Dr. HEUNA KIM

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WORKING EXPERIENCE

2018–01 – present **Deep Learning Researcher**
Haezoom Europe GmbH (IT-based Service Platform for Solar Power Forecasting)

Short-term Solar Power Forecasting based on Satellite "Chollian 2", in progress
- 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 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 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) and satellite "Himawari 8"

2016–12 – 2017–11 **Deep Learning Researcher**
Twenty Billion Neurons GmbH (Deep Learning based Video Analysis Software)

Realtime Common Sense Recognition
- **published** at ICCV 2017
- improved the online RNN (Recurrent Neural Network) model from 5% to 65%, eventually 85% with more data and implemented with Tensorflow
- the model was capable of understanding temporal-relevant 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 Understanding Demo Infrastructure in Python
- designed and implemented a demo program that supports camera streaming, network communication, and multiprocessing
- used OpenCV, PiCamera, PyGame, ImageIO for RaspberryPi and Jetson board
- used multiprocessing, ZMQ, 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, scikit-learn, NumPy, SciPy, Matplotlib, 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)

VOLUNTEER TEACHING

2019–07 – present	Teacher at Redi-school (Non-profit Organization for Refugees and more) Course: Python for Data Analysis
2015–06 – 2015–08	Students Supervision for Their Master Theses
2014–08	Teacher at FU Berlin Course: Experiencing Theoretical Computer Science with Origami

OPEN SOURCE PROJECTS

2019–06 – present	django-migration-vis: Django management command for visualizing migration graphs
2017–07 – present	GulpIO: binary storage format for deep learning on videos