Ali Jahan

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Education

BS **Amirkabir University of Technology**, Computer Engineering — 2021 – Present B.Sc.
- GPA: 3.96/4.0 (18.32/20)

Diploma **Soltani3 High School (NODET)**[1], Mathematics and Physics — 2017 – 2021
- GPA: 19.8/20

Research Interests

Large Language Models **Natural Language Processing** **Information Retrieval** **Machine Learning**

Publications

- Masood Ghayoomi, Fatemeh Mohammadi, **Ali Jahan**, **"Analyzing the Performance of Large Language Models in the Automatic Conversion of Colloquial Persian to Standard Writing based on the Confirmed Persian Orthography Grammar"**, Journal of Language and Linguistics.
- **Ali Jahan**, Masood Ghayoomi, Saeedeh Momtazi, **"Winning with Less for Low-Resource Languages: Advantage of Cross-Lingual English-Persian Argument Mining Model over LLM Augmentation"**. (Under Preparation).

Research Experience

Active Learning for Informal-to-Formal Persian Text Conversion
2024 – Present

Supervisor: Prof. Saeedeh Momtazi & Prof. Masood Ghayoomi

- In this work, we designed an active learning framework centered around the Gemma and Qwen2.5 language models to improve the formalization of informal Persian text.
- A query-by-committee strategy was used to detect hard-to-convert examples, which were then manually annotated to iteratively enrich the training dataset.
- Fine-tuning on these curated samples led to significant gains in conversion accuracy across multiple evaluation benchmarks.

Cross-lingual Argument Mining for Low-Resource Persian
Jan 2024 – Nov 2024

Supervisor: Prof. Saeedeh Momtazi & Prof. Masood Ghayoomi

- In this study, we contrasted zero-shot transfer, LLM-augmented, and bilingual English + Persian training pipelines to enable robust argument mining in a low-resource setting.
- We manually translated 112 English Microtexts into Persian, generated over 3000 minority-class ADUs with GPT, Gemini, Claude and DeepSeek, and released the first balanced Persian argument-mining corpus.
- Fine-tuning a multitask XLM-RoBERTa lifted Persian F1 from 50% (direct transfer) to 75% in the bilingual setup, establishing a new state-of-the-art model.

Wavelet-Conditioned Diffusion Transformer for Turbofan RUL Estimation
Feb 2025 – Jul 2025

Supervisor: Prof. Babak Khalaj

- We proposed a hybrid TransformerDiffWave architecture that conditions a diffusion model on compact wavelet-latent vectors for high-fidelity synthesis of turbofan sensor sequences.
- We trained and evaluated the model on the NASA CMAPSS turbofan dataset (four engine settings, FD001–FD004) and released ~ 200 k synthetic sequences to the community.

[1] National Organization for Development of Exceptional Talents

- We augmented the original training data with these sequences, lowering average RMSE by 23% and the NASA scoring metric by 35% versus a tuned LSTM baseline.

Finding a Lower Bound on the Energy of Graphs Feb 2023 – Feb 2024

Supervisor: Prof. Saeed Akbari

- Investigated lower bounds on the energy of graphs in terms of the vertex cover number.
- Analyzed spectral graph theory concepts to establish mathematical inequalities.
- Explored eigenvalue-based methods to derive novel theoretical results.

Presentations

12th Graph Theory and Algebraic Combinatorics Conference Tafresh University Feb 2024

- Presented: *"A Note on the Lower Bounds for the Energy of Graphs."*

Teaching Experience

- **Artificial Intelligence**, Teaching Assistant (3X) supervised by *Dr. Ghatee*
- **Operating Systems**, Head Teaching Assistant (3X) supervised by *Dr. Zarandi*
- **Data Structures and Algorithms**, Teaching Assistant supervised by *Dr. Shirali-Shahreza*
- **Microprocessor and Assembly Language**, Teaching Assistant supervised by *Dr. Farbeh*
- **Software Engineering**, Teaching Assistant (3X) supervised by *Dr. Gohari*
- **Applied Linear Algebra**, Teaching Assistant supervised by *Dr. Nazerfard*
- **Applied Linear Algebra**, Teaching Assistant supervised by *Dr. Mazlaghani*
- **Mathematical Olympiad**, Teacher of multiple *NODET High Schools*

Related Courses

- **Information Retrieval**: 20/20
- **Artificial Intelligence**: 18.25/20
- **Computational Intelligence**: 18/20
- **Applied Linear Algebra**: 19/20
- **Software Engineering**: 20/20
- **Database Design**: 19/20
- **Graph Theory**: 20/20
- **Data Structures and Algorithm Design**: 20/20
- **Foundation of Mathematics**: 20/20

Honors & Awards

- **134th Place** – National University Entrance Exam (Konkour), ranked among more than 140,000 participants
- Attended the 38th Iranian National Mathematical Olympiad.

Volunteer Activities

- **2024 ICPC (International Collegiate Programming Contest)** – Staff Team Member: Contributed to organizing and facilitating the contest, ensuring smooth execution and participant support.
- **Linux-Fest 2024** – Staff Member: Helped organize the event, assisted in running technical workshops, and supported participants during the final Linux-based competition.

Languages

- **English**: Advanced (**TOEFL** iBT Score:**103**)
- **Persian**: Native