Shinhaeng Lee

Atlanta, GA | shinhaenglee.com | github.com/OneOfCosmosMostWanted | 470-676-4493

Education

Georgia Institute of Technology | Atlanta, GA *Expected May 2026*
B.S Computer Science, GPA 3.4 / 4.0

Experience

UN Peacekeeper - United Nations Interim Force in Lebanon (UNIFIL) *June 2023 - January 2024*

- Maintained, repaired, and constructed websites and servers for internal communication, and managed computer devices as part of the Signal Company, Republic of Korea Battalion.
- Engaged in civilian operations and peacekeeping initiatives to support the local community.
- Worked with multinational forces to enhance regional stability and security.

Personal Projects

Real-Time YOLOv3 Object Detection Model for Gastrointestinal Endoscopy *August 2024*

- Developed a real-time **YOLOv3** model from scratch using **PyTorch** and **OpenCV** to capture and process video frames for poly detection in gastrointestinal endoscopy.
- Fine-tuned the model on **Kvasir dataset** for polyp detection, achieving a **mAP@0.5 of 0.74**.
- Optimized model performance using **L1 and Taylor Expansion-based structured pruning**, targeting the channels of convolutional layer filters.
  - **L1-based pruning** reduced model parameters by **92%**, with only a **11% drop in mAP@0.5**.
  - **Taylor Expansion pruning** pruned **20% more parameters** than L1 pruning while maintaining comparable accuracy and mAP@0.5.
- Applied **K-Means Clustering** to predefine anchor boxes, accelerating model **convergence by 40%**.
- Implemented a custom **Greedy Pruning strategy (iterative method)**, which further maximized filter reduction, improving real-time performance without significantly affecting accuracy.
- Achieved **real-time performance at 19 FPS with 54ms latency** on a **CPU setting**, demonstrating efficient operation even on lower-performance hardware.

Stock Market Prediction Using Sentiment Analysis *November 2024*

- Predicted stock prices using **multi-layer bidirectional LSTMs with skip connections**, implemented with **TensorFlow** and **Keras**, for time-series analysis.
- Integrated sentiment analysis using tweets collected from the **Twitter API** and historical stock price data (close price) from the **Yahoo Finance API**.
- Applied **TextBlob** for tweet sentiment analysis to capture market sentiment trends.

CycleGAN for Face-to-Portrait Image Generation *February 2024*

- Developed a custom **CycleGAN** model for **unsupervised transformation** of human face into portrait images, utilizing PyTorch for model implementation.
- Enhanced the architecture with modified **UNet-based encoders** and **decoders within PatchGAN**.
- Added **Local Self-Attention** to the encoder to focus on critical regions within each image, improving feature representation and leading to more accurate and detailed outputs.
- Utilized **buffering of past generated images** to minimize model oscillation during training, resulting in more stable and reliable convergence.

Autonomous Driving Simulation with Genetic Algorithm *December 2023*

- Simulated real-time road environments, vehicles, and sensors via a web-based interactive interface, enabling autonomous navigation using a **feedforward neural network** built with **JavaScript, HTML, and CSS.**
- Enhanced driving performance through **Genetic Algorithm,** applying **Elitism, Roulette Wheel Selection,** and**, Two-Point Crossover** for continuous performance improvement.

Skills

Languages: Python, R, java, C/C++, C#, SQL, Javascript, HTML/CSS
Frameworks and Libraries: PyTorch, Tensorflow/Keras, Scikit-learn, Numpy, Pandas, Matplotlib, OpenCV
Technologies: Git, Linux, Docker