Erfan Panahi

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Objective

Seeking a PhD position in a dynamic platform where I can acquire new skills, broaden my knowledge, and apply my learning effectively.

Research Interests

- Wireless Communication
- Signal Processing
- Intelligent Systems
- Communication Systems
- Blind Source Separation
- Machine Learning
- Information Theory
- Optimization

Education

University of Tehran[1] **Sep. 2019 – Feb. 2024 (Expected)**

Bachelor of Science in Electrical Engineering — GPA: 18.72/20 [2] *(3.94/4)* *Tehran, Iran*

Thesis: "**Development of ECG signal board and its processing in order to arrhythmia detection**"

Advisor: Dr. Saeed Akhavan

National Organization for Development of Exceptional Talents (NODET) **Sep. 2016 – Sep. 2019**

Diploma in Mathematics and Physics - GPA: 19.38/20 (4/4) *Lorestan, Iran*

Honors and Awards

- **Ranked 2nd** in communication engineering at University of Tehran.
- Among **top 5%** of B.Sc. students in Electrical Engineering at University of Tehran.
- **Ranked 128th (top 0.1%)** among almost 165,000 participants in the Nation-wide Iranian University Entrance Exam in Mathematics and Physics, June 2019.

Experience

Research Assistant **Sep. 2022 – Sep. 2023**

Signal Processing Engineer – Hekimed *Tehran, Iran*

- Performing an internship under the supervision of Dr. Saeed Akhavan on processing ECG and PPG signals.
- Estimating vital parameters of human beings such as heart rate, SpO2, and blood pressure.
- Using machine learning methods in order to diagnose heart arrhythmia and classify its type.

Designing Incoherent Frames – University of Tehran *Tehran, Iran*

- Exploring Incoherent Frame Design in BSS Course (Instructor: Dr. Saeed Akhavan)
- Researching Incoherent Frame Design Methods.
- Developing Algorithm for Constructing Incoherent Frames in Research Article.

Summer Internship **June 2022 – Sep. 2022**

Biomedical and Signal Processing Engineer – University of Tehran *Tehran, Iran*

- Conducting research on the detection of heart abnormalities using 12-lead ECG.
- Developing a module for receiving ECG and PPG signals using MAX86150 and MAX3010x, and processing these signals to obtain vital parameters including SpO2, heart rate, blood pressure, and PQRST detection.

Teaching Assistant **Department of Electrical and Computer Engineering – University of Tehran**

- **Probability and Statistics** Spring 2021 – Spring 2022
  Instructor: Dr. Mohammad-Reza A. Dehaqani
- **Electromagnetics** Spring 2022
  Instructor: Dr. Mohammad Neshat
- **Signals and Systems** Spring 2022 – Fall 2022
  Instructor: Dr. Saeed Akhavan
- **Principles of Communication Systems** Fall 2022
  Instructor: Dr. Maryam Sabbaghian
- **Electrical Circuits I** Fall 2022
  Instructor: Prof. Jalil Rashed-Mohassel
- **Blind Source Separation** Spring 2023
  Instructor: Dr. Saeed Akhavan
- **Engineering Mathematics** Fall 2022 – Spring 2023
  Instructor: Dr. Mehdi Tale Masouleh
- **Electronics II** Fall 2022 – Fall 2023
  Instructor: Dr. Shahin Jafarabadi Ashtiani

Chief Teaching Assistant **Department of Electrical and Computer Engineering – University of Tehran**

- **Electronics I** Fall 2021 – Fall 2022
  Instructor: Dr. Zeinab Sanaee
- **Signals and Systems** Spring 2023
  Instructor: Dr. Saeed Akhavan
- **Principles of Communication Systems** Fall 2023
  Instructor: Dr. Maryam Sabbaghian
- **Intelligent Systems** Fall 2023
  Instructor: Dr. Reshad Hosseini

Technical Skills

Programming Languages: Python, MATLAB, C/C++, Verilog HDL, R, LaTeX
Frameworks & Libraries: Keras, TensorFlow, scikit-learn, Pandas, NumPy, Simulink
Hardware & System Design: Altium Designer, Arduino, ModelSim-Altera, Intel Quartus Prime, NI Multisim, PSPICE, ADLAM-PLUTO, Ansys HFSS, Cassy-Lab

Selected Courses

- **Signals and Systems:** 19.8/20 (4/4)
- **Principles of Communication Systems:** 19.1/20(4/4)
- **Digital Communication:** 19.1/20 (4/4)
- **Wireless Communication:** 18/20 (4/4)
- **Discrete-Time Signal Processing:** 19.1/20 (4/4)
- **Blind Source Separation (Graduate):** 18/20 (4/4)
- **Intelligent Systems:** 19.75/20 (4/4)
- **Linear Algebra:** 20/20 (4/4)
- **Engineering Mathematics:** 20/20 (4/4)
- **Numerical Computation:** 20/20 (4/4)
- **Antenna I:** 19/20 (4/4)
- **Probability and Statistics:** 18.56/20 (4/4)

Selected Course Projects

Signal Processing and Biomedical Engineering | *Python, MATLAB, Simulink* **GitHub**

- Implementing the **PCA** (Principal Component Analysis), **SVD** (Singular Value Decomposition), **CCA** (Canonical Correlation Analysis), **ICA** (Independent Component Analysis) methods.
- **Sparse signal processing** and sparse blind deconvolution.
- Implementing **Brain Computer Interface** (BCI) using **CSP** (Constraint Satisfaction Problem) and **LDA** (Linear Discriminant Analysis) classifier.
- **Separation of original signal** from its echoed one along calculating power and delay of the echo.
- Inspecting the damper system of a car with Simulink.
- Implementing the **DSP blocks**, **EEG** signal processing, and **eliminating echonoise** using Cepstrum and Fdatool.
- **Lagrange interpolation** and **LU decomposition**, **Histogram matching** and Modified QR decomposition.
- **Image processing** applications (image compression and denoising using SVD and FFT).

Intelligent Systems | *Python* **GitHub**

- **Optimization** methods, **Genetic algorithm**, and support vector machine (**SVM**).
- Supervised leaning (**decision tree**, **kNN**, and **metric-learning**).
- Unsupervised leaning (simple and intelligent **clustering**) and **Naive-Bayes**.
- Deep learning (**neural networks**, convolutional neural networks - **CNN**, **transfer learning**).
- **Reinforcement learning** (policy and value iteration, **Q-learning**), Introduction to **RL-GAN**, and **Deep Q-Learning**.

Communication Systems | *MATLAB, Simulink, ADLAM-PLUTO, Ansys HFSS, Altium Designer* **GitHub**

- Implementing the Amplitude, Phase, and Frequency Modulations (**AM**, DSB, SSB, VSB, **PM**/NBPM, **FM**/NBFM).
- **Information theory**, Inspecting **WSS** Processes and Implementing **digital** transmitter, receiver and **quantization**.
- Implementing a **digital communication systems** using different modulations and figuring the **BER plots**. (Hardware implementation using **ADLAM-PLUTO**)
- Implementing a base-station and analysing path-loss and shadowing effects, Implementing a **multipath** wireless channel.
- Implementing a narrow-band channel, a wide-band channel using **OFDM**, and wireless communication concepts (BPSK, QPSK, **PPM**, **diversity** methods, **space–time block coding**, **waterfilling**, **equalizing**, and **clipping** effect).
- Designing a Yagi-Uda **antenna** using **HFSS** and Altium Designer and practical measurement of its characteristics.

Extracurricular

- Membership of **IEEE student branch** at University of Tehran.
- Participation in several **journals** of IEEE student branch at University of Tehran.

Languages

- **English:** Professional Working Proficiency
  IELTS: Speaking (), Listening (), Reading (), Writing () — Overall:
- **Arabic:** Elementary Proficiency
- **Persian:** Native

References

Dr. Saeed Akhavan | *Assistant Professor — University of Tehran* **s.akhavan@ut.ac.ir**

Dr. Maryam Sabbaghian | *Associate Professor — University of Tehran* **msabbaghian@ut.ac.ir**

Dr. Reshad Hossieni | *Assistant Professor — University of Tehran* **reshad.hosseini@ut.ac.ir**

[1] Ranked 151-200 in electrical engineering according to QS World University Ranking in 2023.
[2] University and department average GPA are 15.62/20 and 15.10/20 respectively. (as of Sep. 2023)