Nahyeon Kim

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1 Research Interests

Autonomous Driving, Vehicles, Machine Learning

2 Education

Seoul National University, Seoul, Korea Mar. 2018 - Feb. 2023
B.S. in Mechanical Engineering and Entrepreneurship (GPA: 3.38/4.0)

Relevant Courses: *Mechanical System Design Project, Theory and Practice of Humanoid Walking Control, Artificial Intelligence, Linear Algebra for Electrical Systems, Computer Vision, Deep Learning, Computer Graphics, Materials and Manufacturing Processes, Mechatronics, Mechanical System Modeling and Control, Mechanical Product Design, Dynamics, Creative Engineering Design*

3 Work Experience

Korea Institute of Science and Technology, Seoul, Korea
Undergraduate Researcher Oct. 2021 - Present

- ◇ Knowledge Distillation for Data-Free Subtask Network Compression
- ◇ Data-Free Channel Pruning via Neural Network Inversion

Saige Research, Seoul, Korea
Research Assistant Feb. 2021 - Aug. 2021

- ◇ Optical Character Recognition(OCR) for Automating Manufacturing Process
- ◇ Information Extraction for Document Understanding

Seoul Stock Exchange, Seoul and Pangyo, Korea
Junior Developer Aug. 2020 - Feb. 2021

- ◇ Web Development using Django
- ◇ App Development using React-Native

4 Research Projects

Knowledge Distillation for Data-Free Subtask Network Pruning
Advisor: Dr. Suhyun Kim, Korea Institute of Science and Technology Mar. 2022 - Present

- ◇ Discovered that previous fine-tuning methodology performed poorly on data-free pruning, and that it performs even worse when focused on a subtask
- ◇ Proposed a novel post-pruning method with knowledge distillation and domain-adaptation
- ◇ Solved the accuracy degradation problem and improved performance significantly in data-free conditions.

Data-Free Channel Pruning with Network Inversion Data
Advisor: Dr. Suhyun Kim, Korea Institute of Science and Technology Oct. 2021 - Present

- ◇ Explored the most suitable network-inversion methodology for pruning
- ◇ Implemented network inversion methodologies to be applicable to various models

Optical Character Recognition(OCR) for Automating Manufacturing Process
Research Team, Saige Research May. 2022 - Aug. 2022

- ◇ Developed a character recognition algorithm for automating the manufacturing process
- ◇ Computerize detected characters by OCR recognition

Information Extraction for Document Understanding
Research Team, Saige Research May. 2022 - Aug. 2022

- ◇ Developed a document understanding model to accurately understand the meaning of the letters captured and recognized by the camera in the manufacturing process
- ◇ Implemented an algorithm that corrects to true values according to the meaning even if it is incorrectly recognized due to the anomaly

5 Development Projects

Seoul Stock Exchange — Feb. 2021 - Aug. 2020

- ◇ Developed web service using Django
- ◇ Developed hybrid application using React-Native
- ◇ Deployed the android app to the Google Play Store
- ◇ Developed recommendation algorithm for OTT media service

6 Coursework Projects

Simulation of Humanoid Walking — Theory and Practice of Humanoid Walking Control
Institute of Convergence Science and Technology, Seoul National University — Sep. 2022 - Present

- ◇ Simulated basic robotic motion using MUJOCO Simulator and DYROS JET Controller
- ◇ Controlled and simulated robot walking based on Inverse Kinematics

Wireless Stereoscopic Mouse with Gyroscope Sensor — Mechatronics
Mechanical Engineering, Seoul National University — Mar. 2021 - Sep. 2021

- ◇ Designed a mouse to detect 3d motion via gyroscope sensor and to input stereoscopic data
- ◇ Won first place in the course and won the Encouragement Award in the Creative Design Festival of the College of Technology

Application of Traditional Computer Vision Methods to Deep Learning — Computer Vision
Computer Science, Seoul National University — Sep. 2021 - Dec. 2021

- ◇ Applied traditional computer vision algorithms as deep learning augmentation.
- ◇ Implemented Warping, SIFT, Hough transform for line detection and GABOR filters from scratch
- ◇ Blended images by using laplacian pyramid and implemented Moving Object Detection based on Lucas–Kanade Method

Basics of Graphics and Ray-Tracing — Computer Graphics
Computer Science, Seoul National University — Sep. 2021 - Dec. 2021

- ◇ Implemented a hierarchical dynamic model using matrix stacks using OpenGL
- ◇ Implemented a system for swept surface with geometric transformations and spline curves.
- ◇ Created a synthetic scene with geometric objects and various materials, showing them via ray tracer

Ball Classification Machine using I-Beam — Mechanical Product Design
Mechanical Engineering, Seoul National University — Sep. 2019 - Dec. 2021

- ◇ Created a machine that can classify various types of balls in a short time using I-beam, PVC, MDF, and acrylic

Mini Car with Hydraulic Cylinder and Motor — Creative Engineering Design
Mechanical Engineering, Seoul National University — Sep. 2018 - Dec. 2018

- ◇ Designed and manufactured a forklift mini car that picks up objects using hydraulic cylinders and motors.
- ◇ Learned techniques using drills, milling machines, electric saws, laser cutters, and 3d printers.

7 Skills

Python, Pytorch, MATLAB, SOLIDWORKS, Git, React, React-Native, Javascript, C/C++