Athar Mahmoudi-Nejad

Edmonton,AB – Canada

+1 (587) 501 8919 • athar1@ualberta.ca

www.linkedin.com/in/atharM • athar70

Summary

I am a PhD candidate focusing on Reinforcement Learning. I have 9+ years of fundamental research and industry experience in developing advanced Machine Learning, Deep Learning and Reinforcement Learning solutions to real-world problems, focusing on human-centred AI, virtual reality, human-computer interaction, and cognitive science. My expertise and interests include but are not limited to Reinforcement Learning, generative models, and large language models. I am a skilled communicator with a track record of publishing research and delivering compelling presentations.

Education

Doctor of Philosophy, Computing Science **Sept 2018 – Dec 2024 [expected]**

University of Alberta, Edmonton, Canada

Related Coursework:

- Intro to Virtual/Augmented Reality and Telepresence
- Machine Learning and the Brain
- Image Processing and Analysis in Diagnostic Imaging

Master of Science, Computer Engineering/Artificial Intelligence **Sept 2014 – Aug 2017**

Shahid Beheshti University, Tehran, Iran

Related Coursework:

- Machine Learning
- Neural Network
- Image Processing
- Pattern Recognition
- Data Mining
- Natural Language Processing

Bachelor of Science, Computer Engineering/Software Engineering **Sept 2009 – Aug 2014**

University of Tehran, Tehran, Iran

Related Coursework:

- Advanced Programming
- Database Design
- Intro to Multimedia
- Data Structures
- Artificial Intelligence
- Intro to eLearning
- Operating Systems
- Human-Computer Interaction

Qualifications

- Python
- Pytorch
- MATLAB
- Microsoft.NET
- SQL
- OpenAI Gym
- Jupyter
- Google Colab
- MS Visual Studio
- Unity
- Java
- Git

Related Experience

Intern Research Scientist, Samsung Research Montreal **Jun 2022–Apr 2023**

- Implemented and evaluated reinforcement learning architectures to optimize agent performance.
- Developed curriculum learning techniques to effectively train RL agents.
- Implemented a Vector Quantized Variational Autoencoder for efficient high-dimensional data clustering.
- Adapted and integrated an existing Online Decision Transformer within our RL framework.

PhD research Experience **Sept 2018–Now**

- Designed and developed adaptive virtual reality exposure therapy environments leveraging machine learning methods to estimate stress levels based on physiological measures and reinforcement learning algorithms to personalize the VR experience.
- Conducted human subject studies ($n = 30+$) to evaluate the effectiveness of the developed VR system.

Research Engineer, Pars Cognition **Sept 2017–Aug 2018**

- Developed mini-serious video games within the field of cognitive science.

Master research Experience **Sept 2014–Sept 2017**

- Designed and developed a serious video game to investigate differences in in-game behaviour between normal and autistic children. Conducted a human subject study involving collecting data on game interactions.
- Applied machine learning techniques to analyze game data and identify key behavioural patterns differentiating normal and autistic children.

Selected Projects

Virtual Reality/Games

- Develop different Virtual Reality environments that induce fear in the subjects - **Unity**
- Develop a Virtual Reality environment with adaptive parameters - **Unity**
- Develop small serious video games - **GameMaker and Unity**

Machine Learning/Deep Learning/Reinforcement Learning

- Develop an adaptive system using Experience-driven Procedural Content Generation via Reinforcement Learning - **Python, , OpenAI Gym**
- Develop Online Decision Transformer - **Python, Pytorch**
- Develop Vector Quantized Variational Autoencoder for time-series clustering - **Python, Pytorch**
- Heart rate estimation from video via CNN - **Python, PyTorch**
- Develop curriculum learning for reinforcement learning- **Python, OpenAI Gym**
- Estimate stress level Based on physiological response via traditional machine learning methods and LSTM - **Python, Scikit learn, Pytorch**
- Apply machine learning to find different patterns of behavior in the game - **Matlab**
- Implementation of using Neural Network for detecting impulse noise - **Matlab**
- Implementation of a hidden semi-Markov model with missing data and multiple observation sequences for mobility tracking - **Java**

Publications

- **Athar Mahmoudi-Nejad**, Matthew Guzdial, and Pierre Boulanger. "Spiders Based on Anxiety: How Reinforcement Learning Can Deliver Desired User Experience in Virtual Reality Personalized Arachnophobia Treatment" *[under review 2024]*.
- **Athar Mahmoudi-Nejad**, Matthew Guzdial, and Pierre Boulanger. "Arachnophobia Exposure Therapy using Experience-driven Procedural Content Generation via Reinforcement Learning (EDPCGRL)." Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. Vol. 17. No. 1. 2021.
- **Athar Mahmoudi-Nejad**. "Automated Personalized Exposure Therapy Based on Physiological Measures Using Experience-Driven Procedural Content Generation." Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. Vol. 17. No. 1. 2021.
- **Athar Mahmoudi-Nejad**, Pierre Boulanger, and Matthew Guzdial. "Adaptive Virtual Reality Exposure Therapy Based on Physiological Measures." 25th Anniversary Annual International CyberPsychology, CyberTherapy & Social Networking Conference (CYPSY25). 2021.
- **Athar Mahmoudi-Nejad**, Hadi Moradi, and Hamid-Reza Pouretemad. "The Differences Between Children with Autism and Typically Developed Children in Using a Hand-Eye-Coordination Video Game." International Conference on Ubiquitous Computing and Ambient Intelligence. Springer, 256-264. 2017.
- Shadan Golestan, **Athar Mahmoudi-Nejad**, and Hadi Moradi. "A framework for easier designs: Augmented intelligence in serious games for cognitive development." IEEE Consumer Electronics Magazine 8.1, 19-24. 2018.

Achievements

Olympiad Competition Award **2008**

- Awarded in the Math and Literature Olympiads for pre-university students

Ranked 459th the Undergraduate Nationwide Universities Entrance Exam **2009**

- Undergraduate Nationwide Universities Entrance Exam in Iran with more than 300,000 participants

Ranked 65th the Graduate Nationwide Universities Entrance Exam **2014**

- Graduate Nationwide Universities Entrance Exam in Iran with more than 30,000 participants

Additional Experience

Teaching Assistant Experience **Sept 2018–Now**

- Courses: File and Database Management, Artificial Intelligence in Games, Virtual/Augmented Reality and Telepresence, Introduction to Human Computer Interaction, Introduction to GPU Programming.
- Lecturing in lab sessions, design and grading assignments and exams, holding office hours, and proctoring exams.

Treasurer Role at CSGSA **Sept 2019–Sept 2020**

- Computer Science Graduate Student Association (CSGSA) is a voluntary group at the University of Alberta which offers support and activities for Computing Science graduate students