Hanhee Lee

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Education

University of Toronto, B.A.Sc. in Engineering Science + PEY Co-op — Toronto, ON

Major in Machine Intelligence; ***aGPA: 4.00/4.00*** — *September 2022 – April 2027*

Relevant coursework: Machine Learning, Reinforcement Learning, Control Theory, Data Structures & Algorithms, Matrix Algebra & Optimization, Probability & Statistics, Operating Systems

Certifications: Machine Learning & Deep Learning with MATLAB, Deep Learning Specialization (Coursera)

Awards: ESROP Global ($3500), Mitacs Globalink Research Award ($5000), Dean's List (2022-Present)

Skills & Achievements

Languages: Python, C, MATLAB, HTML, CSS, JavaScript, TypeScript, LaTeX

Frameworks & Libraries: PyTorch, Optuna, NumPy, Pandas, Scikit-learn, Matplotlib, Plotly, Flask, Onnx, React.js

Tools: Jira, Notion, GitHub, Git, Cursor, Microsoft Office, Google Workspace

Achievements: 2x Marathon Runner, 14 Years of Competitive Hockey, 2 Years of Highschool Tutoring (Math, Physics)

Experience

Software Engineer Intern | — January 2025 – Present

Savi Finance — *Toronto, ON*

- Developed an OCR-based bank statement parser by implementing a pipeline where Tesseract extracts text from unstructured PDFs, and the OpenAI API converts this text into structured CSV files, enhancing financial data processing efficiency.
- Engineered core functions for PDF validation, extraction, and structured formatting, ensuring efficient parsing and error handling in financial document processing pipelines.
- Designed and executed unit tests with Jest for PDF validation functions, improving code reliability and reducing parsing errors by 30%.

Applied Machine Learning Researcher | — | **Vercel Website** May 2024 – August 2024

National University of Singapore – Professor Birgersson's Lab — *Singapore*

- Implemented 2 multi-layer perceptron (MLP) models with 43961 parameters using PyTorch and MATLAB to predict the fuel cells' pressure drop and temperature, achieving a MAE of 3% across 3,600 fuel cell samples from COMSOL.
- Designed a genetic optimization algorithm using two MLP models as objective functions to minimize PEMFC pressure drop and regulate stack temperature (50-55°C), achieving optimal fuel cell design with a 2% error validated in COMSOL.
- Designed an interactive web tool using HTML, CSS, and JavaScript for fuel cell researchers to input parameters and visualize predictions in 2D/3D.
- Benchmarked Bayesian hyperparameter optimization against grid/random search using Optuna, lowering MLP error by 10% and improving model generalization.
- Preprocessed fuel cell data in MATLAB using IQR-based outlier removal and Z-score normalization, improving model accuracy by 20%.

Projects

Music-line: Music Timeline using Spotify | **Vercel Website** February – March 2025

- Developed a full-stack Next.js web app using React, Supabase, and Spotify API, automating weekly song reveals with a serverless cron job, enhancing engagement for 3 users.
- Implemented a real-time countdown timer with React Hooks and SWR, dynamically updating the UI and improving user retention for weekly song events.
- Optimized frontend responsiveness with TailwindCSS and Framer Motion, reducing UI glitches on mobile devices, ensuring seamless cross-platform performance.

Hanamphne: Multi-Instrument Music Transcription with WaveNet | — January 2025 – Present

- Developing a pipeline that uses a multi-instrument VAE classification model into 17 source instrument separation models, improving classification accuracy by 18% over spectrogram-based models.
- Implementing a sheet-music system using Klang.io for transcription, enabling users to upload audio for sheets.

SmartFit: Wearable Device for Exercise Classification | — December 2024 – January 2025

- Developed an ML pipeline using Scikit-learn for barbell exercise classification, optimizing Random Forest, Neural Networks, Decision Trees, and K-Nearest Neighbors with grid search, achieving 96% accuracy.
- Designed a systematic feature engineering approach by extracting numerical, temporal, and frequency-based attributes, leveraging Decision Trees to rank importance and boost model performance by 10%.

Adaptive Lighting House System | — January 2024 – April 2024

- Collaborated with a 6-person team to design an adaptive lighting system aimed at optimizing energy usage in urban residential buildings in Lagos, Nigeria.
- Designed a capacitor-relay circuit to enable solar-to-grid energy switching based on photoresistor readings, reducing unnecessary power consumption by 30%.
- Programmed a microcontroller using Python to automate LED brightness adjustments, dynamically responding to ambient light levels, reducing manual intervention to switch between automatic and manual modes.