

WORKING EXPERIENCE

- 2020-06 – **Researcher**
present Project Vibranium (Power Trading Optimization)
- Trading Behavior and Portfolio Optimization for Electricity Markets, in progress
- adapting model-free reinforcement learning algorithms to optimize power trading
 - conducted the market analysis for different electricity markets and applied time-series analysis for price forecasting
- 2018-01 – **Senior Deep Learning Researcher**
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 the algorithm research team and collaborated to develop (1) clear sky image compositions, (2) cloud motion tracking using optical flow, (3) microdust and snow detection algorithms
 - designed the architecture and implemented the satellite image processing module for the newly launched environmental satellite “Chollian 2”
- Wind Power Forecasting
- **Award:** won 4th place for the wind power forecasting competition 2019 by Korea Power Exchange (KPX)
 - implemented a high-precision wind power forecasting model using wind farm data and numerical weather prediction (NWP) data
 - applied the hybrid model combining statistical models and physical models
 - improved the accuracy using bias corrections, ensemble over forecast horizon, power curve fitting with perturbation and variational methods
- 3D Building Reconstruction Prototype using Satellite Images for Shadow Simulation
- extracted the height information from 2D Satellite images by applying super resolution, stereo vision, deblurring, and depth estimation
 - used SNAP (Sentinel Application Platform API) for Satellite “Sentinel 2” and Botos for Satellite “Landsat 8”, QGIS, ImageMagick, Raster images
- Cloud Detection and Cloud Motion Estimation
- researched and developed the cloud detection and cloud motion estimation algorithms by using CNN (Convolutional Neural Network), optical flow, transmittance simulators (RTTOV, 6S) based on satellite “Himawari 8” data
- 2016-12 – **Deep Learning Researcher**
2017-11 Twenty Billion Neurons GmbH (Deep Learning based Video Analysis Software)
- Realtime Common Sense Recognition for Video
- **published** at ICCV 2017
 - improved the online RNN (Recurrent Neural Network) model from 5% to 85% and implemented with Tensorflow
 - developed the model capable of understanding temporal common sense that 2D image object detection models failed to recognize
- Neural Network for Video Captioning and Temporal Action Localization as a Cross-Team Collaboration using Tensorflow and PyTorch
- Realtime Video Analysis Demo Infrastructure in Python
- designed and implemented a demo program that supports camera streaming, network communication and multiprocessing
 - used OpenCV, PiCamera, PyGame, ImageIO with Raspberry Pi and Jetson board
 - used multiprocessing, ZMQ, TCP streaming via socket, PyBuilder, Travis CI

EDUCATION

- 2013–06 – **Ph.D. Mathematics and Computer Science** (Magna Cum Laude)
2016–06 Freie Universität Berlin (FU Berlin), Germany
- Awards**
- 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	pandas, seaborn, scikit-learn, NumPy, SciPy, Matplotlib
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 patch area prediction in Sri Lanka based on 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
- 2018–08 – 2019–11 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 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