Wonseok Oh

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Research Interests

Computer Vision, Machine Learning, Generative Diffusion Model, Robotics

Education

University of Michigan Ann Arbor, Michigan

M.S. Electrical and Computer Engineering *09/2023 - (04/2025)*

- Overall GPA : 3.9 / 4.0 (98.7 / 100)

Course work: Principles of Machine Learning (A+), Foundations of Computer Vision (A), Advanced topics of computer vision (A), Action and Perception (A), Artificial Intelligence in Biomedicine (A)

Korea University Seoul, South Korea

B.S. Computer Science and Engineering *03/2015 - 08/2023*

- Overall GPA : 4.07 / 4.5 (95.7 / 100)

Course work (A+): Artificial Intelligence, Computer programming, Natural language processing, Algorithm, Data structure, Introduction to convex optimization, Theory of computation, Discrete Mathematics, Mathematics for computer science, Computer Architecture, Special lecture for computer science

Korea University Seoul, South Korea

B.Eng. Software Technology and Enterprise Program, B.Eng. Chemical and Biological Engineering *03/2015 - 02/2022*

- Major GPA of STE : 4.15 / 4.5 (96.5 / 100)
- Military service: 09 2016 - 06 2018

Research Experience

Domain transfer of sketched facial image into realistic facial image to prevent crime (best project)

EECS504 Foundations of Computer Vision (Instructor: Jason Corso) [ppt] [Link]

- Improved forensic methods by generating detailed images of criminals from sketches using the pSp model. Then, refined these images by applying specific characteristics through InstructPix2Pix. Evaluated the approach with real sketches.

Enhancing Multi-View Illusion Generation with Latent Diffusion Models and Image Processing

EECS556 Image processing (Instructor: Liyue shen) [Link]

- Improved the perception of multi-view optical illusions by combining latent diffusion models with traditional image processing techniques. Our approach generates high-quality images from limited data and provides diverse transformations, including rotations and flips, to enhance the details usually obscured in 2D images.

Robotic Adaptation Strategies: From Simulation to Real-World Execution with RMA

EECS598 Action and Perception (Instructor: Stella Yu) [Link]

- Enhanced and evaluated Rapid Motor Adaptation (RMA) for legged robots. Key components include fine-tuning RMA to better adapt to diverse terrains, comparing phase-1 and phase-2 adaptations, and methodically analyzing performance across a range of environmental challenges in the real world.

Multimodal with Latent Diffusion Models to Advance Multi-View Optical Illusion Generation

EECS542 Advanced topics of computer vision (Instructor: Andrew Owens) [ppt] [Link]

- Proposed a method that enhances latent diffusion models with multimodal inputs, including sound and text, to generate dynamic multi-view optical illusions. Demonstrate the feasibility of multimodal approaches in enhancing optical illusion generation, evidenced by superior CLIP scores.

Generate Domain Knowledge Diffusion Models employing the Schrödinger Bridge

EECS598 Biomedical Imaging (Instructor: Liyue shen) [Link]

- Improved the perception of multi-view optical illusions by combining latent diffusion models with traditional image processing techniques. Our approach generated high-quality images from limited data and provided diverse transformations, including rotations and flips, to enhance the details usually obscured in 2D images.

Learning Accurate and Parsimonious Point Cloud Representations from Images.

EECS453 Principles of Machine Learning (Instructor: Qing Qu) [ppt] [Link]

- Combined the strengths of volumetric neural rendering and deep multi-view stereo, using neural 3D point clouds and features to efficiently model a radiance field, improving both efficiency and visual quality.

Conference & Journal Publications

Conference publications

- **Wonseok Oh** et al. 2024. From 2D Portraits to 3D Realities: Advancing GAN Inversion for Enhanced Image Synthesis. *CVPR 2024 2nd Workshop for Learning 3D with Multi-View Supervision* (CVPRW 2024) **(oral)** [Link]
- **Wonseok Oh** 2024. Enhanced3DPlaceRecognition: Integrating Graph Convolution with Max-Pooling. [Link]
- **Wonseok Oh** 2024. Cross-Domain Generalization: Enhancing Rare Disease Data Representation using Diffusion Model. (under review) [Link]
- **Wonseok Oh*** (Corresponding Author) Advancements in GAN-based Image Translation: Introducing StyleGAN with Attention-based Encoding (SAE) *Korea Computer Congress 2023* (KCC 2023) **(oral)** [Link]
- **Wonseok Oh*** (Corresponding Author) Improving quality of pixel-wise transfer using Abortion method *Korea Computer Congress 2023* (KCC 2023) **(oral)** [Link]
- **Wonseok Oh** et al. 2021. Visualization Comparison of GAN for Reconstructing De-identified Image Dataset using Attention. *Korea Software Congress 2021* (KSC 2021) (Korean) [Link]

Journal publications

- **Wonseok Oh** et al. 2021. RDID-GAN: Reconstructing a De-identified Image Dataset to Generate Effective Learning Data. *Journal of Korean Institute of Information Scientists and Engineers 2021* (JOK 2021) (Korean) [Link]

Patents

- Kangmin Bae and **Wonseok Oh**, "Method and image processing system to generate training data" Us Patent, Korean Patent (2021) (Patent Appication)
- **Wonseok Oh**, "Dual Tube Wheel" Korean Patent Registration No. 1020110004742, (2011, granted)
- **Wonseok Oh**, "Mask that make used Hanji" Korean Patent Registration No. 1020100035593, (2010, granted)

Awards and Scholarships

Michigan Scholarship: Rackham Conference Travel Grant
University of Michigan *2024*

Excellence Award: 2022 Capstone Design/Independent Study Competition
Korea University *2022*

Semester High Honors
Korea University *2022*

Excellent Mentor award
Korea University *2022*

National Work Scholarships(Government)
Korea University *2022*

Special Scholarship for leaders
Korea University *2020, 2021, 2022*

The Volunteer Service Award
The Seoul Metropolitan Government *2021*

Work-Study Scholarship
Korea University *2019*

Skills

Languages: English, Korean

Programming languages: Python (Pytorch, TensorFlow, Keras), C/C++, Matlab, Kotlin

Documentation: Markdown, LaTeX

Services

Reviewer: CVPR 2024 Generative Models for Computer Vision Workshop, CVPR 2024 AI City Challenge, ECCV 2024 Out Of Distribution Generalization in Computer Vision, ECCV 2024 AI for Visual Arts Workshop

Work Experience

Owens Laboratory, University of Michigan Ann arbor, United States
Research Intern *05/2024 - present*

- **Multimodal learning**: Implementing sound of videos and 3D modeled inputs, generating multimodal dataset in NeRF space. Advising by Professor Andrew Owens. Ongoing!

vaCANCY (Seed funding stage) Seoul, South Korea
Chief Technology Officer *03/2023 - 08/2023*

- Develop Recommendation systems for optimizing cloud costs, Backend, and infrastructure consulting
- Won the 1st prize in Insiders(biggest start-up society in Korea) demoday
- Selected as one of the top 300 young start-ups in Korea

Electronics & Telecommunications Research Institute (ETRI) Daejeon, South Korea
Research Intern @Visual Intelligence Research Section *07-08/2021, 01-02/2022, 07-08/2022*

- Participated in the DeepView project and developed a new network RDID-GAN for reconstructing unidentified image datasets
- Created new datasets and networks to increase detection rates (average precision) for datasets with people in difficult positions that existing networks cannot detect

Korea Army Chemical Biological Radiological and Nuclear School Jangseong, South Korea
Instructor sergeant *09/2016 - 06/2018*

- Instructed trainees on how to cope with chemical and biological warfare
- Developed educational contents(videos, experiment manuals, materials, etc.) on chemical and biological warfare

Extracurricular Activities

Korea University Computer Club Seoul, South Korea
Leader *08/2019 – 08/2023*

- Established a club network and created an official club website for schedule management of various sessions
- Opened and managed algorithm sessions for club members to develop their coding abilities and improve data structure implementing skills

Korea University Innovation Center for Engineering Education Seoul, South Korea
Member *09/2020 – 02/2022*

- Organized a science program for high school students interested in science and engineering
- Explained the experiment methods and scientific background information to the students

Korea University Language Exchange Division Seoul, South Korea
Leader *03/2019 – 02/2020*

- Managed language clubs at Korea University and organized a weekly language exchange program
- Made a Korean reading class for foreign students interested in Korean media and K-pop

References

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References

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