**Reza Karbasi**  
**Robotic Software Engineer**  
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# Summary

Robotics Software Engineer with 4+ years of experience in developing software and designing AI solutions for real-world problems. Holds a master’s degree in AI and Robotics, and boasts proficiency in programming with Python and C. Experienced in collaborating with diverse teams, both academic and international.

# Work Experience

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| **Automotive Software Engineer** | [*SoftwareMotion*](https://sw-motion.tech/) |
| *01/2023 - Now* | *Remote, China* |
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* + Implemented a **CI/CD** pipeline in **Gitlab** with **GTest** for the Autosar-based codebase, reducing on-field testing through automated unit and integration tests by 30%
  + Developed a **PyQT** visualization tool for AEB and ACC systems, integrating BEV plots to drastically reduce debugging time. Processed MF4 and CAN signals (BLF, DBC) for enhanced vehicle issue diagnosis.
  + Evaluated and integrated advanced path planning solutions, such as lattice-based and  [Apollo](https://github.com/ApolloAuto/apollo)’s EM planner. Also, developed and implemented obstacle avoidance algorithms with **DP** and **A\*** techniques, validated through a custom Python-based simulator.

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| **Machine Learning Engineer** | [*Hara AI Company*](https://hara.ai/) |
| *10/2021 - 01/2023* | *Tehran, Iran* |
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* + Automated audio file categorization by gender and age using Google’s  [YamNet](https://www.tensorflow.org/hub/tutorials/yamnet) (in the TensorFlow framework) as the backbone, fine-tuning the model with the company’s labeled data. Developed a custom metric to accurately evaluate classification accuracy, with equal emphasis on precision and recall.
  + Building a filter for detecting operator interruptions and poor voice quality using VAD algorithms.
  + Deployed **MLflow** to facilitate experiment tracking.
  + Conducted an in-depth assessment and visualization of the company’s Speech-to-Text (**STT**) models under varied real-world conditions (such as noise and reverbation) to pinpoint vulnerabilities.

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| **Robotic Researcher** | [*KN2C Robotic Lab*](https://aras.kntu.ac.ir/kn2c/) |
| *05/2015 - 09/2017* | *Tehran, Iran* |
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* + Enhanced robot performance in KN2C’s SSL team by designing, soldering, and maintaining Xmega and ST processor boards for motor control and precise **PID** calibration.
  + Enhanced ball detection accuracy by implementing a **Kalman Filter** with the Armadillo library in **C++**.

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| **Embedded System Engineer** | [*Raiwan*](https://www.linkedin.com/company/raiwan/?originalSubdomain=ir) |
| *12/2017 - 06/2019* | *Tehran, Iran* |
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* Designed an *Inner Hospital Communication System*, incorporating STM32 and ESP32 board design and programming, and established communication using RS485 devices. Custom-machined the device frame with CNC to match project specifications.

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| **Designer of a Trader Bot** | *QDM* |
| *04/2019 - 01/2020* | *Tehran, Iran* |
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* Developed a Metatrader trading bot using a technical strategy, enhanced by a **Deep Q Network** in **PyTorch**. Leveraged a socket connection for real-time data and analysis of historical data from 2007-2019 in Metatrader. Documented a version on this  [Medium blog](https://medium.com/@a.rz.karbasi/enhancing-trading-performance-through-deep-q-network-hyper-parameter-tuning-7475e2f11a06) and this  [Github repo](https://github.com/rezakarbasi/RL-agent-trader).

# Notable Projects

* Implemented an image captioning application using **Resnet18** and **LSTM** models in **PyTorch**.
* Localized Anki robot in a **Gazebo** environment using **particle filter** and **EKF** algorithms.
* Implemented an Adaptive Neuro-Fuzzy Inference System (**ANFIS**) algorithm in **Pytorch** for EEG signal classification, facilitating video game control through brain activity.
* Developed a gym environment with a Deep RL **A3C** agent to optimize station power settings and maximize coverage area while minimizing conflicts.

# 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

# Skills

**Programming** C++(Advanced), Python(Advanced), C(Advanced), Matlab(familiar)

**Frameworks** Pytorch(Advanced), Tensorflow(Advanced), Mlflow(Intermediate), Simulink(familiar), ROS(familiar)

**Libraries** Numpy, Pandas, Matplotlib, OpenCV

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

**Misc** Git, Linux, Docker, Software Testing, GTest

# Education

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| **MSc. in AI and Robotics** |  | Tehran University |  | GPA: 18.8/20 | 2019-2022 |
| **BSc. in Electrical Engineering** |  | Khaje Nasir University |  | GPA: 17.4/20 | 2014-2019 |