Inwon Kang

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Research Interests

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

Education

Rensselaer Polytechnic Institute	2022.08 - Current

Ph.D. in Computer Science

Advised by Professor Oshani Seneviratne. My current research focus is on interoperability of blockchain systems.

Rensselaer Polytechnic Institute	2021.08 - 2022.05

Master's in Computer Science

Advised by Professor Lirong Xia. My final project was on collection/analysis of a dataset on human perception of Gerrymandering.

Rensselaer Polytechnic Institute	2017.08 - 2021.05

Bachelor's in Computer Science

Concentration in AI/ML

Experience

Research Assistant	2022.8 - Current

Rensselaer Polytechnic Institute

- Funded by CRAFT center to investigate and implement a framework for interoperability in disparate blockchain systems.
- Published a survey paper in IEEE BigData 2022 Workshop.

Research Intern	2023.5 - 2023.08

IBM – T.J. Watson Center, Yorktown NY

- Worked as a research intern in AI & Automation department.
- Developed an automated AI experimentation pipeline using ray tune and pytorch.
- Accepted to AAAI Student Abstract track.

Undergraduate Researcher	2020.10 - 2021.05

Rensselaer Polytechnic Institute

- 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	2019.8 - 2020.12

Harris School Solutions

- 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 and Bert to train classifiers to elicit preferences from individual forum post
- *Publication* – COMSOC 2021.

Technical Skills

- **Programming Languages**: Python, Javascript, Typescript, C#, Java, C, C++, Solidity
- **Environments**: Docker, Linux, OS X
- **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

Publications

F. Mohsin, L. Luo, W. Ma, **I. Kang**, Z. Zhao, A. Liu, R. Vaish, L. Xia, 2021, *Making group decisions from natural language-based preferences*, COMSOC-21

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

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

F. Mohsin, **I. Kang**, Y. Chen, J. Shang, L. Xia, 2023, *Dependency and Coreference-boosted Multi-Sentence Preference model*, DLG-AAAI-23 – Workshop

F. Mohsin, **I. Kang**, P.Y. Chen, F. Rossi, L. Xia, 2022, *Learning Individual and Collective Priorities over Moral Dilemmas*, MPREF-22 – Workshop/IJCAI

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

B. Kelly, **I. Kang**, L. Xia, 2022, *Crowdsourcing Perceptions of Gerrymandering*, HCOMP-22 – Conference/AAAI