Jin (Hyeong) Park, MS

Research Engineer at AI Research Institute, Neowiz | Seoul, Republic of Korea
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SUMMARY

An AI research engineer in the game industry, keen to impress audiences through computer graphics combined with machine learning. Jin's best capabilities cover the signal processing, geometry processing, and data-driven approaches. His work has been contributing to the growing game development industry in South Korea, notably by working on one of the first AAA game titles (Lies of P) solely developed from the Korean game industry.
*2023 Game of the Year (Apple Store Awards & NYX Game Awards)
*2024 Apple Design Awards: Visuals and Graphics
Research Interests: *Neural Rendering, Neural Material Representation, Inverse Rendering*

EDUCATION

Chung-Ang University (CAU), Seoul, Korea Mar 2018 - Mar 2020
M.S. in Computer Science and Engineering *(Focus: Machine Learning)*

- Advisor: Jaesung Lee | GPA 3.82/4.0
- Thesis: Effective Front-end Architecture Search for Random Weight Network on Edge Device
  Keyword*: Neural Architecture Search, Heuristic Search Algorithm, Edge Computing*

Korea National University of Transportation (KNUT), Gyeonggi-do, Korea Mar 2014 - Mar 2018
B.S. in Computer Science and Information Engineering

- Advisor: Sungwook Lee | GPA 3.67/4.0

PROFESSIONAL EXPERIENCE

AI Research Institute, **Neowiz | *Head: Sung-Gyu Oh*** Nov 2020 - Present
Research Engineer

- Leading the development of the AI portion of a 2023 Game of the Year Nominated AAA game title (Lies of P)
- Currently applying deep learning solutions to generate resources for game development, including 3D models, 2D illustration, and sound effects (SFX).
- Developed and introduced a AI-based semantic search system to retrieve AAA game resources efficiently; specific to SFX and 3D Graphic resource
- Implemented deep learning in the Game content difficulty prediction QC process, leading to a 30% reduction in operational costs (DJMAX)

Machine Intelligence Lab, **Chung-Ang University (CAU) | PI: Dr. Jaesung Lee**
Graduate Research Assistant Mar 2018 - Aug 2020
Research Intern Jul 2017 - Feb 2018

*** 2 lead authored & 2 co-authored works**

- **Publication Work #1 (co-authored)**: Multi-label Naïve Bayes Classifier Considering Label Dependence; data preprocessing, experimental design and studies, statistical analysis, manuscript writing, and minor revision support
- **Publication Work #2 (co-authored)**: Implemented a compact feature subset for music categorization on mobile devices; performed data analysis, conducted experiments, and provided technical support throughout the research process.
- **Publication Work #3 (lead authored)**: Multi Population Memetic Search for Effective Multi-label Feature Selection

- **Publication Work #4 (lead authored)**: Evolutionary Algorithm Design for Effective Multi-label Feature Selection
- Mentored experimental design and academic paper writing for junior MS student and undergraduate interns

PUBLICATIONS AND PRESENTATIONS

Published in SCI(E) Journals:

Hae Cheon Kim, **Jin-Hyeong Park**, Dae Won Kim, and Jaesung Lee, "Multi-label Naïve Bayes Classifier Considering Label Dependence", *Pattern Recognition Letters,* Vol. 136(1) 279-285, **2020**

Jaesung Lee, Wangduk Seo, **Jin-Hyeong Park**, and Dae Won Kim, "Compact Feature Subset Based Multi-label Music Categorization for Mobile Devices", *Multimedia Tools and Applications,* Vol. 78 4869-4883, **2018**

International Conference Presentation:

Jin-Hyeong Park, and Jaesung Lee, "Multi Population Memetic Search for Effective Multi-label Feature Selection" *2019 International Conference on Platform Technology and Service, BooYoung Hotel & Resort, Jeju, South Korea, (2019)*

Korean Conference Presentation:

Jin-Hyeong Park, and Jaesung Lee, "Evolutionary Algorithm Design for Effective Multi-label Feature Selection" *Spring Conference of SEBS & KISM, 1(1):241-242, CAU 100th Anniversary Memorial Hall, Seoul, South Korea, (2018)*

INDUSTRY PROJECTS

Automated Hair Guide Model Generation for Game Characters from 3D Reconstruction Apr 2024 - Present

Neowiz, South Korea

Keyword: 3D Content Generation, Inverse Rendering, Geometry Processing

- Designed a hair guide model generation pipeline to optimize the creation of game hair models, utilizing Geometry Processing techniques including clustering, importance sampling, and resampling.
- Developed a post-processing procedure that parametrically differentiates guide hair using results from existing Inverse Rendering research.

Enhanced Game Image Generation AI Service Development and Feature Integration Jan 2024 - Present

Neowiz, South Korea

Keyword: Stable Diffusion-based Image Generation, Human-Computer Interaction

- Developed and enhanced the AI service for game artwork by integrating features including concept art generation from sketches, specific art style application, and diverse background variations from prompts.
- Successfully implemented these advanced functionalities into the live service, improving the creative workflow and expanding the game art production capacity

Preliminary Research on Motion In-Betweening for 3D Character Animation Sep 2023 - Dec 2023

Neowiz, South Korea

Keyword: 3D Animation Interpolation, Conditional Motion Generation, Implementation in Unreal Engine

- Explored the real-time generation feasibility of intermediate motions for in game animation in new AAA game titles
- Implemented a prototype about other published works on the Unreal Engine and conducted real-time performance evaluation

Quality Control in Rhythm Games through Automated Difficulty Level Evaluation Jan 2023 - Present

Neowiz, South Korea

Keyword: Deep Learning, Regression Analysis, Active Learning, Content Design Support Tool

- Automated the difficulty level evaluation for new contents in rhythm games (DJMAX) using deep learning

- The automation model achieved a 30% time costs reduction for QC process

Semantic Search System Development for Effective Game Resource Retrieval Nov 2022 - Dec 2023
Neowiz, South Korea
Keyword: Neural General-purpose Representation, Signal Processing, Vector Search, 3D Models, SFX

- Established the semantic search system based on similarity using general-purpose audio representations generated via SSL
- Implemented an Iterative Search mechanism to refine searches according to user intention; achieved higher semantic results accuracy
- Improved search performance significantly on over-300K SFX files database; enhanced resource retrieval efficiency

Development of Facial Animation Pipeline for Lip Sync and Emotion based on Voice and Script [video] Aug 2022 - Oct 2022
Neowiz, South Korea
Keyword: Signal Processing, Multivariate Prediction, Sentiment Analysis

- Developed an automated pipeline for facial animations in cartoon-style games
- Constructed the pipeline utilizing a Script-based Sentiment Analysis Model and Speech2Viseme Model to automate the facial animation creation

Neural Audio Filter for Transforming Monster Voices into Machinery Sounds [video] Jun 2021 - Oct 2022
Neowiz, South Korea
Keyword: Signal Processing, Audio Style Transfer, GANs, Audio Super-Resolution

- Conducted research on style domain transfer to convert monster voice into machinery sounds while preserving the original nuances
- The output of this research was utilized as SFX in a AAA games (Lies of P), which won the Game of the Year awards at the 2023 Apple App Store Awards and NYX Game Awards

Development of ClickML - An Internal AutoML Desktop Application Dec 2020 - May 2021
Neowiz, South Korea
Keyword: AutoML, Tabular Data, Time Series Data, Classification, Prediction, Cross-Platform Development

- Developed AutoML App implementing various ML algorithms (XGBoost, Naive Bayes, AR, etc) to handle both tabular and time series data for classification and prediction tasks.
- Successfully ported the application across Windows, Linux, and MacOS, enhancing the accessibility and efficiency of machine learning model building within the organization, significantly reducing data analysis and model deployment time.

ACADEMIC PROJECTS

Korean Music Reproducing System based on Cultural Aesthetics Mar 2019 - Mar 2020
Ministry of Science and ICT, South Korea
Keyword: Signal Processing, Audio Style Transfer, Generative Adversarial Networks (GAN)

- Developed a GAN-based music reproducing system using digital signal processing to transfer traditional Korean musical styles to contemporary music, enhancing cultural appreciation.

Development of Computer based Three-Dimensional Medical Image Analysis Program for the Objective Assessment of Orbital Disease Sep 2018 - Oct 2019
National Research Foundation of Korea
Keyword: Computer Vision**,** 3D Deep Learning

- Conducted the research project for thyroid orbitopathy classification in medical CT images using 3D Convolution-base Neural Networks
- Achieved a performance of 1) 97% on binary classification tasks and 2) 92% on multi-classes classification tasks, as measured by the ROC curve

Post-human era, Build HAI(Humanities with Artificial-Intelligence) for enhancing the humanity value Jun 2018 - Aug 2020
Ministry of Education, South Korea
Keyword: Natural Language Processing, Ancient Literature Data, Statistical Analysis

Inter-cultural Korean Music Discovery based on Pluralistic Music Emotion Mar 2018 - Aug 2018
Ministry of Future Creation and Science, South Korea
Keyword: Signal Processing, Neural Network, Music Recommendation System

- Developed a music recommendation system by generating a joint embedding space for emotions and music features using digital signal processing and neural networks.

ADDITIONAL PROJECTS

Ray Tracing Implementation

- Implemented a basic ray tracing engine from scratch following the concepts in "Ray Tracing in One Weekend."
- Developed features such as sphere rendering, shading, reflections, and camera control, enhancing understanding of computer graphics and rendering techniques.

NeRF Implementation and Key Research Review

- Reviewed key research papers on NeRF, summarizing the core techniques and advancements, to deepen understanding of 3D scene reconstruction and rendering methods.

DirectX 11 Graphics Implementation

- Implemented various computer graphics concepts using DirectX 11, gaining experience in Physically-Based Rendering, Compute Shaders, Particle Animation, Phong Shading, and Geometry Processing.

AWARDS AND HONORS

Funding & Scholarships

Research Assistantship (A), CAU Mar 2018 - Mar 2020
- Full Tuition Scholarship

National Science & Technology Excellence Undergraduate Scholarship, KSF Sep 2016 - Jun 2017
- Full Tuition Scholarship

Academic Excellence Scholarship, KNUT Sep 2014 - Nov 2015
- Full Tuition Scholarship

Awards

Bronze Medal in Featured Code Competition - CommonLit Readability Prize, Kaggle 2021
CommonLit, Inc.
- Text data Readability Level prediction challenge in Kaggle
- Top 10%, [link]

Silver Medal in Research Prediction Competition - Ion Switching, Kaggle 2020
University of Liverpool
- Time series biological data prediction challenge in Kaggle
- Top 4%, [link]

Excellence Award in Software Competition, KNUT 2017
KNUT Computer Science & Information Engineering Academic Festival
- Developed a Speech Recognition-based smart mirror system utilizing National Public Data

Gold Award in Transportation・Convergence・General Challenge, KNUT 2016

- Developed an efficient train seat monitoring App about Korea Railroad Corporation

TEACHING EXPERIENCE

Teaching Mentor for Undergraduate Interns, CAU Sep 2018 - Mar 2020

- Mentored experimental design and academic paper composition

Teaching Assistant, CAU Mar 2019 - May 2019
Artificial Intelligence Class

- Held weekly Q&A Sessions & support undergraduate students mentoring

Teaching Assistant, CAU Sep 2018 - Oct 2018
Numerical Analysis Class

Teaching Assistant, CAU Mar 2018 - May 2018
Discrete Mathematics Class

LANGUAGE

- English: Proficient or Advanced
- Korean: Native

SKILLS

Qualitative Methodologies
Ethnographic Research・User Interview・Content Analysis・Case Study・Iterative Design and Feedback Loops ・Collaboration and Communication

Quantitative Methodologies
Statistical Analysis・Experimental Design・Signal Processing・Geometry Processing・Data Processing

Programming
Languages: Python・C++・LaTeX・Javascript
Framework: PyTorch・DirectX 11・Vue.js
Software: Blender・COLMAP・Unreal Engine・Unity・Mitsuba 3・ComfyUI・MATLAB

MEMBERSHIP

BrainKorea(BK)21 Four (Associate membership in the Institute for Innovation and Coexistence Education Research, supported by the Ministry of Education and the National Research Foundation of Korea)

EXTRA EXPERIENCE

- Korean Military Service Completed
- Lab Manager for 2 years (2018-2019), managed primary lab operations and coordinating research activities at the Machine Intelligence Lab, CAU
- Student Representative for the junior year (2016), followed by the senior (2017), Computer Science and Information Engineering Department, KNUT