

HANKYU JANG

Applied Scientist @ Amazon

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Seattle, WA

hankyujang

HankyuJang

hankyujang.github.io

PROFESSIONAL SERVICE

PC Member | IEEE Big-Data

02 2024 - Current

PC Member | AAI

08 2022 - Current

PC Member | epiDAMIK @ KDD

08 2021 - Current

Journal Reviewer | SNAM

11 2019

CERTIFICATIONS

Practical Data Science on the AWS Cloud Specialization (3 courses) | Coursera

08 2023 | Credential

Machine Learning Specialization (3 courses) | Coursera

10 2022 | Credential

Deep Learning Specialization (5 courses) | Coursera

4 2022 | Credential

PyTorch (2 courses) | edX

5 2022 | Credential

SCHOLARSHIPS AND FELLOWSHIPS

Dissertation Fellowship

Post-Comp Fellowship

Top 1% - HGU 2015

Top 10% - HGU 2014-2015

EXPERIENCE

Applied Scientist | Amazon.com Services, Inc.

12 2023 - current

Seattle, WA, USA

Skills: ML Operations, Fraud detection | LLM, Prompt Engineering, Continual Learning

- Identify fraudsters that compromise good customers' properties like their credit cards, accounts, etc, to gain profit on Amazon.com
- Explore novel methods in LLM and maintain existing ML models to detect fraud signals
- Research on continual learning to mitigate catastrophic forgetting in ML models

Machine Learning Intern | Pivot Bio

05 2023 - 08 2023

Berkeley, CA, USA

Skills: AutoML, ExplainableAI | Tree Boosting Algorithms, Permutation Importance

- Discovered key features that impact the performance of the product

Applied Scientist Intern | Amazon.com Services, Inc.

05 2022 - 08 2022

Seattle, WA, USA

Skills: Clustering, Community Detection | Graph Neural Networks

- Implemented a fraud community detection pipeline via retail order embeddings

Machine Learning and Data Science Intern | American Family Insurance

05 2021 - 08 2021

Madison, WI, USA

Skills: Multi-class Classification, Data Validation | Graph Attention Networks, BERT

- Provided an ML solution to detect suspicious claim data entries

Graduate Research and Teaching Assistant | University of Iowa

08 2018 - 05 2023

Iowa City, IA, USA

Skills: Collaboration, Leadership, Research, Teaching

- Developed computational methods (algorithms, data mining, machine learning) to model, make inferences about and predict various aspects of healthcare-associated infections
- Collaborated in an interdisciplinary group with specialists in medicine and statistics
- Advised students on a graduate-level course: Computational Epidemiology
- Managed a paper reading group to adapt track novel ML techniques (AlgoEpi)

AWARDS

Data Analysis Winner at Indiana Medicaid Data Challenge

- Discovered imbalance in capacity and demand of mental health treatment
- Our solution is publicly available on the Indiana State government webpage

[Presentation](#)

[Solution](#)

[Tableau visualization](#)

BEST PAPER AWARDS

[2nd Best@ASONAM22](#)

[Best Paper@ASONAM19](#)

DEEP LEARNING

TGN GNN GAT GCN

CNN RNN LSTM

ANN Autoencoder

BERT Transformer

MACHINE LEARNING

CATBoost LightGBM

XGBoost CART KNN

Random Forest K-means

Logistic | Linear Regression

PCA NMF t-SNE

LIME SHAP

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)

MACHINE LEARNING RESEARCH PROJECTS

Predictive modeling of an onset of an infection @ Ulowa

📍 Skills: Classification, Network Embedding, Continual Learning | Neural Networks, BERT

Designed ML models and algorithmic approaches to predict the onset of an infection

- *Continual*: Learn continually adaptive patient embedding via *DECEnt* on electronic health records and BERT on clinical notes | 📄 CIKM 23
- *DECEnt*: Learn patient embedding via co-evolving neural networks and autoencoders to capture the medical history | 📄 ASONAM 22 | 🏆 | 🏆 award
- *2-stage model*: Construct new features that captures the "exposure" to detected asymptomatic infections | 📄 epiDAMIK@KDD 20
- *Optimization*: Detect asymptomatics via graph mining | 📄 KAIS 22 | 📄 ICDM 21 | 🏆

Fraud detection of e-commerce retail orders @ Amazon

📍 Skills: Clustering, Community Detection | Graph Neural Networks

- Implemented a semi-supervised fraud community detection pipeline
- Detected dozens of fraud communities with high fraud ratio
- Parallelized the pipeline by using 48 CPUs and 4 GPUs for fast, scalable inference

Suspicious data entry detection @ AmFam

📍 Skills: Multi-class classification | Graph Attention Networks, BERT

- Developed a machine learning system that detects incorrectly classified claims
- Encoded claim description (free text) using sentence-BERT
- Applied Graph Attention to learn structural information among features for each claim
- Achieved 75% accuracy on classifying 13K claims into over 200 classes
- Distributed the solution to a partnering company for use in practice

Discover key features that derive product performance @ PivotBio

📍 Skills: Classification, Regression, AutoML, Explainable AI | CatBoost, Permutation Importance

- Designed a pipeline for identifying key features that affect the product performance
- Prepared 672 datasets by engineering data from 13 different sources
- Applied variance inflation factor (VIF) to handle collinearity
- Trained 115 ML models and found key features via permutation importance

TOOLS

AWS Deep Learning AMI

AWS EC2, S3, SageMaker

Python MySQL SQLite

Bash | PowerShell Script

Jupyter Notebook Docker

TensorFlow Extended (TFX)

PACKAGES

PyTorch Tensorflow

Keras Scikit-Learn

Numpy Pandas Scipy

Matplotlib Seaborn

Hugging Face NLTK

Deep Graph Library

Autogluon

TensorFlow Data Validation

POSTER AND DATA PUBLICATIONS

Mobility Data

 Kaggle 20

Sensor Data

 ICHE 20 |  Poster

DATA SCIENCE PROJECTS

Image Captioning |  |  |  Poster


 Skills: Transfer Learning | CNN, ResNet50, VGG19, LSTM

- Encoded Flickr8k using ResNet50, then decoded the embeddings using LSTM to generate captions. The encoder-decoder scheme was implemented from scratch using Keras

Dog Breed Classification | 

 Skills: Transfer Learning | CNN

- Achieved 79% accuracy for classifying 8K dog images into 133 categories

IMDB Movie Reviews Sentiment Classification | 

 Skills: Term Frequency, Multi-hot Encoding | Neural Networks


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

Daily Bike Rental Ridership Prediction | 

 Skills: Regression | Neural Networks

- Predicted hourly bike rental counts for 10 consecutive days

Kaggle Competition: Iceberg Classifier Challenge |  | 

 Skills: Image Classification, Dimensionality Reduction | CNN, KNN, Random Forests, SVM, PCA

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

Single Cell Classification |  | 




 Skills: Multi-class classification, Dimensionality Reduction | KNN, Random Forest, SVM, PCA

- Achieved 96% accuracy on 3K brain cell classification into 9 categories




PUBLICATIONS

A. Choudhuri, **Hankyu Jang** et al., "Continually-Adaptive Representation Learning Framework for Time-Sensitive Healthcare Applications" |  CIKM 23

Hankyu Jang et al., "Detecting Sources of Healthcare Associated Infections" |  AAAI 23 |  |  Poster

Hankyu Jang et al., "Dynamic Healthcare Embeddings for Improving Patient Care" |  ASONAM 22 |  |  Best Student Paper Runner Up

Hankyu Jang et al., "Risk-aware Temporal Cascade Reconstruction to Detect Asymptomatic Cases" |  KAIS 22 |  ICDM 21 | 

Hankyu Jang et al., "COVID-19 modeling and non-pharmaceutical interventions in an outpatient dialysis unit" |  PLoS CompBio 21 |  |  Kaggle data publication

Hankyu Jang et al., "A Data-driven Approach to Identifying Asymptomatic C. diff Cases" |  epiDAMIK@KDD 20

S. Lee, **Hankyu Jang** et al., "Link Predictions in an Online Health Community for Smoking Cessation" |  MLG@KDD 20 |  DataScience@INFORMS19

Hankyu Jang et al., "Evaluating Architectural Changes to Alter Pathogen Dynamics in a Dialysis Unit" |  ASONAM 19 |  Best Paper Award