

# Shinhaeng Lee

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## 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 polyp 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