

# HANKYU JANG

PhD Candidate | Applied Scientist Intern @ Amazon 22' | Machine Learning Intern @ AmFam 21'

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(+1) 319-512-6129

Iowa City, IA (willing to relocate)

hankyujang

HankyuJang

hankyujang.github.io

## PROFESSIONAL SERVICE

PC Member | AAAI

08 2022 - Current

PC Member | epiDAMIK @ KDD

08 2021 - Current

Journal Reviewer | SNAM

11 2019 - Current

## SKILLS

Graph Mining

Network Embedding

Community Detection

Node Classification

Link Prediction

Deep Learning

Machine Learning

Social Network Analysis

Submodular Optimization

Data Preprocessing

Parallel Computing

Bash Scripting

Database Data Mining

Classification Clustering

Recommender System

Predictive Modeling

Data Visualization

Model Development

Reinforcement Learning

## EXPERIENCE

Applied Scientist Intern | Amazon.com Services, Inc.

05 2022 - 08 2022

Seattle, WA, USA

- Implemented fraud community detection pipeline that scales to raw data in 1.1 TB
- Detected 100% fraud community from heavily imbalanced 271 MM purchase orders
- Detected dozens of fraud communities with high fraud ratio ( $> 30\%$ )
- Achieved high quality results via graph embedding and local community detection
- Parallelized the pipeline by using 48 CPUs and 4 GPUs for fast inference

Machine Learning and Data Science Intern | American Family Insurance

05 2021 - 08 2021

Madison, WI, USA

- Achieved 75% accuracy on classifying 13K claims into over 200 classes
- Applied GAT on claims data to detect then correct suspicious entries
- Transformed unstructured text into vectors using Sentence-BERT and tf-idf

Graduate Research Assistant | University of Iowa

01 2019 - Current

Iowa City, IA, USA

- Developed approximation algorithms for submodular function optimization | AAAI 23
- Designed co-evolving neural networks to learn dynamic embedding of patients for predictive modeling | Achieved 48% gain | IEEE/ACM ASONAM 22
- Proposed data mining method for missing case detection on large graphs with 1.5M edges | Achieved 360% gain | KAIS 22 | IEEE ICDM 21
- Developed disease simulators | PLoS CompBio 21 | IEEE/ACM ASONAM 19

## EDUCATION

Ph.D. in Computer Science | University of Iowa | GPA: 3.93

08 2018 - 12 2023

Iowa City, IA, USA

M.S. in Data Science | Indiana University | GPA: 3.80

08 2016 - 05 2018

Bloomington, IN, USA

B.S. in Computer Science & Management | Handong Global University

03 2009 - 06 2016

Pohang, Korea

- GPA: 3.94 | Cum Laude

## AWARDS

Data Analysis Winner | 2017 Indiana Medicaid Data Challenge

10 2017 | Sponsors: FSSA, Indiana Chapter of HIMSS, Regenstrief Institute, and KSM Consulting

## MACHINE LEARNING ALGORITHMS

- Random Forest
- XGBoost
- AdaBoost
- PCA
- t-SNE
- Decision Tree
- Naive Bayes
- Support Vector Machine
- K Nearest Neighbors
- K-means Clustering
- Logistic Regression
- Linear Regression

## DEEP LEARNING ALGORITHMS

- TGN
- GNN
- GCN
- GAT
- CNN
- RNN
- LSTM
- ANN
- Encoder-Decoder
- Autoencoder

## NATURAL LANGUAGE PROCESSING

- BERT
- Sentence BERT
- Transformer
- Word2Vec
- Word Embedding
- Sentence Embedding
- tf-idf
- bag-of-words
- sentiment analysis

## TOOLS

- AWS Deep Learning AMI
- AWS EC2, Athena, S3
- Python
- MySQL
- SQLite
- Jupyter Notebook
- Google Colab
- Rstudio
- Tableau
- Terraform

- Discovered imbalance in capacity and demand of mental health treatment in the India state | Published Solution | Tableau Visualization | Presentation

Best Student Paper Award (Runner up) | [IEEE/ACM ASONAM 2022](#)

One of the Best Ranked Papers | [IEEE ICDM 2021](#)

Best Paper Award | [IEEE/ACM ASONAM 2019](#)

Post-Comprehensive Research Fellowship | [University of Iowa](#) | [Link](#)

02 2021 - 06 2021

## PUBLICATIONS

**Hankyu Jang**, A. Fu, J. Cui, M. Kamruzzaman, B.A. Prakash, A. Vullikanti, B. Adhikari, S.V. Pemmaraju, "Detecting Sources of Healthcare Associated Infections," AAAI 2023

**Hankyu Jang**, S. Lee, H. Hasan, P. M. Polgreen, S. V. Pemmaraju, B. Adhikari, "Dynamic Healthcare Embeddings for Improving Patient Care," ASONAM 2022 | [🔗](#) | [🏆 Best Student Paper Award \(Runner Up\)](#)

**Hankyu Jang**, S. Pai, B. Adhikari, S. V. Pemmaraju, (\*Extended version from ICDM 2021) "Risk-aware Temporal Cascade Reconstruction to Detect Asymptomatic Cases," KAIS 2022 | [🔗](#) | [Paper](#)

**Hankyu Jang**, S. Pai, B. Adhikari, S. V. Pemmaraju, "Risk-aware Temporal Cascade Reconstruction to Detect Asymptomatic Cases," ICDM 2021 | [🔗](#) | [🏆 One of the Best Ranked Papers](#)

**Hankyu Jang**, P. M. Polgreen, A. M. Segre, S. V. Pemmaraju, "COVID-19 modeling and non-pharmaceutical interventions in an outpatient dialysis unit," PLoS CompBio 2021 | [🔗](#) | [Paper](#) | [Data \(published in Kaggle\)](#)

H. Hasan, A. Rohwer, **Hankyu Jang**, T. Herman, P. M. Polgreen, D. K. Sewell, B. Adhikari, S. V. Pemmaraju, "Modeling and Evaluation of Clustering Patient Care into Bubbles," ICHI 2021 | [Paper](#)

**Hankyu Jang**, P. M. Polgreen, A. M. Segre, D. K. Sewell, S. V. Pemmaraju, "A Data-driven Approach to Identifying Asymptomatic C. diff Cases," epiDAMIK 2020 | [Paper](#)

S. Lee, **Hankyu Jang**, K. Zhao, M. Amato and A. Graham, "Link Predictions in an Online Health Community for Smoking Cessation," MLG 2020 | [Paper](#)

S. Lee, **Hankyu Jang**, K. Zhao, M. Amato and A. Graham, "Multi-Relational Link Prediction for an Online Health Community," INFORMS Workshop on Data Science 2019 | [Paper](#)

**Hankyu Jang**, S. Justice, P. M. Polgreen, A. M. Segre, D. K. Sewell, and S. V. Pemmaraju, "Evaluating Architectural Changes to Alter Pathogen Dynamics in a Dialysis Unit," ASONAM 2019 | [🏆 Best Paper Award](#)

## PACKAGES

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## POSTER AND DATA PUBLICATIONS

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Healthcare Personnel  
Movement Data  
[Kaggle 2020](#)  
[Data](#)

Sensor Data - Inform  
Mathematical Models  
[ICHE 2020](#)  
[Abstract](#) | [Poster](#)

## MACHINE LEARNING CERTIFICATIONS


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Machine Learning Specialization (Completed 3 courses) | [Coursera](#)

 10 2022 | [Show Credential](#)

1. Supervised Machine Learning: Regression and Classification | [Show Credential](#)
2. Advanced Learning Algorithms | [Show Credential](#)
3. Unsupervised Learning, Recommenders, Reinforcement Learning | [Show Credential](#)

PyTorch (Completed 2 courses) | [edX](#)

 5 2022

1. Deep Learning with Python and PyTorch | [Show Credential](#)
2. PyTorch Basics for Machine Learning | [Show Credential](#)

Deep Learning Specialization (Completed 5 courses) | [Coursera](#)

 4 2022 | [Show Credential](#)

1. Neural Networks and Deep Learning | [Show Credential](#)
2. Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization | [Show Credential](#)
3. Structuring Machine Learning Projects | [Show Credential](#)
4. Convolutional Neural Networks | [Show Credential](#)
5. Sequence Models | [Show Credential](#)

Data Analysis with R | [Udacity](#)

 3 2015 | [Show Credential](#)

## DATA SCIENCE PROJECTS

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Image Captioning |  | [Pdf](#) | [Poster](#)

- Applied transfer learning to encode 8K images from Flickr8k using ResNet50
- Used LSTM to decode embeddings to generate captions

Dog Breed Classification | 

- Achieved 79% accuracy for classifying 8K dog images into 133 categories
- Used transfer learning to get 315% performance gain over CNN

IMDB Movie Reviews Sentiment Classification | 

- Achieved 86% accuracy of predicting (+) review of 50K IMDB reviews using MLP

Daily Bike Rental Ridership Prediction | 

- Accurately predicted hourly bike rental counts for 10 days using MLP for regression

Kaggle Competition: Iceberg Classifier Challenge |  | [Pdf](#)

- Achieved 90% accuracy using CNN, classifying satellite images into iceberg or ship
- Evaluated KNN, Random Forests, and SVM on PCA dimension reduced data

Identification and Localization of Ambulance Siren |  | [Pdf](#)

- Proposed a framework to detect ambulance siren in noisy audio signals
- Reduced data dimension using NMF, then trained SVM for detection

Single Cell Classification |  | [Pdf](#)

- Achieved 96% accuracy on 3K brain cell classification into 9 categories using SVM
- Reduced data dimension from 5K to 50 using PCA without loss of model accuracy