

Seminar at the Department of Business Analytics at the University of Iowa

Friday October 29, 2021. Time: 11:00am-12:00pm (US central time)

Title: Measuring algorithmic interpretability: A human-learning-based framework and the corresponding cognitive complexity score

Speaker: Hong Guo

Abstract:

Algorithmic interpretability is necessary to build trust, ensure fairness, and track accountability. However, there is no existing formal measurement method for algorithmic interpretability. In this work we build upon programming language theory and cognitive load theory to develop a framework for measuring algorithmic interpretability. The proposed measurement framework reflects the human learning process of an algorithm. We show that the measurement framework and the resulting cognitive complexity score have the following desirable properties – universality, computability, uniqueness, and monotonicity. We further illustrate the measurement framework through two common recommender system algorithms. We also demonstrate how cognitive complexity could quantify algorithmic interpretability, which is becoming an important addition to the mix of existing performance metrics (e.g., computational complexity, predictive performance) for managers considering trade-offs when selecting algorithms.

Speaker Bio:

Dr. Hong Guo is a Professor of IT, Analytics, and Operations at University of Notre Dame. Hong studies emerging IT phenomena by characterizing key design features of such systems (e.g., digital platforms, digital games) and examining firms' corresponding strategies. She is also interested in economic analysis of IT policy issues such as net neutrality and public safety networks. Hong's research has been published in top business journals such as MIS Quarterly, Information Systems Research, Manufacturing & Service Operations Management, and Production and Operations Management. Her work was recognized with the INFORMS ISS Sandy Slaughter Early Career Award in 2018. She currently serves as an associate editor for Information Systems Research and senior editor for Production and Operations Management. She also served as an associate editor for MIS Quarterly between 2017-2020.

Hong teaches analytics courses including data visualization, quantitative decision modeling, process analytics, and statistics in business at Notre Dame. She won the Rev. Edmund P. Joyce, C.S.C. Award for Excellence in Undergraduate Teaching in 2017 and the James Dincolo Outstanding Teaching Award for Undergraduate Teaching in 2013.