Farbod Raeisi

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Education

B.Sc. Electrical Engineering | 2021 - 2025
K.N. Toosi University of Technology, Tehran, Iran
GPA: 3.5 of 4 (16.98/20) via 113 credits

High School Diploma (Mathematics and Physics) | 2017 - 2021
Allame Helli High School, National Organization for Development of Exceptional Talents(NODET)
GPA: 18.5 of 20

Research Interests

- Control Theory
- Robotics
- IoT
- System Identification
- Cognitive Neuroscience
- Aeronautics
- Deep Learning & ML
- Biomechatronic
- Power Control Systems

Publications

- F. Raeisi, Dr. M. Delrobaei," Predicting Mind Wandering During SART Tasks Using Video Processing and Reaction Time Analysis" (Bachelor's Thesis, to be submitted to conference)

Research Experience

Mechatronic Laboratory September 2023 – *present*
Researcher | Under supervision of Dr. Mehdi Delrobaei
Working on a research paper about assessment of mind wandering using visual signals.

SBMU Neuroscience Research Center (NRC) August 2024 – *present*
Research Assistant | Under supervision of Dr. Mahdi Aliyari-Shorehdeli
Assisting in addressing LFP data acquisition challenges from rat brains to support neuroscience research initiatives.

Fault Detection & Identification Laboratory (FDI) August 2023 – March 2024
Research Assistant | Under supervision of Dr. Mahdi Aliyari-Shorehdeli
Part of a team analyzing NHTS data for a master's project, aimed at refining airbag performance prediction systems by evaluating American car crash sensor data.

Internships and Summer Schools

Neuromatch Academy | Computational Neuroscience Program Summer 2023
- Gained hands-on experience in computational neuroscience, analyzing the Steinmetz dataset. Collaborated with an international team on data analysis techniques

Machine Learning and Image Processing Intern | Fard Iran Inc. Summer 2022
- Contributed to developing a car plate recognition system, using machine learning algorithms and image processing to improve accuracy.

Teaching Experience

Linear Control Theory Course September 2024 - present
Prof. Hamidreza Taghirad

Advanced Programming Course September 2024 - present
Hossein Yekta Moghadam
Probability and Statics Course October 2022 – February 2023
Dr. Bahare Akhbari

Selected Projects

Advanced Control and Simulation of a Robotic Arm Utilizing LQR Optimization Techniques
- Implemented LQR optimization to design an efficient control system for a robotic arm. The system's dynamics were modeled in SolidWorks, and simulations were run in MATLAB Simulink to test and refine performance.

Rotational Inverted Pendulum System Simulation and Control
- Created state-space, bond graph, and Simscape simulations for a ball and beam system, with MATLAB model identification.

Design and Implementation of State Controller for Propellant Spacecraft System
- Conducted a detailed analysis of propellant spacecraft systems, deriving state equations, evaluating controllability and observability, and implementing state feedback and LQR control strategies.

Assessing Choice Certainty as a Predictor of Performance Accuracy in Mice Using the Steinmetz Dataset
- Focused on decoding neural signals to explore how certainty in decision-making correlates with performance accuracy across different brain regions. This experience enhanced my understanding of computational neuroscience and research methodologies.

Development and Application of a Fuzzy Logic System for Analyzing Production Costs and Sales Forecasting of Multi-Product Operations
- Designed a fuzzy logic system to predict production costs and sales rates for three products across multiple companies and locations, improving forecast accuracy and operational efficiency.

Implementation of Synchronous Machine Current Prediction Using MLP Neural Network
- Used MATLAB neural networks to predict synchronous machine current based on factors like bar current and power factor, testing various architectures to find the best neuron configuration.

Load Flow Analysis and Contingency Assessment of a 13-Bus Power System Using DIgSILENT
- Used DIgSILENT software to conduct AC and DC load flow analyses on a 13-bus power system, evaluating the impact of contingencies like line and generator outages. The analysis offered valuable insights into system performance and reactive power constraints under various scenarios.

Automated Vending Machine Simulation Through Digital Circuit Design Techniques Using Proteus
- Designed and simulated an automated vending machine for two chocolate types using Proteus. Developed a state table, state diagram, and optimized the circuit with flip-flops to handle 1-cent, 2-cent, and 4-cent coins, ensuring accurate display of the entered amount and proper functionality.

Skills

Artificial Intelligence
- Machine Learning
- Computer Vision
- Deep Learning(CNN)
- Convolutional Neural Networks

Software
- SolidWorks
- Altium Design
- Arduino IDE
- Proteus
- SPSS
- PSpice
- COMSOL Multiphysics
- CodeVision AVR

Programming Skills

Programming Languages and Tools:
- Python
- C/C++
- Assembly
- html / CSS
- SQL

Specialized Libraries & Frameworks:

- PyTorch
- Scikit-learn
- OpenCV

Microcontrollers

- ESP32 Microcontrollers
- RaspberryPie

MATLAB

- System identification toolbox,
- Neural network fitting
- Simscape
- Simulink
- Fuzzy Logic Toolbox
- PID Tuner App

Award & Honors

- Ranked 15th (top 10%) out of 150 students in the K. N. Toosi University of Technology, based on GPA and 3rd in control focused students
- Admitted to National Organization for Development of Exceptional Talent

Volunteer Experience

- **Executive Committee Member |** The 3rd International Conference on Electrical Machines and Drives (ICEMD 2023)
- **Executive Committee Member |** The 6th International Conference on Millimeter Wave Terahertz Technologies (MMWATT 2023)
- **Photographer |** IEEE Cultural Branch Iran Section member at K.N. Toosi University of Technology
- **Mentor |** Open Doors Day for Highschool Students at Mechatronics Lab – August 2024
- **Fundraising Participant |** Fundraiser for Flood Relief Victims in Western Iran 2017

Language Proficiency

- English: Full professional proficiency
  Academic IELTS band score 7.5 (Listening: 8.0 Reading: 8.5 Speaking: 7.5 Writing: 6)
- Persian: Native

Courses & Certificate

OpenCV Bootcamp September 2024

- OpenCV

Python for Data Science and Machine Learning Bootcamp August 2024

- Udemy

Signal Processing Problems, solved in MATLAB and in Python August 2024

- Udemy

Applied Electronics for Robotics June 2023

- ARAS (Advanced Robotics and Automated System) | Hi-Tech Robotic Solutions Group

Introduction to the Internet of Things and Embedded Systems August 2023

- Coursera

Computational Neuroscience September 2023

- Neuromatch International Academy

Hobbies

enjoy mountaineering, astronomical photography and playing piano

References

Available upon Request