Jaeseok Song

Software Engineer & AI Engineer

010-8004-9726 | aa9726@naver.com | GitHub | Blog

I am a software engineer with 3 years and 6 months of experience, focused on **solving manufacturing-floor problems with technology**. I built a computer vision defect classification system end-to-end (planning to deployment, 98%+ accuracy), and I have designed, developed, and operated in-house systems across SCM, BI, and digital twin initiatives to deliver measurable business impact. Across AI/ML engineering, backend systems, data pipelines, and infrastructure, I am a full-stack engineer who **understands domain processes first, designs from the user perspective, and drives execution through completion**.

EDUCATION

Hanyang University, Graduate School of Industry Convergence

M.S. in Manufacturing AI (Graduated: Feb 2026)

Thesis: Improving Connector Vision Inspection Accuracy via Image Normalization and Progressive CNN Learning - Advisor: Prof. Young-eun Cho

Sangmyung University

B.S. in Management Engineering (2016-2022)

EXPERIENCE

KYOCERA Connector Products Korea - IT Team

2022.09 - Present (3 years 6 months)

Manufacturing AI Vision Defect Classification System

2025.09 - Present

Project Lead / Data Scientist & AI Engineer

- **Designed image normalization pipeline (OpenCV)** - Tuned contour-detection parameters by brightness group and combined position weighting with convex-hull filtering to auto-localize connector objects; then applied rotation correction, center alignment, and size standardization to build a **34,734-image normalized dataset**
- **Improved labeling efficiency with unsupervised learning** - Pre-clustered irregular defect types using UMAP + HDBSCAN, significantly reducing manual labeling workload
- **Applied progressive CNN training strategy** - Mitigated severe class imbalance with ResNet50, domain-specific augmentation, and weighted sampling
- **Established experiment management** - Tracked experiments in MLflow and ensured reproducible hyperparameter tuning

Achieved 98%+ defect classification accuracy, improved fine-grained defect typing, and published M.S. thesis

Stack Python, PyTorch, OpenCV, ResNet, UMAP, HDBSCAN, MLflow, Docker

Manufacturing Data Pipeline Architecture

2025.09 - Present

Project Lead / Data Engineer

- **Integrated heterogeneous PLC data in real time** - Built real-time collection pipelines with Node-RED from MC Protocol-based equipment (KEYENCE, Panasonic, Mitsubishi)
- **Optimized time-series ingestion** - Designed a large-scale time-series pipeline with QuestDB
- **Improved edge inference performance** - Built a gRPC-based real-time decision system and removed data bottlenecks by optimizing preprocessing logic

Stack Node-RED, Python, QuestDB, Docker, gRPC, PLC Protocols

Material Supply Chain Management (SCM) System

2024.11 - 2025.01 (3 months)

Project Lead / Backend & Frontend Engineer

- Designed Spring Boot-based MSA architecture and automated order-to-purchase workflows using REST APIs and JPA
- Built React frontend with electronic approval integration and SMTP-based automatic notifications
- Implemented stable data synchronization between legacy ERP (AS/400) and heterogeneous systems

Reduced order error rate to 0% and cut over 80 work-hours per month

Stack Spring Boot, JPA, React, MySQL, Nginx, Ubuntu, SMTP

LLM-Powered Document Auto-Translation System

2025.01 (1 month)

Sole Owner for Planning and Development

- Developed a desktop app integrating LLM APIs to automate KR-JP document translation work that previously took 4 hours/day manually
- Added batch processing to optimize API token usage and built parsers preserving **95% of original formatting** for Word, PowerPoint, and Excel
- Built a cross-platform app with Nextron (Electron + Next.js) and improved UX through an internal pilot group

Reduced translation turnaround time by 90% (4 hours/day to 30 minutes/day)

Stack Python, Flask, GPT-4o mini, Nextron, Electron

3D Digital Twin for Logistics Warehouse

2025.03 - 2025.06 (3 months)

Built a Three.js-based 3D visualization system to solve frequent mis-picks and delayed inventory audits. Combined rack IDs with XYZ coordinates for granular location mapping and integrated real-time inventory from Spring backend.

Stack React, Three.js, Spring Boot

In-House BI Dashboard Implementation

2024.02 - 2025.02 (12 months)

Evaluated Metabase, Superset, and Grafana; selected and rolled out Apache Superset. Built KPI dashboards for production performance and equipment utilization.

Stack Docker, Apache Superset, IBM i DB2

CPK Visibility & Vision Measurement Automation

2023.06 - 2024.08

Digitized manual process-inspection data and automated CPK calculation. Integrated vision measurement equipment with DB to achieve **zero manual input errors**. Reporting time reduced from **5 hours to 30 seconds**.

ERP Barcoding Project

2022.09 - 2023.10 (13 months)

Built barcode automation for full inbound, outbound, and inventory workflows. Achieved **99.9% data-entry accuracy** and saved roughly KRW 50M annually.

OTHER PROJECTS

Secondary Firewall Rollout	2024.10 - 2024.11	Migrated from Fortinet web filter to open-source pfSense while maintaining security and reducing cost
Phishing Training Platform (GoPhish)	2024.05 - 2024.06	Improved internal phishing awareness rate from 45% to **90%**
DLP (Data Loss Prevention) Adoption	2022.12 - 2023.04	Established organization-wide data protection framework
Asset Management (GLPI) Rollout	2022.10 - 2022.12	Introduced centralized IT asset management system
Version Control Migration	2022.11 - 2022.12	Migrated code management from CVS to SVN
BCP Backup Server Setup	-	Built NAS-based business continuity backup system

RESEARCH

Improving Connector Vision Inspection Accuracy via Image Normalization and Progressive CNN Learning

Master's Thesis (2025), Graduate School of Industry Convergence, Hanyang University

M.S. Thesis in Manufacturing AI

- Systematically normalized irregular industrial images with OpenCV to stabilize CNN feature extraction
- Proposed an efficient labeling methodology using unsupervised pre-clustering with UMAP + HDBSCAN
- Addressed data imbalance with ResNet50, domain-specific augmentation, and weighted sampling
- Per-class defect accuracy: underfill **99.55%**, breakage **98.73%**, dent 97.25%, burr 95.83%
- Verified that linking normalization, representation learning, and imbalance correction can materially improve industrial vision inspection

OPEN SOURCE & SIDE PROJECTS

Pixelo **App Store 4.8**

Fully offline iOS/macOS AI image upscaler that converts ONNX SR models to CoreML, with fp16 quantization and NPU acceleration.

App Store

whisper_ggml_plus

Cross-platform on-device speech recognition Flutter plugin based on Whisper GGML, with CoreML/Metal acceleration across five platforms.

pub.dev · GitHub

Every PDF **1,100+ Stars**

All-in-one desktop app for PDF parsing, conversion, merge, and security features using Electron + Next.js + Python (FastAPI).

GitHub

Pose Nudge **153 Stars**

Real-time forward-head-posture detection and alert desktop app based on YOLO-Pose, built lightweight with Rust (Tauri) + React.

GitHub

Pingora Proxy Manager **334 Stars**

Zero-downtime reverse proxy manager based on Cloudflare Pingora, built with Rust backend and React dashboard.

GitHub

Sports Instructor Master **10K+ Downloads**

Flutter-based iOS/Android certification study app delivered end-to-end by a solo developer: planning, development, launch, and operations.

App Store

DDBank

Distributed account transfer system using Saga orchestration; guarantees full consistency with Resilience4j circuit breaker and compensation transactions.

GitHub

PopQR

Android QR scanner and generator app built in Kotlin/Java with CameraX + ML Kit for real-time recognition.

GitHub

ENGINEERING PHILOSOPHY

🔍 Process Understanding Comes First

Even strong programming skills cannot create value without understanding the domain process. While developing production inspection software on manufacturing floors, I learned that mapping process variables before implementation is the only reliable way to avoid costly rebuilds.

👤 Compounding Impact of User-Centric Design

"We can live without it" can still cost 100 users one minute every day, becoming 3,000 minutes in a month. A developer's perspective on what would make work easier is both a privilege and a responsibility. Small features often determine organization-wide efficiency.

🔭 Design for the Long Term

Early design choices have outsized downstream effects, while fundamental changes are difficult once systems are in operation. I aim to evaluate long-term impact, think from other stakeholders' viewpoints, and prioritize structures that remain scalable over time.

TECHNICAL SKILLS

Computer Vision / AI	OpenCV, PyTorch, CoreML, ResNet, CNN, YOLO, ONNX, Transfer Learning, Quantization, GGML
MLOps / Data	MLflow, UMAP, HDBSCAN, K-means, t-SNE, Data Augmentation
Backend	Spring Boot, Python (Flask/FastAPI), JPA, RESTful API, MSA, gRPC
Frontend	React, Next.js, Three.js, Flutter, Electron
Data Pipeline	Node-RED, QuestDB, PLC Protocols, Edge Computing
Infrastructure / DevOps	Docker, CI/CD, Nginx, Ubuntu, pfSense
Databases	MySQL, IBM i DB2, QuestDB
Languages	Python, Java, Rust, JavaScript/TypeScript, Dart, SQL
LLM / VLM	LLM API Integration, Batch Processing, Prompt Engineering