Stepan Karapetyan
Northridge, CA | stepan.karapetyan.172@my.csun.edu | linkedin.com/in/stepan-karapetyan- | github.com/Stepkar2004

Education

California State University, Northridge (CSUN) | Northridge, CA
***Bachelor of Science in Computer Science* | Expected Graduation: May 2026**

- **GPA: 3.89 / 4.00**
- **Relevant Coursework: Machine Learning, Data Structures, Algorithms, Automata Theory, Linear Algebra, Ordinary Differential Equations, Probability & Statistics, Operating Systems**
- **Activities & Societies: Society of Software Engineers (SOSE), CSUN SDC, Layer8**
- ***Graduated from Glendale Community College (A.S. Degree, Spring 2022)***

Skills

Languages: Python, C++, Java, SQL, JavaScript
ML / Data Science: PyTorch, TensorFlow, Scikit-learn, NumPy, Pandas, Stable-Baselines3, Gymnasium
Developer Tools: Git, GitHub, Docker, Linux/Unix Environment
Mathematical Foundations: Linear Algebra, Calculus, Ordinary Differential Equations, Numerical Analysis, Chaos Theory, Statistics

Research Experience

AI Research Assistant | SECURE for Student Success, CSUN | Los Angeles, CA
June 2024 – August 2024

- **Led a 4-person team in a comparative study analyzing the efficacy of Neural Networks (MLP, KAN) versus traditional numerical methods for solving nonlinear ordinary differential equations.**
- **Developed and benchmarked deep learning models in PyTorch to predict the trajectory of a chaotic, damped-driven pendulum, implementing custom training and evaluation pipelines.**
- **Demonstrated that for chaotic regimes, the Radau numerical solver achieved high-precision solutions in under 32 seconds, proving significantly more efficient and accurate than deep learning models which required over 20 minutes of training for inferior results.**
- **Synthesized and presented a comprehensive analysis of the team's findings on PINNs at the SfS² First Annual Undergraduate Research Symposium.**

Projects

Reinforcement Learning for Algorithmic Trading | *Python, Stable-Baselines3, Gymnasium, PyTorch*

- **Engineered a trading simulation using gymnasium and gym-trading-env, processing historical market data with Pandas to create a realistic feature set for the agent.**
- **Implemented and trained a Deep Q-Network (DQN) agent using the Stable-Baselines3 framework to learn trading policies based on price and volume indicators.**
- **Analyzed agent performance, concluding that simple RL models struggle with the non-stationarity of financial markets, highlighting challenges in robust reward function design.**

Real-Time Piano Note Recognition App | *Python, Kivy, Music21, Aubio, NumPy*

- **Developed a cross-platform desktop application with a Kivy GUI to provide real-time feedback for piano practice by identifying notes played into a microphone.**
- **Built an audio processing pipeline using Pyaudio for stream input and the Aubio library for highly-efficient live pitch detection.**
- **Leveraged the Music21 toolkit to map detected frequencies to musical notation and investigated algorithms for resolving polyphonic chords from complex audio signals.**

Leadership & Activities

Peer Tutor | CSUN Learning Resource Center | Northridge, CA
August 2023 – Present

- **Mentored over 25 undergraduate students across 10+ Computer Science and Mathematics courses, including Data Structures, Algorithms, and Calculus.**
- **Clarified complex technical concepts through one-on-one sessions, leading to observed improvement in student grades and confidence.**