Amirali Molaei

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EDUCATION

1. Oct. 2020 - present
Master : Computer Engineering – Artificial Intelligence & Robotics
School of Computer Engineering, Iran University of Science and Technology (IUST), Tehran, Iran
   - GPA: 4/4 (18.61/20)
   - Supervisor: Prof. Mohammadreza Jahedmotlagh
   - Thesis: Sarcasm Detection using transformer models via contrastive learning approach
2. Sep. 2015 - July 2019
Bachelor : Mechanical Engineering
Faculty of Mechanical Engineering, Islamic Azad University Tehran North Branch, Tehran, Iran
   - GPA: 16.09/20

RESEARCH INTERESTS

Deep **L**earning**, M**achine **L**earning, **C**omputer **V**ision, **C**omputer **G**raphics, **D**epth **E**stimation, **M**edical **I**mage **A**nalysis**, S**cene **U**nderstanding, **E**xplainable AI

PUBLICATIONS

- R. Azad, A. Kazerouni, M. Heidari, E. K. Aghdam, **A. Molaei**, Y. Jia, A. Jose, R. Roy and D. Merhof, "Advances in Medical Image Analysis with Vision Transformers: A Comprehensive Review," (*Published in Medical Image Analysis Journal)*, Link, Github
- A. Aminimehr, P. Khani, **A. Molaei**, A. Kazemeini and C. Erik, "Tbexplain: A Text-Based Explanation Method for Scene Classification Models with the Statistical Prediction Correction," (Submitted to Expert Systems with Applications journal), arxiv
- A. Aminimehr, **A. Molaei** and C. Erik, " EnTri: Ensemble learning with tri-level representations for explainable scene recognition," (Submitted to Pattern Recognition journal), arxiv
- **A. Molaei**, A. Aminimehr, A. Tavakoli, A. Kazerouni, B. Azad, R. Azad, D. Merhof, "Implicit Neural Representation in Medical Imaging: A Comparative Survey," *Accepted at ICCV 2023 Workshop,* Link, github

RESEARCH EXPERIENCES

RWTH Aachen University, Aachen, Germany
Reasearch Assistant (Under Supervision of Dr. Dorit Merhof and Reza Azad)
- **Implicit Neural Representations in Medical Imaging:** Prepared a survey that examines the recent research progress in medical imaging that utilized implicit neural representations to handle various medical applications information This survey has been recently accepted at the ICCVW 2023 workshop.
- **Vision Transformers in Medical Imaging**: Researched and studied the recent innovative use of vision transformers in addressing medical imaging tasks to contribute to a survey project. This effort resulted in its acceptance by the Medical Image Analysis journal.

Data Mining Lab, IUST**,** Tehran, Iran
Research Assistant (Under Supervision of Dr. Behrouz Minaei)
- **Argument Summarization with Transformers:** Implemented an algorithm based on transformer models for summarizing arguments, which includes extracting salient key point and matching these key points to each argument and predicting the most prevalent key point.

Complex Systems Lab, IUST**,** Tehran, Iran
Research Assistant (Under Supervision of Dr. M.R Jahed-Motlagh)
- **Sarcasm Detection with Contrastive Learning and Transformers:** Currently working in the lab on classifying natural language sentences as either sarcastic or non-sarcastic. This classification is achieved using transformer models that employ a contrastive learning scheme for training.

Project for Reinforcement Learning, Tehran Unviersity, Tehran, Iran, **Jan. 2022**

- **Research Title**: Multi-Agent Opinion Formation via Reinforcement Learning
- **Methods:** Monte Carlo and Q-Learning
- **Description:** Agents learned how to reach consensus on an opinion by maximizing social cumulative reward in a Multi-Agent environment.

TEACHING EXPERIENCES

Teaching Assistant, IUST**,** Tehran, Iran September & 2022 – January & 2023

- **Course:** Natural Language Processing
- **Instructor:** Prof. Behrouz Minaei Bidgoli
- **Responsibilities:**
  - Led a team of teaching assistants in providing assignments, exams, final exams, and projects
  - Instructed sequence to sequence models, Recurrent Neural Networks, and the principles of Transformer networks
  - Assigned leadership roles to other teaching assistants for handling and evaluating students' projects

Teaching Assistant, IUST**,** Tehran, Iran January & 2022 – July & 2022

- **Course:** Advanced Data Mining
- **Instructor:** Prof. Behrouz Minaei Bidgoli
- **Responsibilities:**
  - Instructed sequence to sequence models, Recurrent Neural Networks, and the principles of Transformer networks
  - Designed the assignments and the final exam
  - Managed and evaluated the final projects of students

Teaching Assistant, IUST**,** Tehran, Iran October & 2021 – January & 2022

- **Course:** Neural Networks
- **Instructor:** Prof. Nasser Mozayani
- **Responsibilities:**
  - Designed an assignment on Adaptive Resonance Theory and Hopfield networks

Teaching Assistant, IUST**,** Tehran, Iran October & 2021 – January & 2022

- **Course:** Natural Language Processing
- **Instructor:** Prof. Behrouz Minaei Bidgoli
- **Responsibilities:**
  - Designed an assignment on text classification and spell correction topic
  - Managed and evaluated the projects of a group of students

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TECHNICAL SKILLS

Programming Languages: Python, **J**ava, **J**ulia, **L**atex
Frameworks: PyTorch, Torch, Tensorflow, Scikit-learn, OpenCV, NPM (Numpy – Pandas - Matplotlib), Transformers, etc.

CORE COURSES

Neural **N**etworks, **P**attern **R**ecognition, **N**atural **L**anguage **P**rocessing, **M**achine **L**earning**, R**einforcement **L**earning, **A**dvanced **D**ata **M**ining, **D**istributed **S**ystems, **M**ulti-Agent **S**ystems

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REFERENCES

1. **Dr. Mohammadreza Jahed-Motlagh**, *School of Compute Engineering, Iran University of Science and Technology, Tehran*
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   Jahedmr@iust.ac.ir

2. **Dr. Behrouz Minaei Bidgoli**, *School of Compute Engineering, Iran University of Science and Technology, Tehran*
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   b_minaei@iust.ac.ir

3. **Reza Azad,** *Faculty of Electrical Engineering and Information Technology, RWTH Aachen University, Germany*
   Phone: +491779244025
   rezazad68@gmail.com

4. **Dr. Nasser Mozayani**, *School of Compute Engineering, Iran University of Science and Technology, Tehran*
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