photogrammetry 3D Modeling 3D Visualization

Skills

Core skills	Python (6 years), Machine Learning (3 years), C/C++ (5 years), C#
Backend	FastAPI, Django, Flask, AWS, Docker, Kubernetes, Nginx, Terraform
Frontend	React.js, Vue.js, ES6 jQuery, Bootstrap
Database	MySQL, SQLAlchemy, PostgreSQL, Redis, MongoDB, Celery, RabbitMQ, ElasticSearch
Machine Learning	PyTorch (2 years), Keras (3 years), TensorFlow, PySpark, OpenCV

Projects

Gesture Recognition via Spike-Convolutional Neural Networks (Master Thesis) document 2020

In my master project, I have solved Human Gesture Recognition using Spiking Neural Networks. SNNs are a branch of neural networks that mimics the biological cell, which has electrical pulse output instead of continuous real-valued numbers. The data for this research gathered using DVS sensors instead of conventional Cameras. Working on this project enabled me to implement the essential tools for neural networks from scratch since traditional tools such as Keras or PyTorch do not support SNNs initially.

Computer Vision CNN PyTorch Keras

Autonomous Vehicle code demo 2019

This project was part of a hackathon event held by Cafe Bazaar. In this project, we tried to control a modified vehicle to drive autonomously by providing the steering input. We achieved this goal by using a pre-trained ResNet as the base structure and training an MLP network for decision-making. The ResNet created a semantic-segmentation image from the input camera, and then the MLP outputs the corresponding steering outputs. As a result, the car drove a few miles in an open street.

Computer Vision ResNet CNN TensorFlow

Microservices Refactor 2018

During my experience in CafeBazaar, initially, my team had to manage a monolithic system that led to issues due to its complexity. The solution involved splitting it into microservices and deploying them on Kubernetes instances, which proved challenging due to architectural and decision-making issues. Ultimately, we refactored and implemented each service and released it piece by piece. For each part, we added caching, monitoring, and alert systems.

Python Django Kubernetes Redis ProtoBuf

Fast Soccer Ball Detection with Deep Learning (Bachelor Thesis) code 2017

This project aimed to improve object recognition accuracy in soccer fields for NAO bipedal robots in RoboCup. I have developed modules to recognize objects such as the soccer ball using Convolutional Neural Networks. The challenges in this project included accounting for varying light conditions and the dynamic nature of the soccer field. Another crucial factor was the limited processing power available on the robots.

C++ Python Keras

3D Image Reconstruction Engine3D website 2016

We created an automated 3D reconstruction engine using photogrammetry techniques and a web app surrounding it, that could be publicly accessible. Our goal was to create a reconstruction engine to generate 3D models for objects on any scale. We have modeled several large-scale 3D maps via aerial photography, such as the map of the ancient city of Masuleh, in Iran.

Python Photogrammetry 3D Modeling JavaScripts

Honors and Awards

2019	**The Winning Team** of the Summer School Robotic Challenge - ETH Zürich link
2011-2016	Awarded for **Research Scholarship** from QIAU
2015-2017	Technical and Organization Committee Member of RoboCup Iran Open
2014	Make it up to Quarter Final in World RoboCup Championship
2014	**3rd** place of RoboCup German Open
2012‘13‘14	**1st** place of RoboCup Iran Open
2012‘14	Recipient of Iran Open Innovation Award

Education

2018-2020	**Master of Computer Science, Shahid Beheshti University**, Tehran, Iran
Summer 2019	**Robotics Summer School, ETH Zürich**, Zürich, Switzerland
2011-2017	**Bachelor’s of Computer Engineering, Qazvin Azad University**, Qazvin, Iran