Parmis Bathayan

M.Sc. Candidate in Computer Engineering · University of Tehran

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Research Interests

I study how language and emotion are represented in neural activity and how those signals can advance language technology — fusing EEG, speech, and NLP into multimodal models of sentiment and meaning, with an emphasis on cross-lingual and cross-cultural understanding (Persian and English) and computational neuro-linguistics.

Education

M.Sc. in Computer Engineering, University of Tehran 2023 – 2026 (Expected)

GPA: 19.21/20 · Tehran, Iran

Thesis: Leveraging EEG Signals from Persian and English Speakers to Enhance Multimodal Sentiment Analysis
Supervisors: Dr. Azadeh Shakery, Dr. Mohammad-Reza A. Dehaqani

B.Sc. in Computer Engineering, Shahrood University of Technology 2019 – 2023

GPA: 18.84/20 · Ranked **1st of 96** · Shahrood, Iran

Thesis: Transfer Learning-Based Food Recognition Using Fine-Tuned Convolutional Neural Networks
Supervisor: Dr. Mansoor Fateh

Honors & Awards

- Ranked **1st of 96** B.Sc. Computer Engineering students, Shahrood University of Technology (2023).
- Direct (exam-exempt) M.Sc. admission offers from the University of Tehran, Shahid Beheshti University, Isfahan University of Technology, and Shahrood University of Technology, based on undergraduate rank (2023).

Publications & Manuscripts

M. J. Ranjbar, M. Amini, **P. Bathayan**, H. Faili, A. Shakery. *PARSA-Bench: A Comprehensive Persian Audio-Language Model Benchmark.* arXiv:2603.14456. In preparation for submission to EACL 2027.

Research Experience

Research Assistant — IIS Lab & BCoL Lab, University of Tehran 2023 – Present

Supervisors: Dr. Azadeh Shakery and Dr. Mohammad-Reza A. Dehaqani · Focus: EEG-based multimodal NLP (M.Sc. thesis)

- Investigating cross-cultural neural correlates of language and sentiment processing using EEG recordings from Persian and English speakers.
- Developing multimodal sentiment-analysis models that integrate EEG signals with textual representations.
- Building EEG feature-extraction pipelines using MNE-Python for multimodal machine learning.
- Implementing cross-lingual representation-learning approaches for Persian and English EEG–text data.
- Contributed to PARSA-Bench, benchmarking large audio-language models for Persian and evaluating their performance across diverse speech and language tasks.

Selected Projects

ASR-Based Gender and Accent Classification 2024

- Built an end-to-end Persian speech pipeline spanning data cleaning, acoustic feature extraction (MFCCs, spectral contrast, chroma, zero-crossing rate), and speaker-attribute (gender/accent) classification.
- Fine-tuned Wav2Vec2 for Persian ASR and analyzed how transcription quality relates to speaker attributes such as accent and tone.

Neural Decoding & Psychophysics Analyses *(Course project)* 2025

- Implemented psychometric curve fitting (sigmoid / Gaussian CDF) and ROC-based sensitivity analysis

on a facial-identity detection psychophysics task, testing hypotheses on spatial frequency, gender, and handedness effects.
- Performed spike sorting from scratch, including bandpass filtering, threshold-based detection, PCA/t-SNE feature extraction, and K-means clustering on extracellular neural recordings.
- Preprocessed EEG data and applied temporal and spatial MVPA, time-generalization decoding, and mutual-information analysis to investigate visual representations; compared neural representations with CORnet-S using representational similarity analysis (RSA).

Teaching Experience

Chief Teaching Assistant — Deep Learning, University of Tehran 2025 – 2026

Operational lead within a two-person chief-TA team; coordinated a 16-member TA team.

- Reviewed and approved assignment drafts, including article selection, problem design, and clarity of instructions.
- Selected and onboarded the 16-member TA team and ensured timely preparation of assignments and on-schedule grading.
- Collaborated with the professor on course operations — assignment parameters, student communication, and logistics.
- Managed student communication via the course forum, ensuring questions were consistently answered.

Teaching Assistant — University of Tehran 2024 – 2026

5 courses across 7 semesters: Natural Language Processing, Statistical Inference, Deep Learning (2), Advanced Data Mining (2), and Advanced Algorithm Design.

- Designed and graded assignments, projects, and exam questions for ∼50 students.
- Provided ongoing student support via email and the course forum throughout the assignment cycle.

Teaching Assistant — Shahrood University of Technology 2021 – 2022

3 courses across 4 semesters: Information Retrieval from Web, Data Mining, and Algorithm Design (2).

- Led monthly recitation sessions and graded assignments and problem sets for ∼50 students.
- Supported students through office hours and partnered with instructors on course logistics.

Technical Skills

Programming & Research Tools: Python, Java, Git, LaTeX
Machine Learning & Data: PyTorch, TensorFlow, scikit-learn, NumPy, pandas
NLP & Generative AI: Hugging Face (Transformers, Datasets, PEFT), LangChain, LangGraph, FAISS
Speech & Audio: librosa, fairseq, ESPnet, SpeechBrain
Neural Signal Processing: MNE-Python, EEGLAB, Tensorpac

Leadership & Service

- **Co-founder and Executive Coordinator**, University of Tehran AI Club — lead the organization and management of AI-focused talks and student events.

Relevant Coursework

Natural Language Processing, Deep Learning, Machine Learning, Statistical Inference, Cognitive Neuroscience, Advanced Data Mining, Advanced Algorithm Design, Information Retrieval from Web.

Languages

Persian (Native) · English (Fluent; IELTS Academic 7.5)