Nicolas Kim

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Education

Brown University Providence, RI

Sc.B Applied Math - Computer Science (GPA: 4.0/4.0) *Sept. 2022 - Expected May 2026*

- Relevant Coursework: Computer Systems, Databases, Software Engineering, (Graduate) Deep Learning, Data Structures, Algorithms, Convex Optimization, Statistical Inference I/II, Linear Algebra, Multivariable Calculus

Technical Skills

Programming Languages: Python, Java, JavaScript, SQL, C, C++, R, Bash, HTML/CSS
Frameworks and Software: React.js, Docker, Tensorflow, Flask, PyTorch, Pandas, Numpy, scikit

Experience

National Institutes of Health May 2024 – August 2024

Machine Learning Engineer Intern *Bethesda, MD*

- Developed and trained Siamese deep learning models (CNN, RNN, Transformer) in PyTorch to predict DNA edit distances, lowering prediction mean squared error from **7%** to **2%** compared to the lab's MinHash algorithm.
- Enabled multi-GPU distributed training with PyTorch, storing model embeddings in a mySQL vector database.
- Wrote mySQL queries for conducting k-nearest neighbor search across **1,000,000+** sequences in the database.

Singh Lab at Brown University Mar. 2023 – Present

Deep Learning Research Intern *Providence, RI*

- Constructed deep learning model (CNN) for predicting gene expression using PyTorch, achieving a test accuracy of **92%** beating baselines (Random Forest, Support Vector Machine, XGBoost) from scikit-learn by at least 18%.
- Extracted salient features driving model predictions by re-implementing an input-based gradient descent algorithm from literature in Python and PyTorch, corroborating past wet lab results for 3 major histone marks.

Yajima Lab at Brown University Jun. 2023 – Apr. 2024

Bioinformatics Software Engineer Intern *Providence, RI*

- Wrote 10+ Bash scripts and Docker container for a data pipeline analyzing differential splicing in alternative splicing RNA-seq data, integrating the pipeline into the university's Slurm-based HPC cluster as a batch job.
- Identified **1000+** significantly differentially spliced targets using R for downstream validation by the wet lab.

Projects

Music@Brown July 2024 - August 2024

React.js, Python, Flask, SQLite

- Created full-stack web application with React frontend for connecting underground artists to college students.
- Implemented backend user-authentication and serving of REST API for student and artist data with Flask.
- Integrated Spotify API and k-nearest neighbors search algorithm to recommend students to artists based on shared interests in Spotify genres.

Transforming SAR May 2024

Python, Tensorflow

- Designed end-to-end pipeline for identifying humans in 500+ SAR operation images using Vision Transformers.
- Adapted DETR Vision Transformer to do set-based bounding box prediction, using custom multi-component loss function (L1, GIOU) and prediction-to-ground truth matching to improve R^2 from 0.45 to 0.65.

WeensyOS Apr. 2024

C/C++

- Implemented kernel and process isolation in a toy OS, implementing shared and read-only memory, forking and exiting, virtual page allocation, and overlapping virtual address spaces.

Community & Leadership

Hack@Brown Team Lead October 2022 – Present

Workshops Team Lead *Providence, RI*

- Spearheaded development of workshop series for 300+ hackathon participants, organized weekly meetings for 10+ workshop members, presented workshop on deep learning basics and AI ethics with 50+ attendees.