Amin Nasim Saravi

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About Me

Passionate and proactive professional with a Master's degree in Computer Science from University of Calgary. Enthusiastic about problem-solving and mathematics, with a strong background in machine learning, deep learning, visualization, and computer graphics. Committed to continuous learning and eager to leverage my expertise to contribute to innovative projects.

Skills

- **Programming Languages:** Python, C++, C, Matlab, SQL
- **Frameworks:** PyTorch, TensorFlow (Keras)
- **Libraries:** NumPy, Scikit-Learn, Pandas, Matplotlib, OpenGL, OpenCV
- **Tools:** TensorBoard, Jupyter, Git, Paraview, 3D Slicer
- **Other:** Linux, SLURM Job Scheduler, LaTeX

Professional Experience

Research Assistant **Sep 2020 – May 2024**
University of Calgary

- Researched machine learning methods to assist volume (3D) visualization.
- Collaborated with experts in medical imaging and fluid dynamics to explore applications of volume rendering.
- Worked with University of Calgary's Advanced Research Computing (ARC) HPC cluster.
- Co-authored a paper currently under review. The thesis is available at PRISM

Teaching Assistant **Jan 2021 – April 2024**
University of Calgary

- Assisted in courses including Deep Learning for Vision (Python, PyTorch), Computer Graphics (C++, OpenGL), Working with Data and Visualization (Python, Matplotlib, Pandas), Applied AI in Games (Unreal Engine 4), and Numerical Methods (Pyhton).
- Developed course materials and interactive visualizations to aid student understanding of complex concepts. (Python, Matplotlib)
- Implemented Python unit tester to automate the grading process of students' assignments. (Python, Otter-Grader)

Mentorship **Jun 2023 – Aug 2023**
UofC AI Summer School

- Mentored a group of five students on their audio command project. (PyTorch, Teamwork)

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.

Projects

Machine Learning in Visualization & Rendering

- Developed a method to Transfer Transfer Functions (TTF) between similar volumetric datasets by leveraging differentiable volume rendering and neural networks. This approach automates the selection of appropriate transfer functions for visualizing new volumes based on a single example. (Python, PyTorch)
- Applied this method (TTF) to MR brain volumes to visualize white matter, gray matter, and CSF, and to a simulation dataset to visualize pressure shockwaves in water following an asteroid impact.
- Developed a GUI for visualizing volumetric data and manipulating transfer functions. (Python, Numpy)
- Wrote a script for 3D Slicer to convert transfer functions to colormaps. (Python, 3D Slicer)
- Storing Cook-Torrance shading in texture map, optimizing rendering performance. (Python, Scikit-Learn)

Simulations & Animations

- Created a physically based simulation of a roller coaster with a GUI and simulation controls. (C++, OpenGL)
- Implemented a mass-spring system for simulating cloth and jelly cube behavior with collision detection. (C++, OpenGL)
- Simulated birds' flocking behavior using the BOIDs algorithm. (C++, OpenGL)

Education

Master of Science in Computer Science **Graduation Date: June 2024**
University of Calgary, Calgary, Canada
GPA: 4.0/4.0
Relevant coursework: Social Media Analysis, Animation, Rendering, 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: Pattern Recognition, Image Processing, Linear Algebra, OOP

Publications

TTF: A Guided Approach to Transfer Function Optimization in Volume Visualization **2024**
SIBGRAPI, Manaus, Brazil
Under Review

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