Min Namgung

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https://minnamgung.github.io/

INTEREST

Spatial AI, Environmental Sustainability AI, Representation Learning, Data Mining

EDUCATION

University of Minnesota – Twin Cities Minneapolis, MN
Ph.D. student in Computer Science&Engineering August 2021 – Present
CS Grad Coordinator in Women and BIPOC in CS&E August 2022 – Present

Purdue University Fort Wayne Fort Wayne, IN
Master of Science in Computer Science (**GPA 4.0/ 4.0**) December 2020

- Master's Thesis: Performance Comparison of Public Bike Demand Predictions: The Impact of Weather and Air Pollution

Purdue University Fort Wayne Fort Wayne, IN
Bachelor of Science in Computer Science May 2019

PUBLICATION

J. Kim, Z. Li, Y. Lin, **M. Namgung**, L. Jang, YY. Chiang (ACM SIGSPATIAL 2023) The mapKurator System: A Complete Pipeline for Extracting and Linking Text from Historical Map (Author by system module order)

YY. Chiang, M. Chen, W. Duan, J. Kim, C. A. Knoblock, S. Leyk, Z. Li, Y. Lin, **M. Namgung**, B. Shbita, and J. H. Uhl, In Handbook of GeoAI. 2023. GeoAI for the Digitization of Historical Maps. (Author by alphabetic order)

M. Namgung, YY. Chiang (ACM SIGSPATIAL GeoAI 2022) Incorporating Spatial Context for Post-OCR in Map Images

POSTER & PRESENTATION

M. Namgung, T. Chen, YY. Chiang (UCGIS 2023) Representation Learning of Regions using Unevenly Distributed, Incomplete Multi-Modal Data **(Best paper)**

M. Namgung, YY. Chiang (AAG 2023) Preserving 2-Dimensional Spatial Relation for Map Text in Post-OCR Processing

J. Kim(*), **M. Namgung(*)**, J. Uhl, K. Burghardt, YY. Chiang, S. Leyk, K. Lerman (SaptialHumanities 2022) Identifying Street Name Evolution in Semantic, Temporal, and Geographic Spaces (* denotes equal contribution)

M. Namgung (UCGIS 2022) Incorporating Prior Knowledge To Forecast Fine-Grained Cloud-Top Temperature

RESEARCH EXPERIENCE

University of Minnesota

Region Representation Learning (Computer Vision, Multi-Modal Learning) Spring 2023 – Present

- Build a fine-grained geographic regional foundation model to discover the relationship between environment and dementia by encoding satellite, raster, vector, and geo-token
- Implement Dynamic Hypergraph with Transformer-based masked autoencoder to capture spatial dependencies

Machine Reading Maps (Computer Vision, LLM, Post-OCR) Summer 2022 – Fall 2022

- Built automatic pipeline to digitize 57K historical maps and compared running with SOTA baselines

- Used BART language model to correct imperfect map text and predict unrecognized words from historical maps
- Implemented 2D positional encoding with customized BART encoder to correct map text by understanding 2D image

Street Name Change (Spatial Statistics) Fall 2021 – Summer 2022
- Discovered street name evolution in word semantics over the geographic and temporal space
- Built an e2e framework and measure the evolution with spatial statistics (kernel density)

Weather Forecasting (Spatiotemporal Prediction) Fall 2021 – Spring 2022
- Predicted next hour fine-grained weather by inputting previous one-hour image data
- Built Self-Attention ConvLSTM model optimized with KL divergence loss to capture spatial information among pixels

Purdue University Fort Wayne
Graduate Research Thesis Spring 2020 – Fall 2020
Advisor: Dr. Jin Soung Yoo | Machine Learning and Big Data
- Studied public bike-sharing demand predictions and impacts with air pollution and precipitation
- Used multiple machine learning algorithms for the bike demand models and evaluated performance

Business Intelligence and Information Management Lab Summer 2020 – Fall 2020
Advisor: Dr. Adolfo S. Coronado | Machine Learning and Data Analytics
- Suggested a new objective approach of university ranking computation by comparing multiple models
- Used a machine learning supervised algorithm to evaluate each models' performance

TEACHING

University of Minnesota – Twin Cities
Lead Teaching Assistant
CSCI4707: Practice of Database System Fall 2022
CSCI1933: Introduction to Algorithms and Data Structures Fall 2021
CSCI1913: Introduction to Algorithms, Data Structures, and Program Development Spring 2022

Purdue University Fort Wayne
Graduate Teaching Assistant Fall 2019 – Spring 2020
CS364: Introduction to Database Systems in Department of Computer Science
CS160, CS161: Introduction to Computer Science I, II

Undergraduate Teaching Assistant May 2018 – Spring 2020
CS112: Computer Science for Everyone

WORK EXPERIENCE

Chamberlain Group Summer 2020
Mobile Engineer Summer Intern Oak Brook, Illinois

Parkview Health August 2018 – May 2019
Back-end Developer Fort Wayne, IN

Purdue Indiana Manufacturing Competitiveness Center (IN-MaC) May 2018 – March 2019
Software Developer Fort Wayne, IN

HONORS AND AWARDS

Best PC member in CIKM 2022 Fall 2022
Graduate Teaching Assistant Scholarship Fall 2019 – Spring 2020
Chancellor's Merit Award Scholarship Fall 2017 – Spring 2019
Dual-Degree Program Scholarship Fall 2017 – Spring 2019
Dean's List and Semester Honors' Certificates Fall 2018 – Spring 2019
Academic Excellence Scholarship Fall 2016

Professional Service

AAAI International Workshop on Health Intelligence 2023
CIKM (Best PC member award) 2022
ACM SIGSPATIAL 2022, 2023
ACM SIGSPATIAL International Workshop on GeoAI 2022

Volunteer Experience

Girls Who Code at Purdue University Fort Wayne September 2018 – January 2019
- Led female high school students in discussing computer science subjects

Volunteer, Big Event at Purdue University Fort Wayne April 2018
- Volunteered with non-profit group which gave away free clothes

Volunteer, 1st and 2nd Korea Festival at Fort Wayne, IN September 2017,2018
- Volunteered with the Korean community in Fort Wayne

Hana children's welfare church at Seoul, Korea September 2014 – February 2016
- Taught children aged from 7 to 15 in general subjects

Leadership and Activities

University of Minnesota – Twin Cities
President *of Korean Engineering Association* September 2022 – Present
Vice-President *of Korean Engineering Association* September 2021 – August 2022
- Lead a community group as the vice-president

Purdue University Fort Wayne
President of Club Seoul Fall 2017 – Summer 2018
- Led a community group as the president of Club Seoul

SOPT: Computer Club at Seoul, Korea Fall 2015 – Spring 2016
- Participated in study groups, created business model, implemented an Android mobile application

President of Bong-Dal-E: Volunteer Club at Seoul, Korea Fall 2015– Spring 2016
- Led a volunteer club as the president and bi-weekly volunteered at Hana welfare church

Technical Skills

Advanced Pytorch, Python, Java, R, SQL, PySpark, Spark, Postgres
Moderate Hadoop, C++, NodeJS, HTML, CSS, JavaScript, MongoDB

Language

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

Reference

Dr. Yao-Yi Chiang *Ph.D. Advisor, Associate Professor*
Department of Computer Science and Engineering
University of Minnesota – Twin Cities
612-625-4002, Email: yaoyi@umn.edu

Dr. Adolfo S. Coronado *Interim Assistant Dean and Associate Professor*
College of Engineering, Technology, and Computer Science
Purdue University Fort Wayne
260-481-6181, Email: coronado@pfw.edu

Dr. Jin Soung Yoo *Professor and Director of Computer Science Graduate Program*
Department of Computer Science
Purdue University Fort Wayne
260-481-6946, Email: yooj@pfw.edu