Mohammad Pasande

Tehran- Iran

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Education

University of Tehran (UT) *Tehran, Iran*

M.Sc. in Electrical Engineering (Control Major) *2019 - 2022 (Expected)*

- GPA: 17.05/20.00 (3.65/4.00)
- Thesis: Online Learning for Large Scale Mixture Model.(In Progress)
- Supervisors: Dr. Reshad Hosseini & Dr. Babak N. Araabi

Imam Khomeini International University (IKIU) *Qazvin, Iran*

B.Sc. in Electrical Engineering (Control Major) *2014 - 2018*

- GPA: 17.25/20.00 (3.64/4.00)
- Thesis: Robust PID Controller Design using Kharitonov Theorem and Stability Boundary Locus (SBL) Method
- Supervisor: Dr. Mehdi Rahmani

Interested Area

- Optimization
- Machine Learning Theory
- Reinforcement Learning
- Game Theory
- Causality

Skills

Computer Skills	**Proficient**:Python, MATLAB. **Intermediate**: R, Git, LaTeX
Hardware Des. Language (HDL)	**Proficient**: VHDL. **Intermediate**: Verilog.
Software	MATLAB, Spyder, Google Colab, RStudio, Visual Studio Code, ISE Design Suite, TexStudio, Microsoft Excel, Word, PowerPoint.
Languages	• Farsi: Native • English: Proficient - **TOEFL Overall: 98** (R: 25 - L:28 - S: 22 - W: 23).

Academic Projects

M.Sc. Thesis: Implementation, modification and visualization of following subjects as object oriented code in python (more specifically using Pytorch & NumPy) and MATLAB:

- Manifold Optimization,
- Stochastic Optimization,
- Gaussian Mixture Models and their properties,
- Flow-Based Models (Deep Neural Networks)

B.Sc. Thesis: Research on following topics and implementing codes in MATLAB:

- Kharitonov Theorem and Robust Control
- Stability Boundary Locus and Convex Optimization

Machine Learning: In-course exercises (using Python libraries such as NumPy, SciPy and Scikit-Learn) on:

- Density Estimation,
- Classifiers,
- Dimensionality Reduction Technique,
- Clustering & Unsupervised Learning

Deep Learning: All studies were implemented with the TensorFlow (Keras) framework and Numpy library in needed cases,

- A comparative study on ARIMA, RNNs and CNN-LSTM for time series forecasting
- Supervised learning and Transfer Learning of CNN for image classification
- Implementation of Sequential Models for text generation
- DCGAN model for image generating
- Deep Reinforcement Learning (Deep Q-Learning) on frozen lake game

Statistical Inference: Practical implementation of following topics using R as processing and visualization tool:

- Linear Regression model, Logistic Regression model
- Multiple parametric & Non-parametric statistical tests

Numerical Optimization: (In Progress) Implementation of following tasks using Pytorch framework:

- First & Second order Methods,
- MetaHeuristic Methods,
- Quasi Newton Methods,
- Linear and Nonlinear Conjugate Gradient Method,
- Gauss-Newton & Levenberg-Marquardt Method.

System Estimation & Identification: Conceptual and practical practices (Using MATLAB) on:

- Least Squares (LS) and its extensions,
- Prediction error method (PEM),
- MLP, RBF
- Fuzzy and NeuroFuzzy models,
- Nonlinear Optimization methods.

Cognitive Neuroscience:

- Semantic Priming,
- Prediction of personal morality index,
- Implementation of a cognitive task using PsychoPy,
- Development of behavioral model for Iowa gambling task,
- Lie detection using EEG signal,
- (basic knowledge of FMRI data and FSL).

Game Theory: In-course exercises(using MATLAB) on:

- Simple-form and Extensive-form game,
- Bayesian games,
- Nash bargaining Solution in cooperative games,
- Learning in Games,
- Evolutionary games and mimimax Q-Learning in games.

Optimal Control and Nonlinear Systems:

- Simulation of a single neuron behavior
- Simulation of a 2-lane train passage, linearization, and design LQR optimal controller
- Simulation of a single connection servo motor crankshaft, linearization, and design state feedback compensator
- Modeling and optimal controller design for a flying object.

Publication

Journal Papers

UNDER PREPARATION

- **Pasande M**, Hosseini R, Araabi BN. (2023). Stochastic First-Order Learning for Large-Scale Flexibly-Tied Gaussian Mixture Model. arXiv preprint arxiv 2212.05402

Selected Courses

M.Sc. Courses:

- NN & Deep Learning (17.0/20.0),
- Statistical Inference (18.8/20.0),
- System Est. & Identification (19.0/20.0),
- Game Theory (19.3/20.0),

B.Sc. Courses:

- Operation Research (19.0/20.0),
- Digital Control Systems (18.6/20.0),
- Modern Control Systems (17.5/20.0),
- Mechatronics (20.0/20.0)

Experience

Teacher Assistant

Iran

TA

2015 - 2022

- ***UT 2019 - 2022***
  - M.Sc Courses
    - System Estimation and Identification (Two semesters)
    - Neural Networks & Deep Learning (Three consecutive semesters)
    - Optimal Control
    - Statistical Inference
    - Game Theory
  - B.Sc Courses
    - Intelligent Systems (Cheif TA)
    - Linear Control System (Two semesters)
- ***IKIU 2015 - 2018***
  - B.Sc Courses
    - Basic Physics II
    - Numerical Mathematics
    - Circuit Theory I
    - Logic Circuit I & II
    - Linear & Digital Control System Lab

Algorithm Developer at SEDNA

Tehran, Iran

CONTROL & ML ENGINEER - PART TIME

August 2021– Present

- Due to the building's rules and regulations in Iran, the thermostats usually contain both power and control board together; hence the power board makes unwanted heat which disturbs the sensor's data. I came up with the idea of designing a test environment to model the distribution and model it using ML techniques. **(Sensorless Calibration)**
- Design desirable control routines for house temperature

Embedded Developer at INTELLICO

Qazvin, Iran

DESIGN AND DEVELOPMENT ENGINEER - PART TIME

May 2017 - April 2020

Design and implementation of logic circuits using VHDL on FPGAs

- INT2624M.(24bits - 8channels - 256 KSps - 512 MByte memory - portable - Data Logger) *2019*
- INT2724H (24bits - up to 16channels - up to 256 KSps - Data Logger) *2019*
- INT2224E (24bits - 2channels - up to 2.5 MSps- Data Logger) *2017*
- INT6716 (64channels - simultaneous- 10ns accuracy - Time difference measurement) *2018*

Freelancer

Tehran, Iran

DESIGN AND DEVELOPMENT ENGINEER

2016 - 2018

- Temperature and Humidity Index (THI) measurement and control of a dairy farm. *2018*
- Several practical DSP algorithms implementation on FPGA (such as FIR, MA,...) *2017-18*
- Distance detector mobile robot (dc motor identification & compensator) *2016*

Teaching

Iran

TEACHER

2015 - 2018

- Linear, Digital & Modern Control System using MATLAB
- Applied Design of logic circuit with FPGA using VHDL

Internship at BEHRAN Oil Company

Tehran, Iran

INTERN

June 2017–September 2017

- **Project during the internship:** Maintenance and reprogram of electrical and control enclosure for a palletizer

Honors

2019	**Ranked 10th and 11th**, in the Iranian university entry exam for master students of Bioelectrical engineering and Control of participants of the Iranian university entry exam
2018	**Ranked 3rd GPA**, among graduating students of EE-control major in B.Sc. at IKIU (class 2014)
2014	**Ranked within top 1.5%**, of 180000 participants of the Iranian university entry exam
2013	**Qualified for the second stage**, of physics student olympiad

References

- **Dr. Reshad Hosseini**, Assistant Professor, Department of Electrical and Computer Engineering, UT, Tehran, Iran, reshad.hosseini@ut.ac.ir .
- **Dr. Mehdi Rahmani**, Associate Professor, Department of Electrical Engineering, IKIU, Qazvin, Iran, mrahmani@eng.ikiu.ac.ir .
- **Dr. Ahmad Kalhor**, Associate Professor, Department of Electrical and Computer Engineering, UT, Tehran, Iran, akalhor@ut.ac.ir .