Chenxi "Chelsea" Yuan

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RESEARCH INTERESTS

Developing deep learning methods for 1) early prediction of AD progression, and 2) auditing and addressing algorithmic bias.

EXPERIENCE AND EDUCATION

Postdoctoral Researcher July 2022 –

University of Pennsylvania, Philadelphia, PA

Northeastern University, Boston, MA Sep. 2017 – May. 2022

Ph.D. in Industrial Engineering

Advisor: *Prof.* Mohsen Moghaddam

University of Florida, Gainesville, FL Jan. 2016 – May. 2017

M.S. in Industrial and Systems Engineering

Advisor: *Prof.* Panos M. Pardalos

Northwest University, Shannxi, China Sep. 2011 – May. 2015

B.S. in Mechanical Engineering

PUBLICATIONS

1. **Yuan, Chenxi**, Tucker Marion, and Mohsen Moghaddam. "DDE-GAN: Integrating a Data-driven Design Evaluator into Generative Adversarial Networks for Desirable and Diverse Concept Generation". *Submitted to Journal of Mechanical Design.* (Forthcoming).
2. **Yuan, Chenxi**, Tucker Marion, and Mohsen Moghaddam. "Integrating AI into the Front-End of the NPD Process: Empirical Results and Implications from an Experimental System". *Journal of Product Innovation Management.* (Forthcoming)
3. **Yuan, Chenxi**, Tucker Marion, and Mohsen Moghaddam. "Leveraging End-User Data for Enhanced Design Concept Evaluation: A Multimodal Deep Regression Model". *Journal of Mechanical Design*, 144(2) (2021), 09.021403.
4. **Yuan, Chenxi**, Guoyan Li, Sagar Kamarthi, Xiaoning Jin, and Mohsen Moghaddam. "Trends in Intelligent Manufacturing Research: A Keyword Co-occurrence Network based Review." *Journal of Intelligent Manufacturing*(2021): JIMS-D-21-00187R3.
5. Li, Guoyan, **Yuan, Chenxi**, Sagar Kamarthi, Mohsen Moghaddam, and Xiaoning Jin. "Data Science Skills and Domain Knowledge Requirements in the Manufacturing Industry: A Gap Analysis." *Journal of Manufacturing Systems* 60 (2021): 692-706.
6. **Yuan, Chenxi**, and Mohsen Moghaddam. "Attribute-Aware Generative Design with Generative Adversarial Networks." *IEEE Access* 8 (2020): 190710-190721.
7. Zou, Yongqiang, Shanshan Li, Yuqi Wang, **Yuan, Chenxi**, Weijian Yuan, Lan Zheng, and Xiaolong Han. "Flocculation Behavior of Cationic Pea Starch Prepared by the Graft Copolymerization of Acrylamide for Wastewater Treatment." *Journal of Applied Polymer Science* 133, no. 37 (2016).

RESEARCH EXPERIENCE

PhD Dissertation Sep. 2019 – May 2022

Augmenting Designers' Creativity with Deep Neural Network Architectures for User-Centered Design Concept Generation and Evaluation (Sponsor: NSF)

- Design, test, and validate novel generative adversarial network (GAN) architectures for automated, attribute-aware generative design of both form and function, informed by past successful designs
- Build and validate a novel deep multimodal neural network-based model that allows for accurate prediction of the overall and attribute-level desirability of a concept based on based on orthographic product images and product descriptions, with respect to concerning large-scale user sentiments and feedback on past designs
- Devise intelligent, user-centered and data-driven methods that integrate formal product data with tacit knowledge extracted from large-scale user reviews to create innovative and desirable design concepts
- Collaborate with three faculty from School of Business, College of Arts, Media and Design at Northeastern University and Department of Computer Science at University of Michigan

Supervisor: *Prof.* Mohsen Moghaddam

Research Assistant Jan. 2020 – May 2022

Developing Integrative Manufacturing and Production Engineering Curricula That Leverage Data Science (Sponsor: NSF)

- Support faculty to ideate, design, develop, and deploy sustainable, online courses and curricula at Northeastern University that can bridge the production engineering-oriented data science skills gap of incumbent professional engineers and entering engineers and technicians
- Conduct systematic reviews of the trends in intelligent manufacturing research with keyword co-occurrence network based methodology to inform curriculum design efforts
- Identify skills gaps in manufacturing workforce through content analysis on a large, proprietary labor market analytics and economic dataset (Emsi)
- Develop machine learning based course module recommendation systems for individuals based on their skill gaps and professional requirements

Supervisor: *Prof.* Sagar Kamarthi, *Prof.* Mohsen Moghaddam, *Prof.* Xiaoning (Sarah) Jin

Research Assistant Jan. 2018 – Aug.2019

Improve Access to Healthcare with Adaptive Optimal Control System and Optimize Location Allocation Problem on Opioid Facility (Sponsor: NIH)

- Develop a simultaneous adaptive control theory based model to help decision makers allocate long-term resource capacities, mid-term care modalities, and short-term scheduling prioritization optimally to ensure timely access under multi time-lag scenarios and compared with EWMA control and PID control
- Develop a CPLEX multi-objective optimization model to minimize total cost and optimize location of opioid/heroin addiction treatment clinics so that majority of patients can receive the care they needs
- Build a state-wide Python simulation model of outpatient opioid treatment centers in Mass, to examine how different outpatient interventions may affect key measures to help address ongoing opioid epidemic

Supervisor: *Prof.* James Benneyan

TEACHING EXPERIENCE

Teaching Assistant

IE 4530 Manufacturing Systems and Techniques, Northeastern University Sep. 2019 – Dec. 2019

IE 4520 Stochastic modeling, Northeastern University Jan. 2019 – Apr. 2019

IE 4520 Stochastic modeling, Northeastern University Sep. 2018 – Dec. 2018

OR 6205 Operation Research, Northeastern University Sep. 2017 – Dec. 2017

Guest Lecture

IE 7270 Intelligent Manufacturing, Northeastern University Mar. 2021

ACTIVITIES & AWARDS

Member: Society of Women Engineers at Northeastern University, 2018-2022

Award: MIE Graduate Student Conference Award, 2020

Activity: INFORMS Annual Meeting, 2021

Activity: INFORMS Annual Meeting, 2020

Activity: 2rd Workshop on Adversarial Learning Methods for Machine Learning and Data Mining, 2020

REVIEW SERVICE

IEEE Transactions on Neural Networks and Learning Systems, 2021

Journal of Mechanical Design, 2020 & 2021 & 2022

Expert Systems with Applications, 2020