Peyman Ghaedi

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Education

Master of Science in Energy System Engineering **Nov 2021 – Feb 2024**
Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran
Thesis title: Intelligence Fault Detection and Classification in Photovoltaic Systems using Machine Learning Techniques
GPA: 16.42/20, GPA (Including thesis): 17.1/20

Bachelor of Science in Electrical Engineering **Sep 2016 – July 2021**
Arak University, Arak, Iran
Thesis title: Simulation of DC to DC Power Electronics Converters
GPA: 14.80/20, GPA (The last 60 hours): 16.38/20

Research Interests

- Machine Learning
- Solar Energy
- Autonomous Monitoring
- Energy Systems
- Fault Detection
- Optimization

Academic Publications

Journal Publications

Ghaedi P, Eskandari A, Nedaei A, Habibi M, Parvin P, Aghaei M. Ensemble LVQ Model for Photovoltaic Line-to-Line Fault Diagnosis Using K-Means Clustering and AdaGrad. Energies. 2024; 17(21):5269. https://doi.org/10.3390/en17215269.

Ghaedi P, Eskandari A, Nedaei A, Habibi M, Parvin P, Aghaei M. Logically Optimized and Probabilistic Integrated Photovoltaic Fault Finding Package based on Machine Learning (under review – to Energy Reports journal).

Ghaedi P, Eskandari A, Nedaei A, Aghaei M. Sequential Fault Detection and Resistance Estimation in PV Arrays Using Deep Q-Network and Bayesian Neural Networks (In preparation).

Mamershafai R, **Ghaedi P**, Moradi Sizkouhi A, Talebi S, Aghaei M. Bird Fault Detection in Photovoltaic Panels via Stable Diffusion-Generated Data and Optimized Deep Learning Models (In preparation).

Conference Publications

Nedaei A, Eskandari A, Salehpour S, **Ghaedi P**, Aghaei M. AI in Smart Grids for Enhanced Renewable Energy Management: Part 1. Techniques and Applications (submitted – to FES Conference 2025).

Nedaei A, Eskandari A, Salehpour S, **Ghaedi P**, Aghaei M. AI in Smart Grids for Enhanced Renewable Energy Management: Part 2. Challenges and Future Directions (submitted – to FES Conference 2025).

Technical & Research Experience

Developing regression methods for estimating the elastic modulus of rock. **2024**
Project
. Including DNN, XGboost, Adaboost **---** Implementing Python for coding.

Simulation and Optimization of National-Scale Energy Systems in EnergyPLAN. **2023**
Master Course Project, Modeling of Energy Systems
. A Multi-Scenario Study on Efficiency, Emissions, and Flexibility.

Application of the simplex method to reduce the peak demand and cost of household consumers. **2022**
Master Course Project, Advanced Mathematical Programming Course
. MATLAB was a platform for optimization.

Examining two proposals to reduce electricity consumption in an office building during peak hours. **2022**
Master Course Project, Energy and Economy Course
. Regarding the review of an economic company in Tehran in the summer season – MATLAB.

Simulation of soft switched non-isolated high step-down converter with PSpice software. **2021**
Bachelor Project, Supervisor: Dr. Mahdi Rezvanivardom

230 kV light transmission line design project and programming using MATLAB. **2021**
Course Project, Design of transmission line Course
. The target of this project is the electrical and mechanical design of a transmission line based on current capacity, voltage loss, short circuit current, corona effect, etc.

Optimum design of a 100 KW photovoltaic power plant connected to the grid in Tehran using PVsyst **software.** **2020**
Course Project, Electric power generation Course

Load Flow Project Between Buses in Power Systems Using MATPOWER tool in MATLAB Software. **2020**
Course Project, Analysis of Electrical Energy Systems 2 Course

Programming and making obstacle avoiding robot using Arduino and Ultrasonic sensor. **2020**
Course Project, Digital Systems Course

Designing a LPC2138 electronic board using Altium designer software. **2020**
Course Project, Digital Systems Lab 2

Work Experience

R&D Engineer **2024**
Solar Tabesh Tavan BNL Company, Iran
. Developing the Machine Learning methods for the failures and Defects detection in PV systems.

Research Assistant **2021 - 2024**
Master Thesis, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran
. The main objective of this project was to use artificial intelligence instead of traditional methods and to react quickly to faults in the DC part of photovoltaic modules – Python was a platform for programming.

Building Electricity Course **2021**
Iran Technical & Vocational Training Organization, Iran
. Including electrical wiring in the building and getting familiar with all kinds of electrical appliances in the building.

Designer of Electrical Boards (intern) **2021**
Raad Industrial Group, Iran
. Designing electronic boards of 3d printing and engraving machines designing a manufacturing boards of CNC machines of wood industry machines.

Honors & Awards

Entrance to Amirkabir University of Technology through the Nationwide University Entrance Exam and awarded a scholarship (Tuition waiver). **2021**
Tehran, Iran
. The competition is intense since it is the only means to gain admission to universities.

Ranked top 1% in National University Entrance Exam for master's degree in electrical engineering (out of 25,000 people). **2021**
Tehran, Iran

Entrance to Arak University through the Nationwide University Entrance Exam and awarded a scholarship (Tuition waiver). **2016**
Arak, Iran
. The competition is intense since it is the only means to gain admission to universities.

Ranked top 3% in Iran's National University Entrance Exam for the undergraduate program (out of 180,000 people). **2016**
Arak, Iran

Skills

English
Duolingo English Test Test score: 110 Test date: 2025-01-09

Programming
Python (libraries: NumPy, Pandas, Matplotlib, Scikit-Learn, TensorFlow), MATLAB

Software
PVsyst, Altium designer, Arduino, PSpice, Microsoft Office (Word, Excel, PowerPoint and Visio), LaTeX

Others
Modeling and Optimization**:** Applying various optimization methods, including Genetic Algorithm (GA), Particle Swarm Optimization algorithm (PSO), fuzzy logic, MILP and linear modeling.

Machine Learning & Deep Learning Concepts**:** Classification (EL, MLP, SVM, KNN, LR, GNB, DT, …), Regression (SVR, DNN, XGboost, Adaboost), and Clustering (K-Means).

References

Mohammadreza Aghaei (My M.Sc. thesis supervisor)
Professor, Department of Sustainable Systems Engineering (INATECH)
University of Freiburg, Freiburg im Breisgau, Germany
Email: aghaei@studysolar.uni-freiburg.de

Aref Eskandari (My M.Sc. thesis advisor)
Assistant Professor, Department of Electrical Engineering
Iran University of Science and Technology, Tehran, Iran
Email: aeskandari@iust.ac.ir

Mohammad Bayat (Course professor)
Assistant Professor, Department of Electrical Engineering
Arak University, Arak, Iran
Email:m-baiat@araku.ac.ir