[20pt] Inwon Kang

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Research Interests

Deep Learning, Blockchain Interoperability, Federated Learning, Differential Privacy, Explainable Machine Learning

Education

Ph.D. in Computer Science   2022.08 - Current
Rensselaer Polytechnic Institute
Advised by Professor Oshani Seneviratne. My current research focus is on interoperability of blockchain systems.

M.S. in Computer Science   2021.08 - 2022.05
Rensselaer Polytechnic Institute
Advised by Professor Lirong Xia.
My final project was on collection&analysis of a dataset on human perception of Gerrymandering.

B.S. in Computer Science   2017.08 - 2021.05
Rensselaer Polytechnic Institute
Concentration in AI/ML

Experience

Research Assistant | *Rensselaer Polytechnic Institute*   2022.08 - Current
Blockchain, Hyperledger
- Funded by CRAFT center to investigate and implement a framework for interoperability in disparate blockchain systems.
- Using Hyperledger Cactus to implement prototype.
- Published a survey paper in IEEE BigData 2022 Workshop.

Research Intern | *IBM – T.J. Watson Center, Yorktown NY*   2023.05 - 2023.08
Deep Learning, Foundation Model, Data Distillation
- Worked as a research intern in AI & Automation department.
- Implemented and experimented with an an automated AI pipeline using ray tune and pytorch.
- Accepted to AAAI Student Abstract track.

Undergraduate Researcher | *Rensselaer Polytechnic Institute*   2020.10 - 2021.05
Crowdsourcing, Explainable AI
- Joined Professor Lirong's group as an undergraduate student and worked on various projects, such as conducting surveys through Amazon Mechanical Turk to collect datasets and using GNNs to build NLP models that improved on past works.
- Built a website using Google sheet's API as a database to collect user responses for a survey on human perception of fairness in Gerrymandering.

R&D Intern | *Harris School Solutions*   2019.08 - 2020.12
Software Development, Web Development
- Worked as a full stack software developer for a web application that was used by school districts to manage their budgets
- Used ASP.Net MVC framework, MySQL, TypeScript and JavaScript

Projects

Learning to Explain Voting Rules   2022.07 - 2023.01
Explainable AI, Social Choice
- Used explainable machine learning models – Decision Trees – to learn to generate explanation for voting rules that satisfy the Condorcet Criterion.
- Accepted as extended abstract to AAMAS 2023.

Landslide Likelihood Prediction using Machine Learning Algorithms   2021.12 - 2022.11
Web Dashboard
- Built a map dashboard to show predicted danger level of landslide in Northeastern region of US.
- *Publication* – Presented at IEEE BigData 2022 workshop, paper available in NASA archive.

Analyzing and Predicting Success in Music   2021.09 - 2022.10
Data Collection, Explainable AI

- Collected data on professional musicians using Musicbrainz and Spotify API.
- Used a network based approach to construct a collaboration network of musicians in the dataset and trained decision-tree classifiers to predict their success in the future.
- *Publication* – Scientific Reports.

Crowdsourcing Perceptions of Gerrymandering   2021.08 - 2022.07

Data Collection, Explainable AI
- Built a survey platform and map builder to display pre-generated configurations of districting in a fictional area to gather data on human perception of fairness in gerrymandering.
- Used logistic regression to analyze the importance of features that participants considered.
- *Publication* – HCOMP 2022.

Learning Individual and Collective Priorities over Moral Dilemmas with the Life Jacket Dataset   2021.01 - 2022.05

Data Collection, Explainable AI
- Used Amazon's Mechanical Turk to randomly generate scenarios of moral dilemma to collect crowdsourced responses.
- Used logistic regression to understand the importance of each feature and the decision process behind the responses.
- *Publication* – MPREF 2022.

Making group decisions from natural language-based preferences   2021.01 - 2021.07

Data Collection, NLP
- Collected group discussion dataset about college preferences from College Confidential's forums and used crowdsourcing to label the dataset.
- Used NLP techniques such as TF-IDF along with BERT to train classifiers to elicit preferences from individual forum post
- *Publication* – COMSOC 2021.

Skills

Programming Languages:
>   Python, Javascript, Typescript, C#, Java, C, C++, Solidity

Machine Learning Libraries:
>   pytorch, pytorch-geometric, scikit-learn, tensorflow, opencv, torchvision, nltk, spacy, pandas, numpy

Web Frameworks:
>   Django, FastAPI, Flask, React.js, Next.js, .Net

Environments:
>   Docker, Linux

Publications

I. Kang, Q. Han, L. Xia, *Learning to Explain Voting Rules*, AAMAS–2023 – Extended Abstract

F. Mohsin, **I. Kang**, Y. Chen, J. Shang, L. Xia, *Dependency and Coreference-boosted Multi-Sentence Preference model*, DLG-AAAI-23 – Workshop

I. Kang, A. Gupta, O. Seneviratne, *Blockchain Interoperability Landscape*, IEEE BigData-2022 – Workshop

F. Mohsin, L. Luo, W. Ma, **I. Kang**, Z. Zhao, A. Liu, R. Vaish, L. Xia, Making group decisions from natural language-based preferences, *Making group decisions from natural language-based preferences*, COMSOC-21

F. Mohsin, **I. Kang**, P.Y. Chen, F. Rossi, L. Xia, *Learning Individual and Collective Priorities over Moral Dilemmas*, MPREF-22 – Workshop (IJCAI)

I. Kang, M. Mandulak, B.K. Szymanski, *Analyzing and predicting success of professional musicians*, Scientific Reports – Journal, 2022

B. Kelly, **I. Kang**, L. Xia, *Crowdsourcing Perceptions of Gerrymandering*, HCOMP-22 – Conference/AAAI