Athar Mahmoudi-Nejad

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Summary

I am a Machine Learning Scientist at Advanced Sensor Research Inc. (ASR), where we design advanced Machine Learning techniques, including state-of-the-art Transformer models, to accurately estimate glucose levels using non-invasive sensors. I earned my Ph.D. in Computer Science from the University of Alberta, where I designed novel Machine Learning, Deep Learning, and Reinforcement Learning frameworks.
My expertise includes Reinforcement Learning, Human-centered AI, Transformers, Time Series analysis, and Game Design. I am passionate about leveraging these technologies to develop innovative solutions that enhance user interactions, deepen engagement, and foster greater awareness.

Education

Doctor of Philosophy, Computing Science **Sept 2018 – Jan 2025**
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

Programming Languages: Python, MATLAB, SQL, C#
Machine Learning Frameworks: PyTorch, TensorFlow, Hugging Face, Stable Baselines3, OpenAI Gym, NumPy, Scikit-learn, Pandas, SciPy
Tools and Platforms: Unity, Git, Jupyter Notebook, Google Colab, Microsoft Visual Studio, Google Cloud Platform, AWS

Industry Experience

Machine Learning Scientist, Advanced Sensor Research Inc. (ASR) **Jan 2025–Present**
- Developed **Transformer-based** frameworks for accurate glucose estimation using non-invasive sensor data. *[PyTorch, Hugging Face]*
- Built and optimized **LSTM** and **Autoencoder** models for forecasting glucose levels from time series sensor data. *[PyTorch, TensorFlow]*
- Conducted comprehensive **Exploratory Data Analyses** to derive actionable insights from sensor data. *[SciPy]*

Intern Research Scientist, Samsung Research Montreal **Jun 2022–Apr 2023**
- Designed and evaluated **Deep Reinforcement Learning** architectures to optimize agent performance. *[PyTorch, OpenAI Gym, Stable Baselines3]*
- Designed and implemented **Curriculum Learning** techniques to progressively train RL agents more effectively. *[PyTorch, Stable Baselines3]*
- Implemented a **Vector Quantized Variational Autoencoder** for efficient clustering of high-dimensional data. *[PyTorch]*
- Adapted and integrated an **Online Decision Transformer** into an existing RL framework. *[PyTorch, Hugging Face]*

Research Engineer, Pars Cognition **Sept 2017–Aug 2018**
- Developed **Mini-Serious Video Games** to advance cognitive science research. *[Unity, GameMaker]*

Academic Experience

PhD Research Experience **Sept 2018–Jan 2025**

- Developed an adaptive system using **Experience-Driven Procedural Content Generation via Reinforcement Learning (EDPCRL)**. *[Python, OpenAI Gym]*
- Designed adaptive **Virtual Reality environments** with personalized parameters. *[Unity]*
- Applied **Machine Learning methods** to estimate real-time stress levels based on physiological signals. *[Scikit-learn, PyTorch]*
- Implemented heart rate estimation from video using a **Convolutional Neural Network (CNN)**. *[PyTorch]*
- Developed an emotion recognition system using a **Multivariate LSTM**. *[PyTorch]*
- Conducted **Human Subject studies** ($n = 30+$) to evaluate the effectiveness of the VR system.

Master Research Experience **Sept 2014–Sept 2017**

- Developed a **Serious Video Game** to investigate behavioral differences between typical and autistic children. *[Unity]*
- Applied **Machine Learning** techniques to analyze gameplay data for identifying key behavioral patterns. *[MATLAB]*
- Conducted **Human Subject studies** for data collection and analysis.

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" *Accepted for publication in ACM Transactions on Interactive Intelligent Systems (TIIS), 2025.*
- Dave Goel, **Athar Mahmoudi-Nejad**, and Matthew Guzdial. "Label-Free Subjective Player Experience Modelling via Let's Play Videos." Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. 2024.
- **Athar Mahmoudi-Nejad**, Matthew Guzdial, and Pierre Boulanger. "Arachnophobia Exposure Therapy using Experience-driven Procedural Content Generation via Reinforcement Learning." 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.

Additional Experience

Program Committee Member **Jun 2024–Present**

- Served as a program committee member and reviewer for the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE) 2025 and the Experimental AI in Games (EXAG) Workshops 2024, with a focus on procedural content generation and experimental AI in games.

Peer Reviewer, Conferences and Journals **Sept 2023–Present**

- Reviewed research submissions for venues including CHI Conference 2024, the PeerJ Journal, and the Transactions on Affective Computing journal.

Teaching Assistant Experience **Sept 2018–Dec 2024**

- 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