[PORTFOLIO] 서재원

2019 (1st grade)

- Creative Engineering Design
- General Chemistry 1,2
- General Physics 1,2

2020 (2nd grade)

- Solid Mechanics
- Dynamics
- Fluid Mechanics
- Engineering Thermodynamics
- Engineering Mathematics 1,2
- Mechanical Engineering Materials
- Introduction to Artificial Intelligence for Mechanical Engineers
- Computer Aided Drawing
- Data Structures
- Robust System Design with Big Data Analytics and Artificial Intelligence

2021 (3rd grade)

- Design Lab on Solid Mechanics
- Design Lab on Vibration and Dynamic Systems
- Machine Elements Design
- System Dynamics

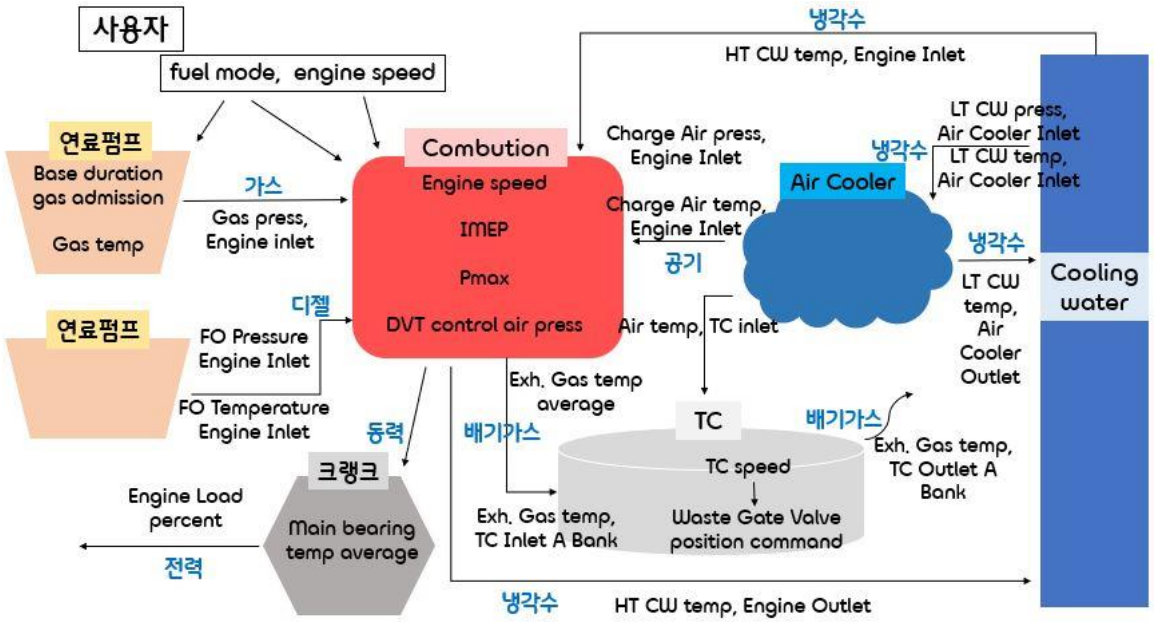
2023 (3rd grade)

- A new human, phono sapiens Experience Design
- Design Lab on Thermo-Fluidics
- Automatic Control Systems
- Measurement Engineering
- Engineering Numerical Analysis
- Introduction to Artificial Intelligence
- Smart Factory Convergence Capstone Design 2

[PORTFOLIO] 서재원

HiMSEN Engine Abnormality Detection Analysis

Based on the knowledge from the courses taken, preprocess the HiMSEN engine fault data, separate the data by mode and by four different systems, analyze it, and implement a fault diagnosis and cause system algorithm using ANN



Duration

2021.01 ~ 2021.02

SKILLS / IDE

Python
Jupyter Notebook

ROLE

Understanding Data Characteristics
(Temperature, Pressure)
Data Preprocessing

CODE(Github URL)

https://github.com/sepengsu/HiMSEN
(ppt, report)

[PORTFOLIO] 서재원

Monthly Dacon Machine Failure Diagnosis AI Contest

Participated in a project individually, extracted statistical features from sound in both time and frequency domains, preprocessed the data after separating it by mode (0,2), and implemented a machine fault diagnosis algorithm by ensembling IF (Isolation Forest), OCSVM (One-Class SVM), and AE (AutoEncoder)

Duration

2022.12.05 ~ 2023.01.16

SKILLS / IDE

Python
Jupyter Notebook

CODE(URL)

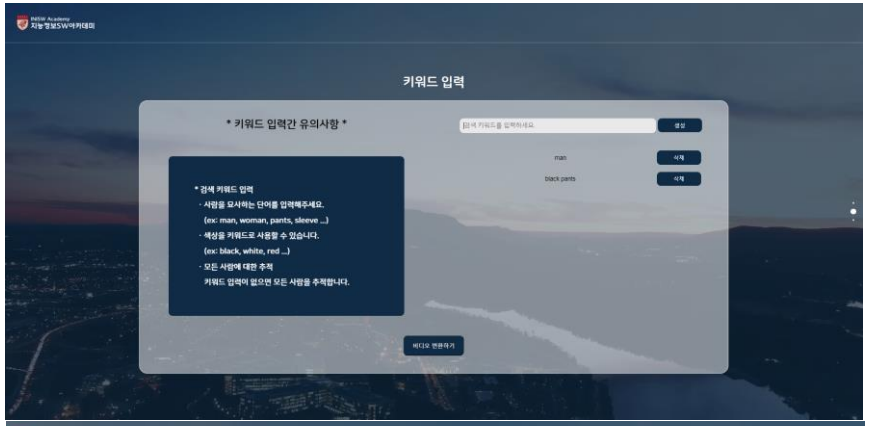
https://dacon.io/competitions/official/236036/codeshare/7504

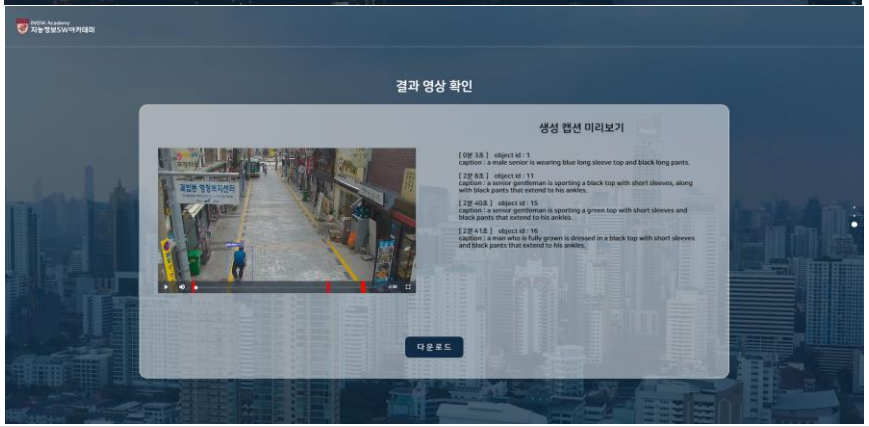
https://github.com/sepengsu/DACON-machine-fault-diagnosis

[PORTFOLIO] 서재원

TOC in CCTV

A project implemented as a multi-stage model of Tracking + Super-Resolution + image-captioning with the goal of text conversion of video. Used Yolo4Deepsort (Yolo4), SwinIR (Swin Transformer), and BLIP (vit-encoder + cross attention + LM-decoder) respectively.





Duration

2023.05 ~ 2023.06

SKILLS / IDE

Python
Jupyter Notebook
JavaScript

ROLE

Super-resolution (select model)
Image-captioning (select model and finetuning)

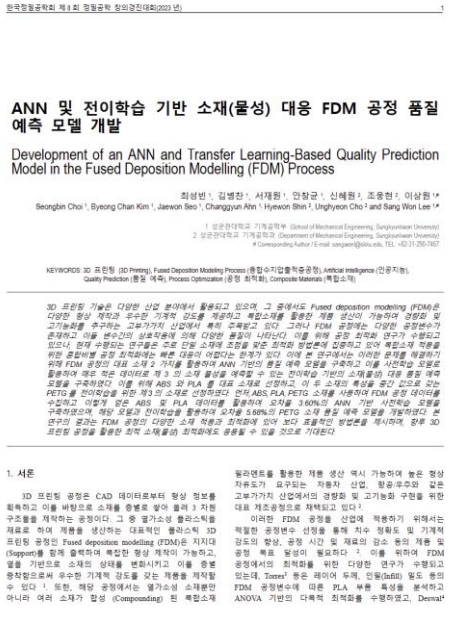
CODE(Github URL)

https://github.com/INISW/INISW6

[PORTFOLIO] 서재원

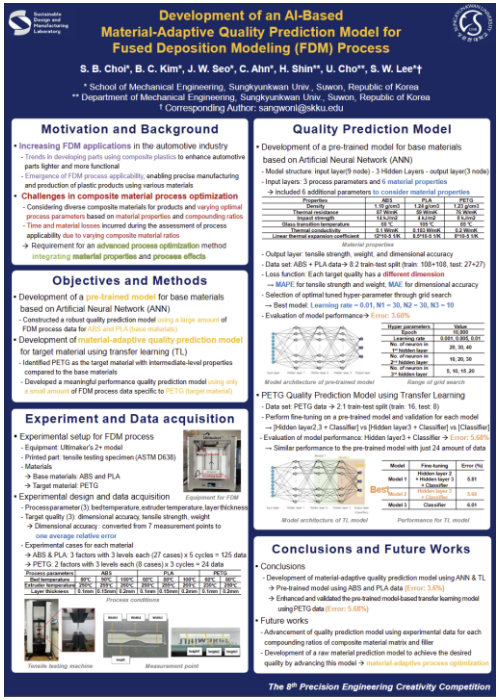
Development of an FDM process quality prediction model based on ANN and transfer learning for material response

Participated in the 8th Precision Engineering Creative Competition as an undergraduate researcher in Professor Sangwon Lee's laboratory, along with graduate students. Developed a quality prediction model for the FDM process for composite materials (ABS, PLA, PETG) based on ANN and transfer learning.



ANN 및 전이학습 기반 소재(물성) 대응 FDM 공정 품질 예측 모델 개발

Development of an ANN and Transfer Learning-Based Quality Prediction Model in the Fused Deposition Modelling (FDM) Process



Duration

2023.07 ~ 2023.11

SKILLS / IDE

Python
3d-printer (Ultimaker)

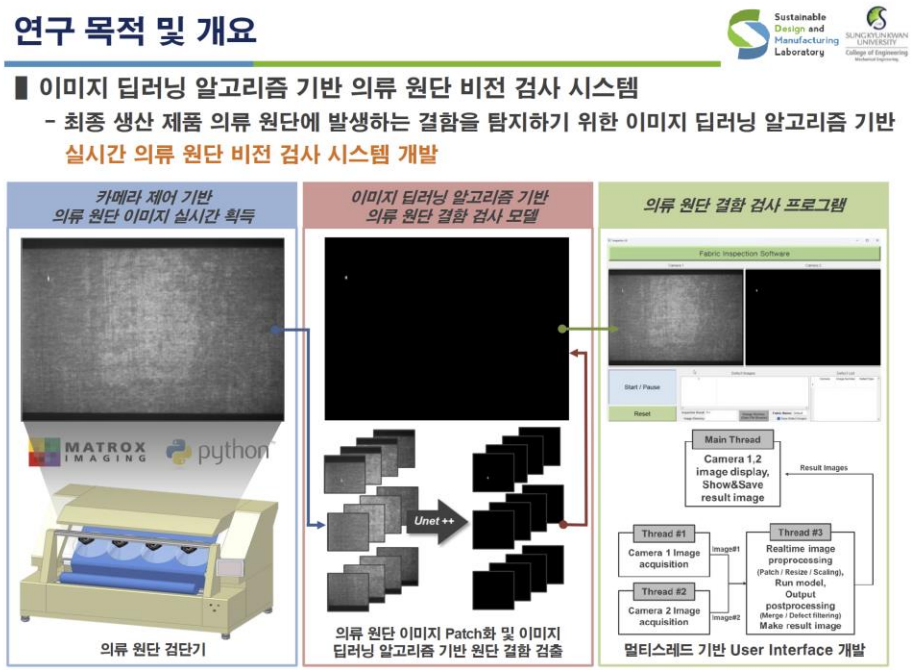
ROLE

Data collection and preprocessing
Quality Prediction modeling
Make poster and presentation

[PORTFOLIO] 서재원

Vision inspection system for clothing fabric based on image object segmentation algorithm

Participated in a system development project to inspect fabric defects (stain, hole, dyeing) using a vision camera and deep learning as an undergraduate research student. Achieved Acc 95.31%, IOU 0.902, and Inference time 54FPS with the deep learning image object segmentation model U-net++ and ensemble and threshold algorithms



Duration

2023.07 ~ 2023.12

SKILLS / IDE

Python
Matrox Imaging Library
CVAT (image labeling tool)

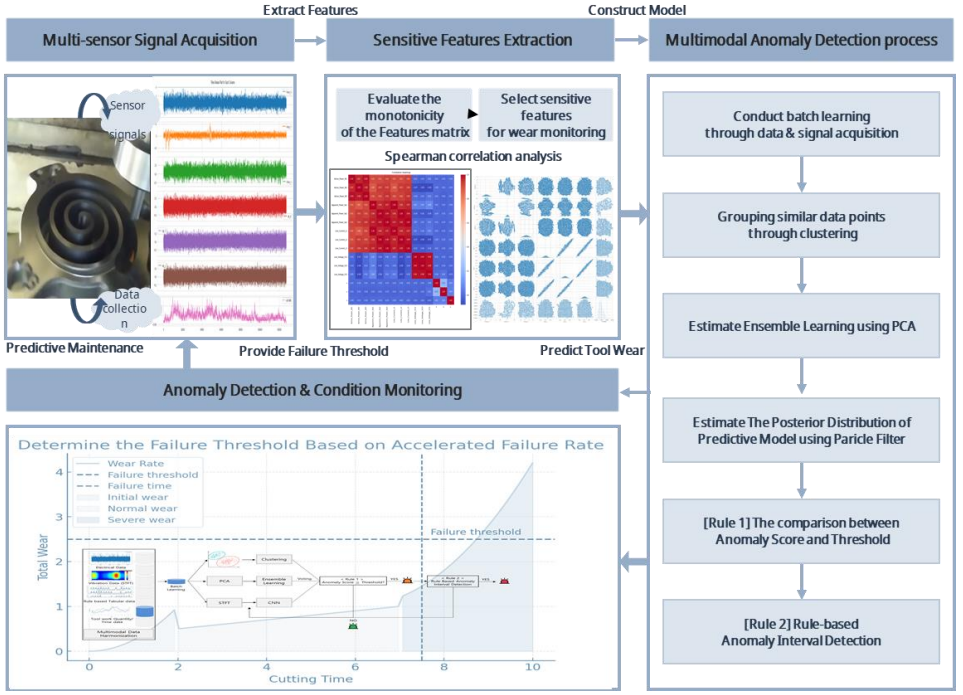
ROLE

Paper review
Code review
Image Data Collection
Data Labeling and Preprocessing

[PORTFOLIO] 서재원

Development of an anomaly detection algorithm based on multimodal learning for CNC tool wear recognition and monitoring

For a capstone project, developed a CNC tool wear recognition and replacement notification algorithm by applying an ensemble model based on unsupervised and supervised learning, and a Rule-based model in stages. Unsupervised learning used clustering (Agglomerative method), ensemble (with anomaly detection and sampling techniques applied), a CNN classification model based on STFT images, and a Rule-based model.



▶ 진행 기간

2023.09 ~ 2023.12

▶ SKILLS / IDE

Python
Jupyter Notebook

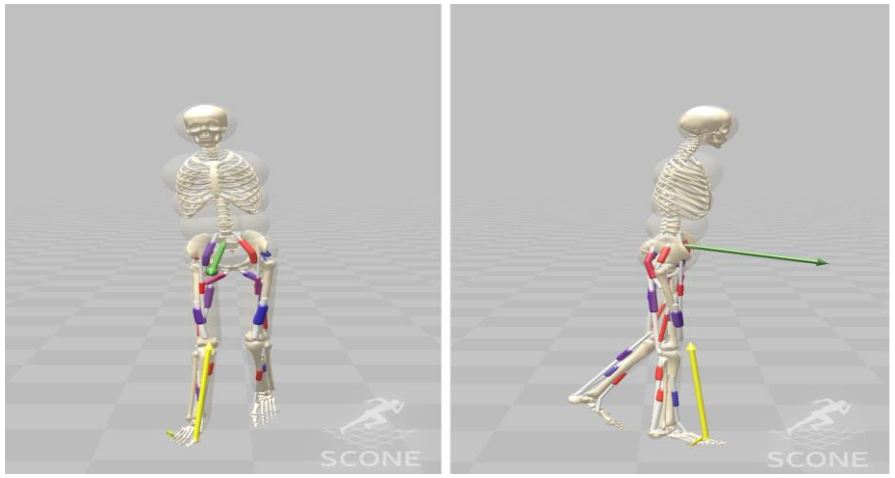
▶ ROLE

Paper review (RUL and Anomaly detection)
Code review (DAMP algorithm)
EDA (t-test, MFCC use)
Data Labeling and Preprocessing
Model Selection
Sampling Method (over and undersampling)
Model train and test

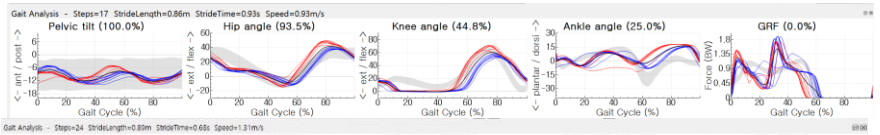
[PORTFOLIO] 서재원

Reinforcement learning algorithm and gait simulation based on the SCONE program

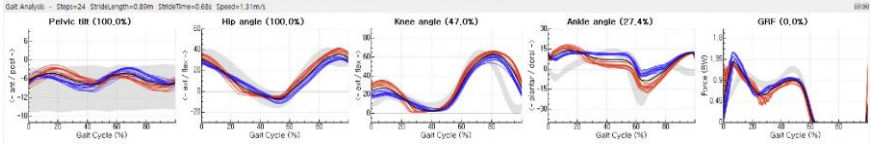
As part of a CO-OP project, carried out a normal person's Gait simulation using the gait simulation program SCONE and reinforcement learning algorithms. The DEP(controller)-MPO(reinforcement learning) algorithm was used, and a PD controller was utilized to maintain the balance of the upper body. Additionally, by modifying the walking model to automatically maintain balance, performance was further improved



Baseline



ours



Duration

2023.12 ~ 2024.02

SKILLS / IDE

Python
DEP-RL (reinforcement learning library)
SCONE (Gait simulation tool)

ROLE

Paper and Code review
Coding and model Customize
Model Selection
Customize reward function and pd controller

CODE(Github URL)

https://github.com/sepengsu/winter_co_op.git

[PORTFOLIO] 서재원

ACTIVITY & AWARDS

2021.01 ~ 2021.02	**Encouragement Prize** at the 1st Big Data/AI College Student Contest for Digital Innovation in the Shipbuilding/Maritime Industry
2022.07 ~ 2022.07	Completed the SKKU-KISTI HPC·AI **Summer School**
2022.12 ~ 2023.01	Monthly Dacon Machine Failure Diagnosis AI Contest **TOP 4%**
2023.05 ~ 2023.05	**Encouragement Prize** at the Korea Economic Daily Intelligent Information SW Idea Contest.
2023.05 ~ 2023.06	**Grand Prize** at the 2nd Performance Presentation of the Korea University Intelligent Information SW Academy 2023 (Awarded by the Director of the Information and Communication Planning Evaluation Institute)
2023.03 ~ 2023.06	Completed the 2nd Term of the Korea University **Intelligent Information SW Academy 2023**.
2023.07 ~ 2023.11	**Excellence Prize** at The 8th Precision Engineering (Hyper-Scale Artificial Intelligence and Smart & Green Precision Engineering Technology)
2023.07 ~ 2023.12	**Undergraduate researcher** at SDML (Professor Sangwon Lee's Lab)
2023.12 ~ 2024.02	Rehabilitation-Biomechatronics Research Lab (Professor Jonghyun Kim's Lab) **Co-op**

LICENSE

2022.11.25	Advanced Data Analytics Semi-Professional (ADsP)
2023.06.19	AICE - ASSOCIATE
2023.10.29	TOPA, Level-2