

Amin Nasim Saravi

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About Me

Highly motivated professional with a Master's in Computer Science from the University of Calgary. I am passionate about software development, problem-solving, and mathematics. With four years of hands-on research experience in deep learning, computer graphics, visualization, and GPU programming I am a lifelong learner eager to contribute to cutting-edge projects.

Education

Master of Science in Computer Science

Graduation Date: June 2024

University of Calgary, Calgary, Canada

GPA: 4.0/4.0

Relevant coursework: Rendering, Computer Animation, Random Variables & Stochastic Processes

Bachelor of Science in Computer Engineering

Graduation Date: Jan 2020

Bu-Ali Sina University, Hamedan, Iran

GPA: 3.9/4.0

Relevant coursework: Linear Algebra, Pattern Recognition, Computer Architecture

Recent Projects

TTF Project: Machine Learning for Visualization 🧰

Published SIBGRAPI 2024

- Developed, and tested a neural network with a differentiable volume rendering layer on GPU to automate volume rendering of complex, 3D data by generating transfer functions tailored to a given aspect of the data a user intends to track. (Python, PyTorch)
- Developed an interactive GUI for visualizing volumetric data and manipulating transfer functions. Compared and checked the results with other available volume renders. (Matplotlib, 3D Slicer, VTK)
- Applied the method to MRI brain volumes to visualize white matter, gray matter, and CSF, and to NASA's asteroid impact simulation dataset to track pressure shockwaves.
- Developed a script to convert the output transfer functions into a compatible format for 3D Slicer, including transfer functions and colormaps. (Python, 3D Slicer)

Series of Simulations & Animations 🧰

- Created a physically based simulation of a roller coaster with a GUI and simulation controls. Taking into account the preservation of energy, centrifugal force, and track banking. (C++, OpenGL)
- Implemented a mass-spring system for simulating cloth and jelly cube behavior with boundary- and self-collision detection. (C++, OpenGL)
- Simulated bird flocking behavior using the BOIDS algorithm, incorporating smooth steering to prevent collisions with obstacles. (C++, OpenGL)

Machine Learning Rendering

- Optimized rendering performance by storing Cook-Torrance shading in a texture map, based on light and observer angles. (Python, Scikit-Learn)

Professional Experience

Research Assistant

Sep 2020 – May 2024

University of Calgary

- Collaborated with radiology and fluid dynamics experts to explore 3D visualization applications on MRI and simulation volumes, identifying key limitations and areas for improvement.
- Researched deep learning methods to assist and automate 3D data visualization.
- Utilized the University of Calgary's Advanced Research Computing (ARC) cluster and SLURM Job Schedule to perform high performance computing.
- Co-authored a research paper introducing a novel approach to reducing manual effort in volume visualization. Full thesis available on [PRISM](#).

Teaching Assistant

Jan 2021 – April 2024

University of Calgary

- Assisted in teaching over 400 students across courses such as Deep Learning for Vision, Numerical Methods, Computer Graphics, Working with Data and Visualization, and Applied AI in Games.
- Created course materials and interactive visualizations to enhance student comprehension of complex topics.
- Developed unit and integration testing scripts to automate the grading process for student assignments.

Mentorship

Jun 2023 – Aug 2023

UofC AI Summer School

- Mentored a group of five students on their audio command project under the supervision of Dr. Farhad Maleki.

Network Monitoring Intern

Jun 2018 – Aug 2018

SabaNet, Iran

- Monitored and reported internet bandwidth usage using Cacti.
 - Assisted ISP users with access point configuration and reported issues to the relevant department.
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Skills

- **Programming Languages:** C++, C, Cuda C, Python
 - **Frameworks:** PyTorch, TensorFlow (Keras)
 - **Libraries:** OpenGL, NumPy, Pandas, Matplotlib, Scikit-Learn
 - **Tools:** Git, TensorBoard, Jupyter, Paraview, Power BI
 - **Other:** Linux, SLURM Job Scheduler, L^AT_EX
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Publications

TTF: A Guided Approach to Transfer Function Optimization in Volume Visualization

2024

SIBGRAPI, Manaus, Brazil

Link: [authors.elsevier.com/sd/article/S0097-8493\(24\)00202-4](https://authors.elsevier.com/sd/article/S0097-8493(24)00202-4)

An Efficient Approach for Using EM Algorithm in Capsule Networks

2019

International Conference on Machine Vision and Image Processing supported, Qom, Iran

Arxiv: arxiv.org/abs/1912.05333

Certifications

- Neural Networks and Deep Learning – [Credential link](#)
- Structuring Machine Learning Projects – [Credential link](#)
- Improving Deep Neural Networks – [Credential link](#)
- Convolutional Neural Networks – [Credential link](#)