Nguyen Minh Hieu

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Research engineer specialized in Graphics, 3D Geometry Processing, and Machine Learning.

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST)   Feb 2021 – Aug 2024
Bachelor in Computer Science and Electrical Engineering   Daejeon, South Korea

INDUSTRY EXPERIENCES

NetropyAI   Oct 2024 – present
Research Engineer - 3D Reconstruction   Seoul, South Korea
- Lead the analysis and development of robust and lightweight 3D reconstruction methods for robotic simulation.

StoneLab   Mar 2024 – Jun 2024
Machine Learning Research Intern - 3D Machine Learning   Seoul, South Korea
- Conduct research on 3D Adaptive Shell for accelarated segmentation and classification on CT-Scans.
- Conduct research on the Inverse Diffusion Model on Medical Imaging.

Steinfeld Co.   Jun 2022 – Aug 2022
Software Engineer Intern - Graphics and Geometry Processing   Seoul, South Korea
- Implemented Bézier curve editing algorithm and tools on surface meshes of dental crowns.
- Implemented Surface Editing and Deformation for dental crowns.

RESEARCH EXPERIENCES

Visual AI Lab, KAIST   Jul 2022 – Sep 2024
Student Researcher supervised by prof. Minhyuk Sung   Daejeon, South Korea
- Worked on utilizing CLIP as a multi-view regularizer for Neural Radiance Field (NeRF).
- Published a paper in ICCV 2023 on Latent Diffusion for shape generation and manipulation: Worked on network architecture design, formulation, and implemented text-based editing.
- Published a paper on Cylinder Extrusion CAD model from Multi-view Images: Led the initial implementation of the main method and optimal surface extraction from the neural field.
- Worked human motion diffusion interpolation via hyperpherical splines.

Data Science Group, KAIST/IBS   Dec 2021 – May 2022
Student Researcher supervised by prof. Meeyoung Cha   Daejeon, South Korea
- Used Contrastive Learning and manifold-based dimensional reduction method to analyze and visualize the social-economic trends based on the evolution of sneaker design.

NMAIL Lab, KAIST   Feb 2020 – Dec 2020
Honor Research Program Student hosted by prof. Sungho Jo   Daejeon, South Korea
- Worked on rewriting and merging weights of generative models.

Ahn Microbial Engineering Lab   Jan 2019 – Feb 2021
Student Researcher supervised by prof. Junghoon Ahn   Busan, South Korea
- Conducted analysis on Protein Docking Simulation using Maestro.
- Developed and published an efficient algorithm for Protein Mutatation based on Linear Charge Density. This software is the basis for 3 publications to Biomedicine (2021), IJMS (2022), and Microbial Cell Factories (2024).

PUBLICATIONS

[1] **MV2CAD: Reverse Engineer CAD from Multi-view Images**
Eunji Hong, **Nguyen Minh Hieu**, Mikaela Uy, Minhyuk Sung
NeuRIPS, 2024
arxiv

[2] **SALAD: Part-level latent diffusion for 3D shape generation and manipulation**
Juil *, Seungwoo Yoo*, **Nguyen Minh Hieu***, and Minhyuk Sung
ICCV, 2023 (* denotes equal contribution)
arxiv · project page · code · hugging face demo

[3] **PySupercharge: an algorithm for enabling ABC transporter bacterial secretion of all proteins through amino acid mutation**
Yerin Kim, Danny Kim, **Nguyen Minh Hieu**, Hyunjong Byun, Jung Hoon Ahn
Microbial Cell Factories, 2024

[4] **Generalized Approach towards Secretion-Based Protein Production via Neutralization of Secretion-Preventing Cationic Substrate Residues**
Byun Hyunjong, Park Jiyeon, Fabia Benedict Uy, Bingwa Joshua, **Nguyen Minh Hieu**, Lee Haeshin and Ahn Jung Hoon
International Journal of Molecular Sciences, 2022

[5] **Utilizing the ABC transporter for growth factor Production by fleQ Deletion Mutant of Pseudomonas fluorescens**
Fabia Benedict-Uy, Bingwa Joshua, Park Jiyeon, **Nguyen Minh Hieu**, and Ahn Jung-Hoon
Biomedicines, 2021

PROJECTS

Wave Equation Solver with Walk-on-Boundary

- [code] Designed and implemented an algorithm for solving the Helmholtz equation using Walk-on-Boundary method.

Implemented Geometry Processing Papers

- [code · paper] The Heat Method for Distance Computation. (SIGGRAPH15)
- [code · paper] Parametric Gauss Reconstruction for Normal Estimation (SIGGRAPH22).
- [code · paper] Monte-Carlo Geometry Processing. (SIGGRAPH21)

Implemented Diffusion Papers

- [code · paper] Score-Based Generative Modeling through SDEs. (ICLR2021)
- [code · paper] Flow Matching for Generative Modeling (ICLR2023)
- [code · paper] I^{2}SB: Image-to-Image Schrödinger Bridge (ICLR2023)

Rendering Projects

- [code] Implemented Rasterizer with shading
- [code] Implemented Tiny SDF renderer with csg-tree support

Implemented LZ77 Compression

- Implemented the LZ77 encoding and decoding algorithm with Python

SKILLS

Languages: C++, Python, Rust, CUDA, WGSL, Slang
Frameworks: PyTorch, OpenGL, WebGPU, Thrust, libigl

GRANTS AND SCHOLARSHIPS

KAIST Fully-funded scholarship for undergraduate and 16,800,000 KRW stipend (12,367 USD)
Undergraduate Research Program (URP) Spring 2024 grant of 5,000,000 KRW (3,681 USD)
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