Sepehr Karimi

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Research Interests

Applied ML and Deep Learning | Reinforcement Learning | Time Series Prediction

Education

PhD in Electrical Engineering, Adelaide University (2025 – Present)
Thesis: *Unified approach for price prediction and battery operation in the Australian National Electricity Market*
Supervisor: Dr. Ali Pourmousavi

MSc in Computer Engineering, University of Tehran (2021 – 2024)
Thesis: *Retweet Prediction using Graph Neural Networks and Representation Learning*
Supervisor: Dr. Masoud Asadpour

BSc in Electrical Engineering, Amirkabir University of Technology (2016 – 2021)
Thesis: *Applying reinforcement learning methods in solving differential games*
Supervisor: Dr. Mohammad Bagher Menhaj

Work and Research Experience

Software Engineer, OptiGrid Pty Ltd, Australia (Jan 2024 – Present)
Developed a reliable API for providing real-time electricity price forecasts to customers in the Australian energy sector. Built optimal data pipelines to seamlessly fetch and process real-time market data from the AEMO public database. Established a reliable infrastructure for running machine learning models with high up-time and low latency.

Co-Founder, ML/AI Engineer, SofiaMind Chatbot, Iran (Sep 2023 – Mar 2025)
Co-founded sofiaMind, an intelligent chatbot platform utilizing LLMs to automatically answer customer queries. Integrated state-of-the-art natural language understanding techniques to deliver accurate, context-aware, and real-time responses.

Research Assistant, Health Sciences Research, Columbia University, USA (Jan 2024 – Jan 2025)
Mentor: Dr. Maryam Zolnoori
Focused on developing pipelines leveraging LLMs for clinical decision support as a diagnostic tool. Designed methodologies to optimize LLM integration for real-time clinical applications.

Research Assistant, Nottingham Trent University, UK (Feb 2024 – Sep 2024)
Mentors: David Brown, *Mufti Mahmud*, *Alexander Sumich*, *Nadja Heym*
Conducted a systematic review of deep learning approaches on EEG for the early detection of Alzheimer's Disease and Mild Cognitive Impairment (MCI).

Research Assistant, Social Network Laboratory, University of Tehran, Iran (Oct 2021 – Sep 2024)
Developed a deep learning model for interaction prediction on Twitter (X) using structural embeddings from the follower graph and textual embeddings from user tweets.

Member of Executive Committee, Innovation Center of Amirkabir University, Iran (Mar 2019 – Dec 2020)

Software Engineer, Freelancer (Jan 2021 – Sep 2023)
Built and maintained the server-side infrastructure for multiple services and games using the Django Framework

Research and Development Intern, LuxinTech, Iran (Aug 2019 – Sep 2019)
Developed a program for controlling the surrounding and main lights of the house with low latency.

Publications

- **Deep Learning Approaches in EEG Analysis for Early Detection of Alzheimer's Disease and Mild Cognitive Impairment: A Mini Systematic Review**
  *Authors: Tahoura Morovati[*], Hamed Vaezi[*], **Sepehr Karimi**[*], Md Mahmud, Michael Crook-Rumsey, Nicky Heym, David J. Brown, Alex Sumich*
  Published in: International Conference on Applied Intelligence and Informatics (2024)
  [*] **Authors contributed equally.**

- **Speech-Based Cognitive Screening: A Systematic Evaluation of LLM Adaptation Strategies**
  *Authors: Fatemeh Taherinezhad, Mohamad Javad Momeni Nezhad, **Sepehr Karimi**, Sina Rashidi, Ali Zolnouri, Maryam Dadkhah, Yasaman Haghbin, Hossein AzadMaleki, Maryam Zolnoori*
- **PersianMedQA: Language-Centric Evaluation of LLMs in the Persian Medical Domain**
  *Authors: Mohammad Javad Ranjbar Kalahroodi, **Sepehr Karimi**, Amirhossein Sheikholselami, Sepideh Ranjbar Kalahroodi, Heshaam Faili, Azadeh Shakery*

Teaching Experience

- Advanced Algorithms (Chief TA), University of Tehran, Spring 2025, Instructor: Dr. Heshaam Faili
- Natural Language Processing, Spring 2024, University of Tehran, Instructor: Dr. Heshaam Faili
- Deep Neural Networks, Spring 2024, University of Tehran, Instructor: Dr. Ahmad Kalhor
- Social Networks, Spring 2024, University of Tehran, Instructor: Dr. Masoud Asadpour
- Statistical Inference, Spring, Fall 2024, University of Tehran Instructor: Dr. M. A. Dehaqani

Selected Course Projects

- **Question Answering on knowledge graphs using DDQN** *Advanced RL Course*
  - Built an RL-based agent that can answer complex multi-hop questions over a knowledge graph.
  - Used the Doubled DQN algorithm to train the agent to learn to predict a sequence of actions to navigate the knowledge graph to find the correct answer.
- **Stock Prediction using sentiment analysis of social media** *Social Networks Course*
  - Created a social indicator (using sentiment analysis and social network analysis) and combined it with other price indicators in the stock market to predict the price of stocks in a 24hr, 48hr time-slot.
- **Developed ML classifiers for EEG data analysis** *Machine Learning Course*
  - Implemented machine learning algorithms to develop classifiers for Electroencephalography (EEG) data. They also Assessed the performance of different classifiers to determine the most effective approach for EEG data classification.
- **Function Approximation Based Control specialized for Prosthetic Legs** *Advanced Robotics Course*
  - Built a hybrid controller for n-DOF robot and applied the controller for different uncertain models.

Honors

Ranked 16th in the national PhD entrance exam for Iranian universities (2024)

Ranked within the top 0.1% in the national master entrance exam for Iranian universities (2021)

Ranked within the top 0.4% in the nationwide B.Sc. entrance exam (2016)

Selected Courses

NLP (Grad)	19.7/20 (4/4)	Data Analysis (Grad)	18.9/20 (4/4)
Advanced Algorithms (Grad)	18.7/20 (4/4)	Statistical Inference (Grad)	17.5/20 (4/4)
Algorithm Designs	20/20 (4/4)	Computer Architecture	19.2/20 (4/4)

Skills

Programming/Scripting: Python, C/C++, R, MATLAB, SQL/NoSQL, LaTeX

NLP/Data Tools: Pandas, Scikit-learn, NLTK, SpaCy, HF Transformers, TensorFlow, PyTorch

IDEs/Development Tools: Git, Docker, Jupyter Notebook, AWS

Soft Skills: Team Work, Problem-Solving, Time Management

Language Skills

English: Fluent - TOEFL: 104 (Listening: 29, Reading: 27, Speaking: 25, Writing: 23)

Persian: Native

References available upon request.