Colette Suhjung Koo
https://sj0414.github.io/colette-koo/

EDUCATION

Konkuk University Seoul, Korea
March, 2023 - February, 2025
Expected graduation: February, 2025
B.S., Computer Science and Engineering
Coursework: Computer Graphics, Advanced Computer Graphics, Human Computer Interaction, UX Design, Digital Image Processing, Computer Vision

Sungshin Women's University *(Transferred)* Seoul, Korea
March, 2021 - February, 2023
Majored in AI Convergence, Artificial Intelligence

RESEARCH EXPERIENCE

Undergraduate research assistant, Adviser: Professor Hyungseok Kim July, 2024 -

- Worked on 'Real-Time Photorealistic Rendering Technology for Large-Scale Digital Twin' research project.
  - Designed a system capable of rendering high-density models in real-time and successfully rendered models with over 10 million polygons and billions of point cloud data on a high-performance computing environment.
  - Implemented Image-Based Lighting (IBL) to efficiently handle high-frequency reflections in complex environments. Enhanced visual realism through optimized lighting techniques, refined microfacet models, and adaptive importance sampling using modern OpenGL.
  - Enhanced Physically Based Rendering (PBR) by developing adaptive texture map formulas and modular shaders, improving visual fidelity and performance.
  - Developed functionality to load multiple GLTF models with a system that assigns optimized shaders and rendering parameters at load time to meet the specific rendering requirements of each model.
  - Developed an efficient rendering pipeline by implementing multiple shader cases for PBR and IBL, tailored to handle scenarios such as those with or without texture maps.
  - Built a system using modern OpenGL and am working on transitioning it to Vulkan for enhanced performance and scalability.
  - Expected to present at the HCI KOREA 2025 Conference with the paper 'Realistic Lighting Implementation and Optimization Using Physically Based Rendering and Image-Based Lighting' in the poster session. (February 2025)

Undergraduate research assistant, Adviser: Professor Haewon Byun January, 2022 - June, 2022

- Applied knowledge of data structures and algorithm design from C++ Programming and Advanced C++ Programming courses to solve Kaggle problems. Gained hands-on experience in processing real-world datasets and optimizing machine learning models to improve performance and accuracy.
- Analyzed research papers by integrating knowledge gained from Artificial Intelligence and Data Structures courses and expanded concepts of neural networks and machine learning models.
- Accumulated knowledge in deep learning and discussed various topics in seminars with other lab researchers.

PROJECTS

Graduation Project: Conference Record Management Service Using Computer Vision

- Used OCR and STT in developing a conference record management service which summarizes and records meetings, and further made the sharing of notes and schedules possible with team members.
- Achieved a recognition accuracy of 95% by fine-tuning EasyOCR model with approximately one million handwritten Korean text images.

- Integrated a fine-tuned model into the service in collaboration with FE and BE teams through the AI engineering process. Developed an API workflow enabling Spring to send requests, Flask to process images with the model, and return results.
- Showcased the project's key features and impact effectively by performing a one-minute madness pitch and organized a metaverse online exhibition including a three-minute explanation video.

'Nanuming' Project: A Non-Face-to-Face Sharing Service for Childcare Supplies

- Developed a non-face-to-face service that allows users to easily share and receive childcare supplies through the 'Nanuming Locker.'
- Created the 'Nanuming Locker', which can be unlocked via Bluetooth, using 3D printing and Arduino.
- Developed an AI-based category recommendation system based on titles and implemented an image similarity analysis system utilizing Google Cloud's Vertex AI generative models and LangChain.
- Identified causes of Korea's severe low birth rate and proposed a solution in alignment with the UN Sustainable Development Goals.
- Conducted actual user tests and feedback for service improvement and verification.
- Managed the project using collaboration tools such as Jira and Confluence.

EXTRACURRICULAR ACTIVITIES

Google Developer Student Clubs at Konkuk University
October, 2023 – July, 2024
Regular Member of AI

- Gave a presentation on documentation, organization, and planning, focusing specifically on the Bullet Journal method.
- Led the *'Nanuming'* project, a non-face-to-face sharing service for childcare products using a self-designed *'Nanuming Box.'*
- Achieved top 21% ranking with fellow AI team members in an AI competition on Dacon to predict prices of specialty products from Jeju.
- Participated in a study group focused on reading and analyzing AI research papers concentrating on Transformer models.
- Participated in a study group to acquire foundational knowledge in machine learning engineering.

AWARDS & SCHOLARSHIPS

- **Research For Undergraduate Students (RUS) Program Scholarship**
  Konkuk University, Awarded scholarship for participation in the RUS program for the research project *'Real-Time Realistic Rendering Technology for Large-Scale Digital Twin'*, recognizing academic commitment and research potential. (2024)
- **Wrtn Technologies Inc. 2nd Ideathon, Generative AI Ideathon On Konkuk, Excellence Award**
  Awarded for the idea *'Petamong: Helping Young Adults Achieve Daily Goals with a Growing Pet Companion'* (2024)
- **STARTUP021 2023 Entrepreneurship Club Grant**
  Received funding through the STARTUP021 program for participation in the 2023 Entrepreneurship Club initiative, supporting the development of a *'Campus Navigation System and AI Chatbot Service'*. (2023)
- **Software Innovation Competition at Sungshin Women's University 2022, Gold Prize**
  Awarded for the project *'CAMVI: Campus Navigation System'* (2022)
- **S+ Mileage Scholarship**
  Sungshin Women's University, Awarded for outstanding participation in school activities. (2022)
- **Scholarship for Academic Excellence**
  Sungshin Women's University, Awarded for top academic performance in Second Year, First Semester. (2022)

- **Language Skills Enhancement Scholarship**
  Sungshin Women's University, Awarded for achieving an excellent score on a recognized English proficiency test in Korea. (2021)
- **Scholarship for Academic Excellence**
  Sungshin Women's University, Awarded for top academic performance in First Year, Second Semester. (2021)
- **Scholarship for Academic Excellence**
  Sungshin Women's University, Awarded for top academic performance in First Year, First Semester. (2021)

COMPETENCIES

Language Proficiency
English: TOEFL iBT Score 103/120
Korean: Native
Programming Languages
C++, Python, GLSL, Kotlin, Java
Frameworks & Libraries
OpenGL, Vulkan, OpenCV, PyTorch, TensorFlow

REFERENCES

Hyungseok Kim
Professor
Department of Computer Science and Engineering at Konkuk University
Email: hyuskim@konkuk.ac.kr
Phone: 010-2599-8295

Hyunkook Jang
Professor
Department of Computer Science and Engineering at Konkuk University
Email: hkjang@konkuk.ac.kr
Phone: 010-4330-6287

Jaigun Kim
Professor
Department of Computer Science and Engineering at Konkuk University
Email: jaygkim@konkuk.ac.kr
Phone: 010-9770-0600