Reza Karbasi

Robotic Engineer

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Summary

Experienced in different fields of robotics from path planning and decision making all the way to control and perception. Participated in developing various Python and C/C++ programs and deploying them on diverse platforms like servers and embedded systems. I have a master's in **AI and Robotics** and I'm passionate about multidisciplinary projects to expand my horizons.

Work Experience

Algorithm Engineer — *SoftwareMotion*
Apr. 2023 - Present — *Remote, China*

SoftwareMotion is a company that develops Advanced Driver Assistance Systems(ADAS). I worked there as an Algorithm Engineer in the Decision Planning and Control(DPC) team.

- Implemented a CI/CD pipeline (using **GTest**), including many unit tests and integration tests, for our implementing codes to reduce the on-field tests. In this regard, I compiled an Autosar-based codebase with customized CMake.
- Designed a comprehensive visualization app (using **PyQT**) for various functionalities, with a focus on AEB and ACC, incorporating BEV (Bird's Eye View) plots for enhanced system analysis. This tool reduced debugging time significantly.

ML Engineer — *Hara AI Company*
Jun. 2022 - Mar. 2023 (10 months) — *Tehran, Iran*

Hara AI is a B2B company specializing in AI services for businesses, including OCR and STT. As an ML engineer in the Call Center team, I contributed to the development of AI-driven solutions for call centers, such as quality control for operators and sentiment analysis on the calls.

- As part of my responsibilities at the company, I implemented a network to assign tags to audio files, such as gender, age, sentiment, and satisfaction. Additionally, I developed a filter to detect frequent interruptions by the operator, as well as poor voice quality.
- Assessing the company's STT model in various real-world conditions, such as applying different levels and types of noise to the sound, helped identify its vulnerabilities related to gender, age, and signal quality. This analysis enabled the development of more robust AI-driven solutions for call centers, ultimately improving customer experiences.
- By implementing **MLflow** workflow, we established a standard for deep learning workflows, enabling us to track experiments, capture experiences, and create referable documents.

Student Researcher — *KN2C Robotic Lab*
May 2015 - Sep. 2017 (2 years and 4 months) — *Tehran, Iran*

KN2C Robotic Lab is a robotic lab that works on various robotic devices and projects from UAVs to Small Size football leagues. I was there as an electronic and control engineer in the SSL team (Small Size League).

- Designer and maintainer of the main boards of our soccer players. The board had an Xmega processor and 4 ST processors to drive motors. We applied higher-level commands (wheel velocities) on each BLDC motor using a PID controller.
- Implementing a **Kalman Filter** on the estimated position of the ball (based on the camera) to achieve a more stable strategy during gameplay. Besides, I implemented a PID controller on our robot to control the wheel's velocity.
- Developing a GUI to monitor the robots' condition during the game, connected to the main transmitter board to receive data and display essential flags for each player.

Designer of a Trader Bot — *QDM*
Apr. 2019 - Jan. 2020 (10 months) — *Tehran, Iran*

QDM was a company that worked for 10 years in stock market trading. I was responsible for designing an automatic trader bot using RL.

- I made a trader bot in **Metatrader** and set the parameters using the Deep Q network in Python. Metatrader and the RL algorithm were connected by a socket. I published a minor version of the app in this medium blog and this Github repository. As I described there, I implemented the procedure using socket communication between Metatrader and Python. Besides, there's a multithreading arcitecture in the python app.

Embedded Software Engineer *Raiwan*
Dec. 2017 - Jun. 2019 (19 months) *Tehran, Iran*

Raiwan specializes in designing and building IoT and industrial manufacturing and laboratory devices. I was the main responsible for designing **Inner Hospital Communication** devices and involved in **Taxi Payment Device** project.

Skills

Programming C++(Advanced), Python(Advanced), C(Advanced), Java(Intermediate), Matlab(familiar)

Frameworks Pytorch(Advanced), Tensorflow(Advanced), Mlflow(Intermediate), Simulink

Hardware Keil, Stm32Cube, ARM, XMega, Altium, Soldering

Databases SQL, InfluxDB, MongoDB

Misc Git, Linux, Bash Scripting, CMake, Docker, REST API, Software Testing, Confluence, Jira, Django

Notable Projects

Image Captioning

- Using **Resnet18** and **LSTM** model in an image captioning application with pytorch framework. It was one of the projects of the Deep Learning course.

Localizing of A Robot

- In this project, we aimed to localize the Anki robot in a **Gazebo** environment using **particle filter** and extended Kalman filter (**EKF**) algorithms. This was our final project for the Advanced Robotics Course.

Estimating the Velocity of a device Using its position and acceleration

- In this project, we aimed to predict accurate acceleration, velocity, and position values using GPS and an accelerometer. We implemented a **Kalman Filter** to filter the sensor values and estimate the device's velocity. I used an **Arduino DUE** to collect the data and applied the filter in **MATLAB**. This project was the final assignment of the Instrumentation course.

Online Analysis of News in Soroush App

- This was the final project of the Big Data Course. In this project we were supposed to crawl Soroush app(a social medium in Iran) and make an analysis on the public channels to be shown to the admin. I was responsible for the web crawling of Soroush messenger (I did it with **Selenium**) and establishing data transmission through **Kafka**. We stored the codes in this repository.

Education

University of Tehran (It has the best ranking in Iran) Tehran, Iran
MS in Artificial Intelligence and Robotics; ***GPA: 18.86/20*** *Sep. 2019 - Jan. 2022*

- Notable Courses: Advanced Robotics, Deep Neural Network, Machine Vision, Reinforcement Learning

K. N. Toosi University of Technology(top 5 universities in Iran) Tehran, Iran
BS in Electrical Engineering (major in Control Engineering); ***GPA: 17.4/20*** *Sep. 2014 - Jan. 2019*

- Notable Courses: Pattern Recognition, Modern Control, Digital Control, Advanced Programming(OO)

Honors & Certificates

Iran Open Robocup: Ranked 5th in 2016's Small Sized League (SSL)

Snake League: Ranked 3rd in 2019's Snake League in Nasir Cup

Certificate in Database Principles and SQL Server: Link to the certificate