

# AVINASH KUMAR

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## ENGINEERING PROFILE

Computer Vision Engineer based in Seoul with 2+ years of experience building end-to-end pipelines for **detection/segmentation (e.g., YOLOv8)**, **image synthesis (GANs/diffusion)**, and robust dataset/training workflows in **PyTorch**. Strong in taking ideas from research to production: data curation, model training, ablation/evaluation, and deployment integration. Interested in **multimodal** and **controllable vision systems** (text/image conditioning), representation learning, and practical CV applications. Published in international venues, with hands-on deployment experience (**mywriting.kr**) and patent applications related to generative model quality and verification.

## TECHNICAL SKILLS

- **Core:** Computer Vision, Deep Learning, Generative AI, Image-to-Image Translation, Model Training & Evaluation, Dataset Engineering.
- **Generative Models:** Diffusion Models, GANs (cGAN, StyleGAN, DCGAN, StarGAN), Neural Style Transfer, Perceptual Loss, Feature Matching.
- **Detection & Segmentation:** YOLOv8, Object Detection, Semantic/Instance Segmentation (U-Net, DeepLab, Mask R-CNN), practical pipeline experience.
- **Frameworks:** PyTorch, TensorFlow/Keras, OpenCV, NumPy, scikit-learn, PIL, Pandas.
- **Programming:** Python (primary), JavaScript, Java, C/C++ (working knowledge), Bash.
- **Tools:** Linux, Git/GitHub, Jupyter, VS Code, LaTeX; basic web deployment with Django/REST APIs.

## PROFESSIONAL EXPERIENCE

- **System Software Lab, Soongsil University** Sep 2022 - Present  
*Research Associate — Computer Vision & Generative AI* Seoul, South Korea
  - Built component-aware pipelines for **Korean Hangul font generation**, combining **YOLOv8 segmentation** with generative models for style-consistent synthesis.
  - Developed and maintained **mywriting.kr**, an end-to-end handwriting/font generation service capable of generating **2,780 Korean characters from 43 handwritten samples**; integrated preprocessing, inference, and font delivery workflow.
  - Implemented training/inference code in **PyTorch** for GAN/diffusion experiments: dataset preprocessing, augmentation, reproducible runs (configs/checkpoints), and evaluation reporting for papers.
  - Co-authored peer-reviewed publications (Electronics 2023/2025; HCLT 2024; ICOIN/arXiv 2025) and contributed to **patent applications** related to font generation quality and style verification.
  - Collaborated with lab members on ablations, qualitative/quantitative comparisons, and figure generation suitable for journal submission.
- **Cubix** Feb 2022 - Aug 2022  
*Assistant Software Engineer (Blockchain / Full-Stack)* Karachi, Pakistan
  - Developed and tested **Solidity smart contracts** for gaming-related tokens and NFTs using Remix IDE and Truffle.
  - Integrated blockchain functionality with JavaScript-based dApps; contributed to decentralized exchange features (liquidity pools, token workflows).
  - Wrote test scenarios and validation scripts to improve reliability and security of smart contracts.

## EDUCATION

- **Soongsil University** Sep 2022 – Aug 2024  
*M.S. Computer Science and Engineering* Seoul, South Korea
  - **GPA:** 4.34 / 4.50
  - **Thesis:** Korean Font Generation using Position-based Components (YOLOv8, GANs)
- **Mehran University of Engineering and Technology (MUET), SZAB Campus** Oct 2016 – Jan 2021  
*B.E. Software Engineering* Khairpur Mir's, Pakistan
  - **GPA:** 3.86 / 4.00
  - **Final Project:** FIS Hostel Finder — Android app to help students locate hostels; supported by Ignite funding (Pakistan).

## SELECTED PROJECTS

- **mywriting.kr — Generative Handwriting/Font Service**  
YOLOv8, GANs (PACGAN), PyTorch, Web Service [🌐]
  - End-to-end font generation workflow: segmentation → generation → packaging/delivery.
  - Generates **2,780 Korean characters** from **43 handwritten samples** (few-shot style acquisition).
  - Focus on preserving component geometry and style consistency across syllables.
- **Component-Guided Hangul Font Generation (Electronics 2025)**  
YOLOv8 Segmentation, Adversarial Style Transfer [🌐]
  - Position-aware component decomposition and recombination for Hangul font image generation.
  - Uses deep semantic segmentation to guide local structure and adversarial transfer to maintain style.
- **Text-Conditioned Diffusion for Korean Font Generation (arXiv/ICOIN 2025)**  
Diffusion Model, Style Encoder, Text Conditioning [🌐]
  - Diffusion-based automatic font generation for complex scripts (Korean), enabling controllable synthesis via text conditioning.
  - Emphasis on stable training and high-fidelity details compared with GAN baselines.
- **FontFusionGAN — Refinement of Handwritten Fonts by Font Fusion (Electronics 2023)**  
StyleGAN-style Fusion, Style Transfer [🌐]
  - Published method to refine imperfect handwriting by fusing handwriting/printed styles to improve readability while retaining author style.

## PUBLICATIONS

- [1] **Avinash Kumar**, Irfanullah Memon, Abdul Sami, Youngwon Jo, Jaeyoung Choi. *Positional Component-Guided Hangul Font Image Generation via Deep Semantic Segmentation and Adversarial Style Transfer*. **Electronics (MDPI)**, 14(13), 2699, 2025. DOI: [10.3390/electronics14132699](https://doi.org/10.3390/electronics14132699)
- [2] Abdul Sami, **Avinash Kumar**, Irfanullah Memon, Youngwon Jo, Muhammad Rizwan, Jaeyoung Choi. *Text-Conditioned Diffusion Model for High-Fidelity Korean Font Generation*. **arXiv/CoRR**, 2025. arXiv: [2504.21325](https://arxiv.org/abs/2504.21325)
- [3] Youngwon Jo, **Avinash Kumar**, Uijong Yang, Jinyeong Jang, Daeun Kim, Jaeyoung Choi. *Korean Handwriting Font Generation Service using Image Generation Model*. **Annual Conference on Human and Language Technology (HCLT)**, 2024, pp. 50–55. [KoreaScience](https://www.koreaScience.org)
- [4] **Avinash Kumar**, Irfanullah Memon, Abdul Sami, Youngwon Jo, Jaeyoung Choi. *Ckfont3: Component-Based Korean Font Generation Using Positional Aware Component Decomposition*. **SSRN**, 2024. [SSRN](https://ssrn.com/abstract=4481448)
- [5] **Avinash Kumar**, Kyeolhee Kang, Ammar ul Hassan Muhammad, Jaeyoung Choi. *FontFusionGAN: Refinement of Handwritten Fonts by Font Fusion*. **Electronics (MDPI)**, 12(20), 4246, 2023. DOI: [10.3390/electronics12204246](https://doi.org/10.3390/electronics12204246)
- [6] Hyston Kayange, **Avinash Kumar**, Yejung Lee, Hoonseo Jung, Jongsun Choi. *Deep Adaptive Feature Selection in Deep Recommender Systems*. **KIISE (Korean Institute of Information Scientists and Engineers) Conference Proceedings**, 2023. [DBpia](https://dbpia.or.kr)
- [7] **Avinash Kumar**, Kyeolhee Kang, Ammar ul Hassan Muhammad, Jaeyoung Choi. *A Study on the Refining Handwritten Font by Mixing Font Styles*. **MITA 2023**, Technical University of Ostrava, Czech Republic, 2023.

## PATENTS (APPLICATIONS)

- **Font verification method for style consistency & shape accuracy (KIPO)**  
Patent Application: 10-2025-0047215 (Submitted: 2025-04-11)
- **Font image generation method to improve handwriting quality (KIPO)**  
Patent Application: 10-2025-0045652 (Submitted: 2025-04-08)

## HONORS & AWARDS

- **Best Research Paper Award** 2023  
MITA 2023, Czech Republic
- **Sakura Science / Exchange Program** 2018  
Japan
- **Ignite Funding (Undergraduate Project Support)** 2020–2021  
Pakistan

## REFERENCES

Available upon request.