

HANGZHI GUO

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EDUCATION

Pennsylvania State University (GPA: 3.99/4.0)

Ph.D. in Informatics

Advisor: Prof. Amulya Yadav

State College, US

Aug.2020 - Present

Wenzhou-Kean University (GPA: 3.64/4.0)

B.S. in Computer Science (Minor in Mathematics)

Wenzhou, China

Sept.2016 - Jun.2020

RESEARCH INTERESTS

AI for Social Good, Explainable AI, Algorithmic Recourse, Machine Learning, Human-Computer Interaction

PUBLICATIONS

Pre-prints

1. **Hangzhi Guo**, Thanh Nguyen, and Amulya Yadav. CounterNet: End-to-End Training of Counterfactual Aware Predictions. arXiv preprint arXiv:2109.07557, 2021.

Best Paper Runner-up Award at ICML-21 Workshop on Algorithmic Recourse.

Peer Reviewed Conference Papers

1. **Hangzhi Guo**, Alexander Woodruff, and Amulya Yadav. Improving Lives of Indebted Farmers using Deep Learning: Predicting Agricultural Produce Prices using Convolutional Neural Networks. In proceedings of The 34th AAAI Conference on Artificial Intelligence (IAAI Technical Tracks), 2020.
2. Pinata Winoto, Jie Chen, **Hangzhi Guo**, and Tiffany Y. Tang. A Mathematical and Cognitive Training Application for Children with Autism: A System Prototype, In proceedings of International Conference on Human-Computer Interaction (HCI), pp. 114-119. Springer, Cham, 2018.

RESEARCH EXPERIENCE & PROJECTS

Pennsylvania State University, Research Assistant, PA, US

Advisor: Prof. Amulya Yadav

Research Topic: Explainable AI

Sep.2020 - Present

- **End-to-End Training of Counterfactual Aware Prediction System**

Motivated by the recent GDPR of the algorithm on “right to an explanation”, we proposed a novel end-to-end learning framework, CounterNet, which integrates the model prediction and the counterfactual explanation into a single one-stage pipeline. By adopting the block-wise coordinate descent procedure, we effectively trained the CounterNet model that outperformed the state-of-the-art methods in balancing the cost-invalidity trade-off. Furthermore, CounterNet runs orders of magnitude faster than state-of-the-art methods. A workshop version of this paper was awarded as *best paper runner-up at ICML-21 Workshop on Algorithmic Recourse.*

- **Robust Counterfactual Explanations under the Distribution Shift**

Existing counterfactual explanation methods suffer from poor robustness of explanation induced by distribution shift, leading to trustworthiness issues in ML models. To generate distributionally robust counterfactual explanations, we adopted adversarial training by constructing shifted adversary models from optimizing a bi-level data poisoning problem. Preliminary evaluation shows improvements in robustness by a large margin (e.g., ~ 35% robust validity increase in average) as compared to state-of-the-art methods.

Research Topic: AI for Social Good

Jul.2019 - Present

- **AI for Reducing the Risk of Maternal and Neonatal Deaths in Kenya**

In collaboration with Jacaranda Health (an NGO in Kenya), we developed a deep learning model to classify the intent of incoming messages sent by maternal mothers from Kenya. Since these messages are highly code-mixed, we adopted the adaptive fine-tuning on the XLM-RoBERTa model. Our offline experiment shows ~10% precision improvements to the vertex model, and we are in the process of model deployment for an A/B test.

- **Deep Learning for Predicting Agricultural Produce Prices to Improve Lives of Indebted Farmers**
We proposed a novel deep learning model, PECAD, for helping farmers to sell their products in their best interests. PECAD is trained on real-world daily prices and produced volume data of six crops for 11 years gathered from an official Indian government-administered website. We implemented a TCN based deep neural network achieving 25% improvements than the state-of-the-art baseline. This project was published at AAAI-20, and was covered by multiple media sources, including [The Print India](#), [News Medical](#), and [Penn State News](#).

Research Topic: Human-AI Interaction and Crowdsourcing

Sep.2020 - Present

Mentor: Prof. Ting-Hao (Kenneth) Huang

- **Human Discriminator: Distinguishing Real and Fake Images using Crowd**
We designed a novel evaluation pipeline by harnessing the crowd-sourcing workers in Toloka.ai in detecting fake images generated from GAN. By implementing detailed instructions and training sessions, we can achieve 75.5% accuracy in distinguishing real and fake images, as compared to an accuracy of 64.8% without any interventions. This project charts the way toward future study in benchmarking GAN models with human-in-the-loop evaluation.

Mentor: Prof. Frank E. Ritter

- **An Explainable Machine Learning System for K-12 Teachers**
We investigated both teachers' and ML practitioners use of the explainable machine learning model. We developed a web-based explainable intelligent system to assist users in predicting students final scores. We performed a user evaluation on four participants (with a diverse background in teaching and AI) after using the explainable intelligent system. Our results highlight the importance of considering user expertise when designing explainable intelligent systems. This project received the *Fred Loomis Outreach Prize (best paper award)* from IST 521, Penn State.

SELECTED AWARD & HONOR (BY YEAR)

- **Excellent Teaching Support Award** | IST, Penn State University *2022*
- **Best Paper Runner-Up Award** | ICML-21 workshop on Algorithmic Recourse *2021*
- **Outstanding Graduate Award** | Wenzhou-Kean University *2020*
- **The Research and Innovation Scholarship** | Wenzhou-Kean University *2017 - 2019*

TEACHING EXPERIENCE

Penn State University

- **Teaching Assistant** | DS 310: Machine Learning for Data Analytics *Sept.-Dec.2021*
Received the *Excellent Teaching Support Award* by IST at Penn State University

Wenzhou-Kean University

- **Teaching Assistant** | CPS 1231: Introduction to Java Programming *Sept.-Dec.2018*
- **Peer Tutor** *Sept.2018-June.2019*

PROFESSIONAL SERVICE

Reviewing Activity

- IEEE Transactions on Big Data, AAMAS 2021

Workshop Program Committee

- AAMAS 2021, 2022 (Autonomous Agents for Social Good), IJCAI 2021 (AI for Social Good)

Conference Volunteers

- ACL 2020

TECHNICAL SKILLS

Programming Languages	Python, Java, CSharp, PHP, JavaScript, Julia, R, C, Bash
Tools	Git, Docker, Vim, Jupyter Notebook
Framework	Pytorch, Weights & Biases, Sci-Kit Learn, React.js, Django, Flask