Dr. HEUNA KIM

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WORKING EXPERIENCE

2020–06 – present **Researcher**
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 – 2020–05 **Deep Learning Researcher**
Haezoom Europe GmbH (IT-based Service Platform for Solar Power Forecasting)

Short-term Solar Power Forecasting based on Satellite "Chollian 2"
- 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 in a single month 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 – 2017–11 **Deep Learning Researcher**
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 – 2016–06 **Ph.D. Mathematics and Computer Science** (Magna Cum Laude)
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 – 2013–02 **M.S. Computer Science** (GPA: 4.25/4.30, 99.44%)
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 – 2008–02 **B.S. Mathematics, Minor in Physics** (GPA: 3.57/4.30, 92.7%)
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 for Refugee Homes in Berlin (Freifunk Berlin)
2020–06 – present	Advising Students for Their Master Theses
Topic 1:	Power Forecasting of Building Integrated Photovoltaics by Analyzing the Loss Model
Topic 2:	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 Supervision as an External Commitee Member (Non-volunteering)
Topic:	Irradiance Forecasting using Satellite "Himawari 8" under Snow Conditions
2015–06 – 2015–08	Advising Students for Their Master Theses
Topic 1:	Enumerating Combinatorially Different Convex Hulls of Points in Lines
Topic 2:	Shortest Distance between Points in a Circle
2014–08	Teacher at FU Berlin
Course:	Sommeruniversität: Experiencing Theoretical Computer Science with Origami

OPEN SOURCE PROJECTS

2020–11	ConfigAutomationMikrotik: automatic batch configuration scripts for routers
2019–06	django-migration-vis: Django management command for visualizing migration graphs
2017–07	GulpIO: binary storage format for deep learning on videos