

# Jeehyun Hwang

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jeehyunHwang.github.io

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- INTERESTS** Neural Differential Equations, Spatiotemporal Models, Graph-based Neural Networks, Physics-informed Machine Learning
- EDUCATION** **Yonsei University** Mar. 2016 - Present  
*Undergraduate Student* Seoul, Korea  
Bachelor of Engineering in Computer Science (Expected graduation: Feb. 2022)
- PUBLICATIONS** Jeongwhan Choi, Hwangyong Choi, Jeehyun Hwang, and Noseong Park. Graph Neural Controlled Differential Equations for Traffic Forecasting. To appear in *Proceedings of the Thirty-Sixth AAAI Conference on Artificial Intelligence (AAAI-22), 2022*. [pdf][code]
- Jeehyun Hwang, Jeongwhan Choi, Hwangyong Choi, Kookjin Lee, Dongeun Lee, and Noseong Park. Climate Modeling with Neural Diffusion Equations. To appear in *Proceedings of IEEE International Conference on Data Mining (ICDM), 2021* [pdf][code]
- PREPRINTS** Seulki Yeom, Kyunghwan Shim, and Jeehyun Hwang, Toward Compact Neural Networks via Energy-Aware Pruning. preprint arXiv: 2103.10858
- “PDE-regularized Neural Networks for Image Classification”, Co-Author, Preprint available under request.
- RESEARCH EXPERIENCE** **Big Data Analytics Lab**, Yonsei University Jul. 2020 – Nov. 2021  
*Research Intern (Advisor: Prof.Noseong Park)* Seoul, Korea
- Application Platform Lab**, Hongik University Dec. 2019 – Jun. 2020  
*Research Intern (Advisor: Prof.Young Yoon)* Seoul, Korea
- WORK EXPERIENCE** **Nota.Inc** Jan. 2021 – Feb. 2021  
*Research Scientist Intern (Advisor: Dr.Seulki Yeom)* Seoul, Korea
- PROJECTS** **Neural Convection-Diffusion Equation** Sep. 2021 - Current  
*Big Data Analytics Lab at Yonsei University, Research Intern*
- Journal extension of Climate Modeling with Neural Diffusion Equations.
  - Proposed enhanced version of Neural Diffusion Equation – applicable to directed graph, adaptive graph structure generation.
- Graph Neural Controlled Differential Equations** Jul. 2021 - Oct. 2021  
*Big Data Analytics Lab at Yonsei University, Research Intern*
- Built spatiotemporal graph neural controlled differential equation (STG-NCDE).
  - Proposed STG-NCDE showed highest performance in benchmark datasets of traffic forecasting and irregularly sampled traffic dataset.
- Climate Modeling with Neural Diffusion Equations** Mar. 2021 - Aug. 2021  
*Big Data Analytics Lab at Yonsei University, Research Intern*
- Designed novel climate model based on neural ordinary differential equations (neural ODEs) and diffusion equation.
  - NDE can be viewed as either one of neural partial differential equation or continuous version of diffusion-based graph neural network.

**Energy-Aware Pruning** Jan. 2021 - Feb. 2021  
*Nota.Inc, Research Scientist Intern*

- Proposed a new filter pruning criteria based on nuclear-norm (NN) of each filter.
- Proposed NN-pruning showed top accuracy with lowest FLOPs and parameters. It also shows robustness among data quality and quantity.

**Neural Partial Differential Equations** Jul. 2020 - Dec. 2020  
*Big Data Analytics Lab at Yonsei University, Research Intern*

- Introduced novel partial differential equation (PDE) based approach for image classification, learning both governing equation and its solution for image classification.
- Our PDE-regularized neural network (PR-Net) showed better performance in terms of accuracy, robustness compared to neural ODEs and Isometric MobileNet V3.

**Network Traffic Anomaly Detection** Nov. 2019 - Jul. 2020  
*Application Platform Lab, Research Intern*

- Built a framework that performs anomaly detection (DDoS, Brute Force, PortScan, etc.) of network packet datasets.
- The given data set was processed through feature engineering, and then density-based clustering was performed in latent vector space.

**AI Programming with Python Nanodegree** Jan. 2019 - Mar. 2020  
*Udacity, Nanodegree [Certificate]*

- Learned essentials of calculus, linear algebra, neural network, and designed image classifiers.

**COMPUTER SKILLS**

**Languages:** Python, R, Java, C, C++

**Web Development:** NodeJS, MySQL, JavaScript, PHP, HTML, CSS

**Deep Learning Framework:** (Proficient) Pytorch, (Familiar) Keras

**LANGUAGE PROFICIENCY**

Fluent in **English** and Native in **Korean**

- IBT TOEFL: 109

- GRE: 152 (Verbal), 169 (Quantative), 4.0 (Writing)

**OTHER ACTIVITIES**

**Military Service**

Served as Korea National Police Agency Auxiliary Police

Feb.2018 - Nov. 2019