Sepehr Kazemi Ranjbar

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Education

2020-now **Sharif University of Technology**, *B.Sc., Electrical Engineering, Communication Systems.*
GPA: 18.36/20 (Top 10% of class)

2016-2020 **Allameh Tabatabaei High School**, *High School Diploma, Physics and Mathematics.*
GPA: 19.83/20

Research Interests

- **Vision/Language Models :** Applying LLMs/VLMs to specific domains such as image/video understating, robotics (using as a policy maker or a reward model), healthcare, etc.
- **Explainability and Robustness of Machine Learning Systems :** Currently focused on explainability of VLMs for computer vision tasks and investigating their robustness through different attacks.
- **Graph Neural Networks :** Dynamic GNNs with application on temporal interaction networks.
- **Reinforcement Learning :** Its application to robotic tasks such as Vision-Language Navigation (VLN).

Publications

Published Papers

1. **Sepehr Kazemi Ranjbar** and Emad Fatemizadeh. ExIQA: Explainable Image Quality Assessment Using Distortion Attributes, WACV 2025 (under-review).
2. **Sepehr Kazemi Ranjbar***, Ali Rasekh*, Milad Heidari, and Wolfgang Nejdl. ECOR: Explainable Clip for Object Recognition, AAAI 2025 (under-review).
3. Ali Mamaghani, Ali Nourian, Negin Mohtaram, Alireza Shokrani, Seyed Mohsen Nasiri, **Sepehr Kazemi Ranjbar**, Alireza Mohammadi, Navid Nikaein, and Babak Hossein Khalaj. LLM for 5G: Network Management, ICLMCN 2024.

In-Processing Papers

4. **Sepehr Kazemi Ranjbar**, Mohammad Ostadmohammadi, HamidReza Rabiee and Arash Amini. GNTIN: Graph Neural Temporal Interaction Network.
5. **Sepehr Kazemi Ranjbar***, Ali Rasekh*, Simon Gottschalk and Wolfgang Nejdl. Generative Explinabale Image Classification via Identifying Rationales.
6. Ali Rasekh, AmirAbass Afzali, Borna Khodabande, **Sepehr Kazemi Ranjbar**, Simon Gottschalk and Wolfgang Nejdl. A DPO framework for Addressing Adversarial Attacks to Vision Language Models.

Skills

Programming Skills: Python (pytorch, numpy, scipy, pandas, etc.), C/C++, Matlab, Java, Assembly
Computer Skills: PsPice, Proteus, MPLAB, Linux(ubuntu,Kali), Comsol, LaTeX

Research Experiences

2023-present | **L3S Laboratory, Hannover, Germany**

- Working under the supervision of Prof. Wolfgang Nejdl (Leibniz University) and Ahmet Iscen (Google DeepMind).
- Did a research project about the explainability of VLMs such as CLIP for the object recognition task. Despite classical models, we aimed first to predict rationales in an image and then infer the category of the image from those predicted rationales. This work resulted in a publication [2] where I am the co-first author.
- Currently, we are implementing the idea of "first predict rationales, then predict category" in a generative case with open vocabulary [5].
- I am also involved in another research project about utilizing DPO (Direct Policy Optimization) for addressing typographic attacks in VLMs such as CLIP [6].

2023-present | **Sharif University of Technology, Electrical Engineering Department**

- Working under the supervision of Prof. Emad Fatemizadeh (Sharif University of Technology).
- Conducted a research project on utilizing Vision Language Models for Image Quality Assessment. We developed an explainable approach for distortion identification based on attributes/effects of those distortions, then inferred the quality score of the photo based on predicted distortions and attributes. This resulted in one publication [1] where I am the first author.

2023-present | **DML Laboratory, Tehran, Iran**

- Working on my bachelor's thesis under the supervision of Profs. HamidReza Rabiee and Arash Amini (Sharif University of Technology).
- Developing a novel model for graph interaction networks, where the goal is to predict the time and features of the next interaction (edge) in a dynamic graph network [4].

2023-2024 | **5G Laboratory, Sharif University of Technology / Eurecom Research Center, Biot, France**

- Worked under the supervision of Prof Prof. Babak Khalaj (Sharif University of Technology) and Prof. Navid Nikaein (Eurecom Research Center).
- Did a research project about utilizing LLMs such as GPT-3 for 5G network management. This was achieved by creating datasets for different commands of a 5G network and fine-tuning GPT-3. We also consider a feedback loop for correcting the mistakes with users' responses. This project resulted in a publication [3].

Selected Courses

Graduate Courses

- Security and Privacy in Machine Learning (on-going)
- Deep Generative Models (on-going)
- Reinforcement Learning(19/20) (Project: Presenting recent advancements in language-based reinforcement learning.
- Game Theory(18/20) (Project: Modeling resource allocation in a communication network with stable matching and auction
- Computer Vision(17.7/20)
- Deep Learning(17.1/20) (Project: GAN-Bert: a semi-supervised learning method for text classification → link)
- Image Processing (20/20) (Project: SR-GCN: a GNN for Image Super Resolution → link)

Under-Graduate Courses

- Introduction to Machine Learning (20/20) (Project: Denoising of images based on mixture models → link)

- Microprocessor Systems (20/20) (Project: Presenting of recent advancements in ARM architecture)
- Computer Architecture (18.2/20) (Project: Building a calculator with floating point operations on STM-32 → link)
- Introduction to Robotic Systems (18/20) (Project: Simulation of a manipulator and a mobile robot → link)
- Digital Signal Processing (19.1/20) (Project: Circle detection based on wavelet transform → link)
- Signal and System (20/20) (Project: Song Detection based on Fourier transform → link)
- Convex Optimization (17.2/20)
- Object Oriented Programming (20/20) (Project: Building Farm Frenzy 3 with JAVA → link)

Teaching Assistance

2024 Digital Image Processing (*Prof. Emad Fatemizadeh*)
2023 Machine Learning (*Prof. Mohammad B. Shamsollahi*)
2023 Communication Systems (*Prof. MohammadReza Pakravan*)
2023 Electric Circuits Theory (*Prof. Emad Fatemizadeh*)
2022 Engineering Mathematics (*Prof. Davood Poreh*)
2022 Electrical Circuits and Lab (*Prof. Emad Fatemizadeh*)

Languages

English: Fluent
Persian: Native

Honors and Awards

2019 Awarded Silver Medal in the 32nd Iranian National Physics Olympiad
2020-persent Top 15% GPA of my class