Eugene Baek
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Anticipated Graduation: **April 2026**

Experience

Machine Learning Engineer Intern – Shopify May 2025 – August 2025

- Built and operationalized an evaluation pipeline to assess **1,000+ daily support interactions using a custom LLM**, increasing support quality visibility from <2% of interactions previously evaluated.
- Created a **human-labeled benchmark** validated through inter-annotator agreement and Cohen's kappa and used it to **tune LLM scoring models for higher alignment with human judgment**.
- Designed and implemented a Python framework to **evaluate and benchmark multiple LLMs at scale** using an **LLM-as-a-judge** paradigm.

Machine Learning Intern – 2Digit September 2022 – May 2023

- Improved NLP sentiment classification accuracy by **15%** through **class balancing**, **label refinement**, and **multilingual data augmentation**.
- **Fine-tuned a PyTorch-based** sentiment model on curated and augmented Korean financial news and user-comment data.

Software Developer Intern – Symcor June 2021 – Feb 2022

- Designed and implemented an **automation** pipeline in **Python** to generate quarterly risk reports, reducing manual reporting time by 70%.
- Streamlined access to in-house risk metrics by creating a **MySQL** database and **REST API** in **Flask**, saving the team up to ~40 hours per quarter in data-retrieval.

Projects

Real-Time Executive (RTX) Development

- Designed and implemented a **real-time executive kernel** for the **ARM Cortex M4** microprocessor with **cooperative multitasking** and **round-robin scheduling**.
- Engineered a dynamic task management system with **pre-emptive scheduling** using **Earliest Deadline First**, supporting task creation and termination during runtime.
- Built a **custom memory allocator** as part of the RTX to manage dynamic memory efficiently.

VHDL Compiler

- Implemented a VHDL compiler in **Java** capable of **parsing**, **analyzing**, and **optimizing** VHDL code using **tokenization**, **syntax analysis**, and **code generation**.
- Developed comprehensive **testing** units to ensure the accuracy of the compiler, including input/output validation and functionality checks.

GPT2

- Recreated the GPT2 model from scratch using **Python** and **PyTorch**, implementing the **self-attention** mechanism, **multi-head attention** layers, and **positional encoding**.
- **Collected** and **preprocessed** large volumes of textual data to create a **custom dataset** and trained the model using **Cross Entropy Loss** and the **Adam optimizer**.

Education & Technical Skills

University of Waterloo – BASc in Computer Engineer, Honours April 2026
Relevant Courses – Compilers, Databases, Data structures & Algorithms, Real-Time Operating Systems
Programming Languages – C, C++, Python, Java, SQL
Machine Learning Frameworks – Pytorch, Scikit-Learn
Tools – Git, Pandas, Numpy, MySQL