

WORKING EXPERIENCE

- 2021-02 ~ **Senior Machine Learning Engineer**
2021-07 Pupil Labs GmbH (Deep Learning powered head-mounted eye tracker)
- Gaze Direction and Point Estimation
- developed a deep learning model capable of incorporating individual eye geometry and camera geometry in PyTorch, PyTorch Geometric and OpenCV
- 2020-06 ~ **Researcher (Initiated the Project)**
2020-12 Project Vibranium (Power trading optimization)
- Trading Behavior and Portfolio Optimization for Electricity Markets
- conducted the time-series-based market analysis for different electricity markets
 - researched power trading optimization by adapting model-free reinforcement learning
- 2018-01 ~ **Senior Deep Learning Research Scientist**
2020-05 Haezoom Europe GmbH (IT-based service platform for solar power forecasting)
- Short-term Solar Power Forecasting based on Satellite “Chollian 2” data
- as a **team lead**, supervised and collaborated with the algorithm research team of 5 people to develop (1) clear sky image compositions, (2) cloud motion tracking using optical flow, (3) microdust and snow detection algorithms
 - designed an architecture of a satellite image processing pipeline for a newly launched satellite “Chollian 2” and implemented/delivered it as an API service
- Wind Power Forecasting
- **Award:** won 4th place for the wind power forecasting competition 2019 by Korea Power Exchange (KPX)
 - implemented forecasting models based on numerical weather prediction (NWP) data
 - achieved high-accuracy forecasting based on a hybrid (statistical-physical) model by applying bias corrections, ensemble, and power curve fitting with a variational method
- 3D Building Reconstruction Prototype using Satellite Images for Shadow Simulation
- extracted the depth from 2D Satellite images by applying GAN-based (Generative Adversarial Network) super resolution, deblurring, stereo vision and depth estimation
 - used SNAP (Sentinel Application Platform API) for satellite “Sentinel 2” and Boto3 (AWS S3) for satellite “Landsat 8”, QGIS and ImageMagick for raster images
- Cloud Detection and Cloud Motion Estimation
- developed cloud detection and cloud motion estimation by using optical flow and transmittance simulators (RTTOV, 6S) based on satellite “Himawari 8” data
- 2016-12 ~ **Deep Learning Research Scientist**
2017-11 Twenty Billion Neurons GmbH (Deep Learning based video analysis software)
- Realtime Common Sense Recognition for Video
- **published** at ICCV 2017
 - developed an online RNN (Recurrent Neural Network) model combined with 3D-CNN (Convolutional Neural Network) that understands temporal common sense
 - improved the accuracy from 5% to 85% and implemented the model in Tensorflow
- A Cross-Team Collaboration for Video Captioning and Temporal Action Localization
- Realtime Video Analysis Demo Infrastructure in Python
- implemented a demo that supports OpenCV video streaming, network communication (ZMQ) and multiprocessing on Raspberry Pi and Jetson board

EDUCATION

- 2013–06 ~ **Ph.D. Mathematics and Computer Science** (Magna Cum Laude)
2016–06 Freie Universität Berlin (FU Berlin), Germany
- Scholarship from German Research Foundation: Methods for Discrete Structures
 - See the webpage for **publications** including **7 reviewed** and **3 weakly reviewed** papers.
- 2011–02 ~ **M.S. Computer Science** (GPA: 4.25/4.30, 99.44%)
2013–02 Korea Advanced Institute of Science and Technology (KAIST), South Korea
- Awards**
- Best Poster Award for Master Thesis
 - National Research Scholarship from Korea Scholarship Fund
- 2004–03 ~ **B.S. Mathematics, Minor in Physics** (GPA: 3.57/4.30, 92.7%)
2008–02 Pohang University of Science and Technology (POSTECH), South Korea
- Awards**
- Honorable Scholarship from the President of Korea
 - Honorable Scholarship from Korea Foundation for Advanced Studies
 - Silver Medal from National Collegiate Programming Competition
 - Winner of Software Security Team Competition between POSTECH & KAIST

SKILLS

Programming	Proficient: Python, \LaTeX , SQL (PostgreSQL, MySQL, SQLite, and DB theory) Intermediate: Java, Haskell, R, Bash/Zsh Small Projects: C++03, Standard ML, Coq, Sage, Maple, MATLAB, Octave
Frameworks	Tensorflow, PyTorch, OpenCV, Hadoop
Data/Numerical	scikit-learn, NumPy, SciPy, Matplotlib, pandas, seaborn
Methodologies	TDD, CI/CD (Travis CI, Jenkins, Docker), Agile (Scrum, Kanban, also as a moderator)
Environments	Proficient: Linux, Git
Language	English (IBT 105/120, Nov. 2012), German (C1), Korean (Native)

VOLUNTEERING AND TECHNICAL ACTIVITIES

- 2020–08 ~ present WiFi installation technician for refugee housing in Berlin (Freifunk Berlin)
- 2020–06 ~ present External advisor for a master student
- Topic: Optimizing loss model in power forecasting for Building Integrated Photovoltaics (BIPV)
- 2020–07 ~ present Collaborator of a sustainable food supply project
- Topic: Rice paddy area prediction in Sri Lanka based on a satellite “Sentinel 1” SAR data
- 2019–07 ~ 2020–07 Teacher at ReDi School (non-profit organization for refugees and more)
- Course: Python for Data Analysis
- 2018–08 ~ 2019–11 Master thesis supervisor (external committee member, non-volunteering)
- Topic: Irradiance forecasting using satellite “Himawari 8” under snow conditions
- 2014–07 ~ 2014–08 Organizer of a research visiting program for master students
- Example Topic: Enumerating combinatorially different convex hulls of points in lines
- 2014–08 ~ 2014–08 Teacher at FU Berlin
- Course: Sommeruniversität: Experiencing theoretical computer science with Origami

OPEN SOURCE PROJECTS

- 2020–11 Haskell lanyon-hakyll: a port of Lanyon theme for the Haskell-based static generator Hakyll
- 2020–11 Bash ConfigAutomationMikrotik: automatic batch configuration scripts for Mikrotik routers
- 2019–06 Python django-migration-vis: Django management command for visualizing migration graphs
- 2017–07 Python GulpIO: binary storage format for deep learning on videos