Mohammad Hosseini

AI Researcher

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About me

I am a passionate and dedicated data mining master student with a particular interest in making connections between concepts. This ability not only fuels my creativity and innovation but also proves incredibly beneficial in my professional work as an AI researcher. In fact, I have successfully utilized this skill to find solutions for various projects. Currently, I am focused on my thesis, which centers around cloud computing resource management. I have proposed a new mechanism that aims to achieve optimized resource allocation, and my approach involves leveraging graph neural networks and reinforcement learning. Moreover, I am eager to utilize reinforcement learning and graph neural networks to address real-world problems that can make a meaningful impact on others.
If my background and interests resonate with you, please don't hesitate to reach out.

Education

2020 – present
Tehran, Iran

Master's degree in Data Mining, *Kharazmi University*

- Relevant course: Machine Learning, Deep Learning, OCR, Functional Analysis and Mathematics of Learning, GPA: 3.2
- Thesis: Cloud computing resource management with graph NNs and Reinforcement Learning

2015 – 2020
Kashan, Isfahan, Iran

Bachelor's degree in Computer Science, *University of Kashan*

- relevant course: Data Structure, Algorithms, Computational Intelligence, Data Mining, Statistical, Artificial Intelligence, GPA: 3
- Thesis: Examining the performance of several deep learning architectures for Persian Named Entity Recognition(NER)

Ongoing Research and Future Publication Projects

01/2023

TGR: Task scheduling with Graph and RL, *Master Thesis, Under Review*

- Designed and implemented a comprehensive task scheduling system for cloud computing, addressing the challenges of resource management in a dynamic environment.
- Employed a simulation module to generate and track task execution within VMs across various hosts.
- developed an optimized graph representation technique for handling DAG-based task dependencies.
- Integrated a deep reinforcement learning algorithm to train a transformer actor model, enabling effective task allocation and resource optimization.

04/2023 **MKP-RL: Multiple Knapsack Problems with RL,** *Under Review*

- Developed and implemented a novel approach utilizing transformer models to optimize the identification of object-knapsack connections in multidimensional and multiple knapsack problems
- Utilized PPO and discrete-SAC algorithms to train the encoder model, and introduced variations of PPO and SAC for training encoder-decoder models
- Conducted a thorough comparative analysis of three different output types to determine the most effective training method
- Designed and built a specialized training environment to facilitate the training process

Research Interests

Reinforcement Learning (RL) in real life problems

DRL Algorithms

Representation Learning

Self-supervized Learning

Natural Language Processing

Graph Neural Networks

Transformers Learning

Robotics

Scientific Programming

Image Classification

Transfer Learning

Medical Image Processing

Federated Learning

ML in Combinatorial Optimization

Skills

Python • Java • Pytorch • Tensorflow/Keras • Machine Learning/Data Mining Algorithms

Deep Learning Algorithms • Reinforcement Learning • Linux • git/github • Docker • NLP • OCR

Projects

08/2023 – present **MKP-GBO**

- Integrated a RL process into the existing model introduced in the paper titled "COSCO: Container Orchestration using ...", eliminating the need for manual data gathering and labeling, and employed the PPO algorithm for efficient training
- Utilized this enhanced model for solving complex knapsack problems

03/2023 – 05/2023 **HECO: Self-supervised Heterogeneous Graph Neural Network with Co-contrastive Learning,** *Paper implementation*

- self-supervised heterogeneous graph NNs based on the cross-view contrastive learning
- Implemented as a dynamic model to use in new environments

09/2021 – 01/2022

Learn#: A Novel incremental learning method for text, *Paper Implementation*

- The implementation consists of a three-step incremental model. The LSTM models, Reinforcement learning techniques, XGBoost, were utilized in the implementation.
- BERT model was used for embedding in the LSTM section of the implementation.

03/2021 – 06/2021

DeepFont: Identify Your Font from An Image, *Paper Implementation*

- project aimed to accurately identify and classify fonts from images with TensorFlow
- Adopted Auto Convolutional Encoder model for font recognition and Connected the encoder of the model to a fully-connected model
- Implemented two transfer-learning models, VGG-19 and resnet152v2, to enhance personal experience

Teaching Experience

02/2017 – 07/2017
Kashan University

Teacher Assistant, *Advance Java Programming*

- Developed and implemented engaging projects for students to apply concepts of object-oriented programming, including Inheritance, Polymorphism, and Exception Handling
- Conducted comprehensive UML training sessions to enhance students' programming skills

09/2020
Kashan University

Online Workshop, *First Step in Artificial intelligence*

- Conducted interactive workshops on the fundamentals of AI, enabling students to gain insights into starting their journey in this field.
- Delivered lectures on the innovative training approaches and the philosophical ideas that drive new AI systems.

11/2018
Kashan University

Workshop, *Machine Learning for Beginner*

- Led interactive discussions on various machine learning algorithms, facilitating a comprehensive understanding of their unique characteristics, strengths, and limitations

10/2017
Kashan University

Workshop, *Indesign for Magazine*

- conducted a workshop on Adobe InDesign, where I imparted knowledge and skills to students on magazine page layout and designing visually appealing magazines for the launch of a student magazine at Kashan University.
- Facilitated discussions on the legal aspects and responsibilities of an editor-in-chief in a student magazine

Professional Experience

05/2019 – 11/2021
Isfahan, Iran

Founder, *FOOTNOTE STARTUP*

- Goal was to create a platform for people to easily share knowledge and ideas
- Experience in FootNote team, lead to new lessons and studies in startup team development specifically studied Agile project management and team lead

Volunteering

02/2020 – 08/2020
Isfahan, Iran

HR manager, *CreativeMornings Isfahan*
- Primary responsibilities included membership growth, improving soft skills, motivating team members, and performance evaluation

10/2018 – 09/2019
Isfahan, Iran

Co Organizer, *CreativeMornings Isfahan*
- My responsibility was to plan events, coordinate between executive departments, manage the event day, negotiate with other institutions as a team representative, and support team members to improve it
- plan more than nine events

01/2018 – 06/2019
Kashan, Iran

Member of the Committee for Support and Supervision of Scientific Stuedent Associations, *University of Kashan*
- I was member of this committee for two semesters as the president of the Student Scientific Associations
- The committee consisted of the university board and the authorities of the Student Scientific Associations
- The main goal was to develop the performance of the scientific association with the approval of new policies

10/2017 – 06/2019
Kashan, Iran

President of Scientific Student Associations, *University of Kashan*
- After being elected as President of the Central Committee of the Computer Science Students' Scientific Association, I was also elected as the president of Kashan University Scientific Student Associations
- My responsibility was coordinate between more than forty associations, Monitoring the performance of associations, holding meetings and follow up on the implementation of approvals
- Holding 3rd and 4th Harekat Festival as executive secretary of the festival

01/2017 – 02/2019
Kashan, Iran

Managing Director and Editor_in_chief of Pardazsh Student Magazine,
Computer science Student Association University of Kashan
- Trying to publish 9 issues of this magazine
- Collaboration with 35 computer science students to create content for each issue
- Trying to keep the magazine up-to-date and motivating undergraduate students to work in this field

Robotic Competitions

09/2015
Tehran, Iran

Sharif Student Robo Cup 2015, *sharif university of technology*
- Participation in team for two leagues of Junior Pathfinder robots and Fire Fighter robots
- I learned valuable skills and experiences through participating in the competition

04/2014
Tehran, Iran

RoboCup IranOpen 2014
- Competed in the Junior Soccer Open League
- This experience provided valuable experience in teamwork and strategy

- I was in charge of the electronic robot department. my Specialized activities included designing related circuits and troubleshooting them. I also supervised the team's finances

04/2013
Tehran, Iran

RoboCup IranOpen 2013

- Competed in the Junior CoSpase Rescue League
- My responsibility was to troubleshoot electronic circuits
- That was my first experience participating in an out of school team, so it helped me a lot with my skills in problem solving, teamwork, strategy, and so on