



Shaily Bajpai

AI Research Engineer | Industrial Defect Detection & Vision Systems (IEEE Peer-Reviewer)

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PERSONAL STATEMENT

AI Research Engineer with 3+ years of experience designing, deploying, and evaluating computer vision-based AI systems in production environments, and 6+ years of combined technical and research-driven experience across AI, engineering, and education. Strong background in visual inspection and defect detection under limited and imbalanced data, with hands-on experience adapting foundation and Transformer-based vision models and integrating AI into real-world constraints, in both industrial and medical settings. Focused on autonomous defect detection systems for continuous production environments with minimal human supervision. Experienced in taking AI solutions from experimentation through deployment and user-facing integration, including collaboration with non-AI domain experts. Author of peer-reviewed publications and filed patents in applied computer vision and imaging-based AI systems.

Core Competencies: Industrial Visual Inspection & Defect Detection • Computer Vision • Transformer-based Vision & Vision-Language Models • Annotation-Efficient & Data-Scarce Learning • Model Evaluation, Error Analysis & Robustness • Production AI Systems • Cross-Disciplinary Collaboration

WORK EXPERIENCE

01/2025 – Present

AI Engineer

FlexiGO Inc., South Korea

- Led an end-to-end low-data industrial defect detection pipeline, owning dataset strategy, training, evaluation, and deployment integration for operator-facing inspection workflows (C#/.NET WPF).
- Developed adaptive defect detection methods robust to distribution shift, enabling recognition of rare and unseen defects using embedding-based similarity in feature space.
- Explored foundation-model-based and text-conditioned adaptation strategies to support zero- and few-shot defect localization in data-scarce industrial settings under edge-compute constraints.
- Implemented uncertainty-aware inference, aggregating multiple stochastic predictions to flag ambiguous cases for human review and improve decision reliability.
- Addressed real manufacturing constraints with robust high-resolution image handling (up to ~80MP), including safe loading, memory-limited processing, and multi-resolution coordinate scaling.
- Demonstrated strong performance under real operating conditions while maintaining real-time inference suitable for industrial quality inspection.

02/2023 – 01/2025

Research Assistant

MIP Lab, Chosun University, South Korea

- Conducted research on annotation-efficient and robust deep learning for medical image segmentation and localization.
- Performed systematic experimental evaluation and ablation studies, analyzing model generalization and failure modes under noisy and imbalanced data.
- Investigated representation learning and domain robustness in medical imaging, with methods transferable to industrial defect detection.
- Co-authored peer-reviewed publications in medical imaging and computer vision.

02/2022 – 02/2023

Research Assistant

SunMoon University, South Korea

- Research on industrial automation communication systems (Ethernet/IP).
- First-author publication at IEEE ICCAS 2022.

04/2020 – 01/2022

Mentor-Teacher

WhitehatJr Education Technology, Remote, India

- Taught coding, app development, and AI concepts to global students (ages 6-18).
- Mentored fellow instructors and developed curriculum materials.
- Gained practical insights into student learning processes, motivation, and collaborative problem-solving.

Early Career & Additional Experience (Summary)

- Freelance Subject Matter Expert (Computer Science)-Chegg India, Remote (08/2023 - 08/2024)
- Learning & Development Specialist-Think & Learn (BYJU'S), India (06/2019- 12/2019)
- Walk-in Relations Executive-ANI Technologies (OLA), India (07/2018- 11/2018)

EDUCATION

02/2023 – 02/2025
South Korea

Master of Science in Information & Communication Engineering

Chosun University

GPA: .31/.5 (Distinction)

Thesis: Deep Learning-Based Teeth Segmentation, Missing Teeth Detection and Localization

08/2014 – 06/2018
India

Bachelor of Technology (Hons.) in Computer Science & Engineering

Lovely Professional University

GPA: 7.23/10 (First Division)

Capstone: e-commerce app using Android Studio [↗](#)

🌐 LANGUAGES

English (C1 - IELTS 7.0, 2021)

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🧠 SKILLS

Machine Learning

Deep learning, annotation-efficient learning, domain adaptation, robustness analysis, uncertainty-aware inference

Computer Vision

Object detection, image segmentation, image classification, vision–language models, multimodal learning, visual anomaly detection

Frameworks:

PyTorch, TensorFlow, Hugging Face Transformers, OpenCV, NumPy, Scikit-learn

Programming:

Python, C++, C#, JavaScript, Java

Other Tools:

Docker, GitHub, FastAPI

📄 PUBLICATIONS/PATENTS

- 2025 **DentAll: Annotation-Efficient Dental Segmentation and Missing-Tooth Localization in Panoramic Radiographs**
Computers in Biology and Medicine (Under Review) - Shaily Bajpai, Hamza Shafiq, and Bumshik Lee
- 2025 **Advanced Teeth Instance Segmentation Using Contextual Spatial Attention and Deeper Mask Head** [↗](#)
International Conference on Consumer Electronics (ICCE) / IEEE - Shaily Bajpai, Pankoo Kim, and Bumshik Lee
- 2025 **IA-MUNet: A Knowledge-Guided Instance-Aware Mamba-UNet for Efficient Multiclass Dental Image Segmentation** [↗](#)
Knowledge-Based Systems - Hamza Shafiq, Shaily Bajpai, and Bumshik Lee
- 2022 **Development of Ethernet/IP Adapter for Explicit Messaging in Cooperative Robot Communication** [↗](#)
22nd International Conference on Control, Automation and Systems (ICCAS)/ IEEE - Shaily Bajpai, Rahul Ranjan, Sungchul Lee, Kyung Oh Lee, Joongeup Kye
- 08/2025 **Deep Learning-Based Vision Inspection Device and Method (Application)**
Patent Issuer: Flexigo Co., Ltd. (Korean) - Shaily Bajpai and Lee Ki Yong

📁 PROJECTS

- 2025 **AI Research Assistant - Multi-Agent System** [↗](#)
- Developed an autonomous multi-agent system (Planner, Researcher, Writer, Editor) for structured academic research and report generation.
 - Integrated OpenAI GPT- with arXiv, Tavily, and Wikipedia APIs for multi-source synthesis, with reflection loops and orchestration workflows.
 - Implemented fully Dockerized, CLI-driven pipeline with outputs in Markdown/HTML.
- 2025 **Slackbot MVP - Content Pipeline** [↗](#)
- Built and deployed a Slackbot that processes marketing keywords, groups them, generates outlines, and produces downloadable PDF reports.
 - Developed using FastAPI and Docker; deployed on Render.
 - Demonstrated scalable AI-assisted content workflows in collaborative environments.

📄 CERTIFICATES/AWARDS

Patent Innovation Award (FlexiGO Co. Ltd. | 2026)

Agentic AI [↗](#) (deeplearning.ai | 2025)

Docker on Azure [↗](#) (LinkedIn Learning | 2025)

Generative AI: Working with Large Language Models [↗](#) (LinkedIn Learning | 2025)

Best Session Presentation Award (ICCE 2025 (IEEE) | 2025 - Presented by Professor)

Consecutive research scholarship for 4 semesters (Chosun University | 2023)

🔗 REFERENCES

Dr. Bumshik Lee, Associate Professor,
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Dr. Muhammad Azhar, Associate Professor and Associate Head of Department,
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