Reza Karbasi

Robotic Engineer

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WORK EXPERIENCE

SoftwareMotion   Remote, China
Algorithm developer   *Apr. 2023 - Present*

- Codebase analysis (**C/C++**) for advanced automotive functionalities, encompassing **ADAS** levels 2+ and 3.
- Code compilation and Python-based simulation, using data from diverse sources to assess system performance.
- Conducted in-depth research on **path planning** algorithms, exploring **POMDP** approaches like belief tree and the Apollo-developed em-planner.
- Developed a path planner using Dynamic Programming (**DP**) techniques.
- 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.

Hara Company   Tehran, Iran
ML Engineer   *Jul. 2022 - Mar. 2023*

- Evaluating STT models in various real-world conditions and utilizing visualizations for data-driven insights of our model.
- Implementing speaker profiling network and identifying speaker attributes and attitudes in a conversation.
- Designing models for call center automation such as Detecting conversation interruptions, pacing, and emotions.
- **Highlights**: STT, VAD, mlflow, linux, tensorflow, Jira, Visualization

QDM   Tehran, Iran
Designer of a trader bot   *Apr. 2019 - Jan. 2020*

- Design trade strategies in Metatrader
- Setting hyperparameters using Reinforcement Learning (DQN)
- Published materials: medium blog and github repo
- **Highlights**: Python , MQ4 , Deep Q Network , RL , Ichimoku , Backtrader , Multithread, C

Raiwan   Tehran, Iran
Electronic Engineer , device designer   *Dec. 2017 - Jun. 2019*

- Inner Hospital Communication: Designed and developed communication boards for in-hospital use. I used STM32 microcontrollers for efficient data transfer and connectivity.
- Taxi Payment Device: Led the mechanical design and development of a taxi payment device. Programmed ESP32 for secure and reliable payment processing.
- **Highlights**: stm32f103 , stm32Cube , Altium designer , PCB , keil , CNC, C

KN2C   Tehran, Iran
Electronic and Control Engineer   *May 2015 - Sep. 2017*

- Supervisor: Prof. Hamid D. Taghirad
- Designed and manufactured small-sized football player robots.
- Participated in the SSL league of RoboCup, contributing to the development and performance of robotic soccer players.
- Notable Projects:
- Robot Electronics Design: Led the design and development of robot electronic components, including control boards and connectivity systems.
- Kalman Filter Implementation: Applied Kalman filter for precise position estimation and filtering.
- Desktop Monitoring Program: Designed a desktop monitoring program for real-time robot tracking and control.
- Electronic Team Leadership: Led an electronic team, overseeing project development, board design, and soldering tasks.
- **Highlights**: Xmega , PCB design , PID controller , Kalman filter , Soldering , FPGA, C, C++

Academic Experiences
Teaching Assistant

- **Deep Neural Networks**: I served as a TA in *Spring 2022*, working with Dr. Reshad Hosseini

- **Introduction to Reinforcement Learning**: I served as a TA in *Fall 2021*, working with Prof. Majid Nili Ahmadabadi
- **System Identification**: I served as a TA in *Spring 2020*, working with Prof. Babak Nadjar Araabi
- **Pattern Recognition**: I served as a TA in *Fall 2022 , Fall 2019 , Fall 2017*, working with Prof. Hamid Abrishami Moghaddam

Aras Academy   Tehran, Iran
Instructor   *Jun. 2021 - Aug. 2021*
- Supervisor: Prof. Hamid D. Taghirad
- Course: Introduction to Reinforcement Learning
- Link to the website: http://aras.kntu.ac.ir/education/aras-academy/

Skills

Programming Python, Matlab, C, Java, Assembly, Bash Scripting, C++

Frameworks Pytorch, Tensorflow, Mlflow, Metatrader, Android

Libraries Numpy, Pandas, Matplotlib, Plotly, Selenium

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

DataBases SQL, InfluxDB, MongoDB

Misc Docker, Git, Confluence, Jira, Linux, Django, REST API

Projects

A Project of Deep Neural Networks Course
- Implementing Segnet neural network for **Semantic Segmentaion**
- Using pytorch framework to implement the model.

A project of Deep Neural Networks course
- Using Resnet18 and LSTM model in an image captioning application with pytorch framework.

A project of Deep Neural Networks course
- Implenting encoder section of a **transformer** network and use it for a translation application.

Iran's National Elites Foundation   Oct. 2022 - Oct. 2023
- The project was to find a trajectory in a big searching space for an aircraft.
- There was lots of limitations to fly and surveillance devices that would have been avoided.
- Used a Graph based search in the space to accomplish the task.
- **Highlights**: networkx, A*, DP, RCS, docker, flask, REST

final project of Advanced robotic course
- Localizing Anki robot in **Gazebo** using **particle filter** and **EKF**

an academic project   Feb. 2021 - Aug. 2021
- Our project was to use **EEG signals** to play a simple video game
- My task was to implement an Adaptive neuro fuzzy inference system (**ANFIS**) algorithm due to the classification task
- **Supervisor** : Dr. Mohammadreza Abolghasemi Dehaqani

An Academic project   Sep 2021
- Make a gym environment for simulating the results alongside a deep RL agent (**A3C**) to set each station's power some how reduce their conflict while maximizing the coverage area.

final project of Reinforcement Learning course
- Implementing a **Deep Q network** architecture to trade on historical data of Tehran Stock Exchange

final project of Instrumentation course
- Predicting accurate values of acceleration, velocity and position using GPS and Accelometer.
- Used **Arduino DUE** to collect the data and implementing Kalman filter

A project in Big Data Course
- Our aim was to extract data from the Soroush app for analysis and dashboard creation using big data methods.

- Personally responsible for web crawling Soroush messenger data utilizing **Selenium** and establishing data transmission through **Kafka**. This crucial component ensured data flow to downstream project segments.

A freelance project in Ponisha Nov. 2020
- Finding a dataset about surgical results and analyzing the results of surgeries for certain medical centers and patients

final project of social network course May 2020
- Our team was supposed to find customer's opinion about a product using the product's comments
- I crawled Digikala website using **Selenium** and implemented a simple sentiment analysis on the comments to make a KPI for each product
- Link to the crawler repository

Awards & Achievements

High Honors Degree: Awarded to Bachelor alumni who have graduated with a GPA greater than or equal to 3.50 by Boğaziçi University. (Jul 2023)

Education

UT(University of Tehran) Tehran, Iran

M.S. in Computer Engineering - Artificial Intelligence; ***GPA: 3.58/4.00*** *Sep. 2019 - Jan. 2022*

Notable Courses

KNTU(Khajeh Nasir Toosi University of technology) Tehran, Iran

B.S. in Electrical Engineering - Control Engineering; ***GPA: 3.58/4.00*** *Sep. 2014 - Jan. 2019*

Notable Courses