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Kai Zhu

ABOUT ME

I am a 5th year PhD student in Information Systems at Boston University. My research broadly seeks to understand the impact of digital technology on our life and society, and how can we better utilize technology to facilitate greater economic and societal success. My current research focus on bias, skewness, and polarization in systems that are enabled by digital technology (e.g. Wikipedia, social media, broadcast mass media). Having training in both economics and computer science, I apply a wide variety of tools to large-scale structure and unstructured data in conducting these research. These includes statistical modeling and causal inference, machine learning and deep learning, natural language processing, randomized controlled trial, and network science.

SELECTIVE COURSEWORK

Seminars and Courses around Boston Area

Economics of Information and Technology (Erik Brynjolfsson, MIT)
Empirical Studies of Innovation and Digitization (Shane Greenstein, Harvard)
Causal Inference in Management Research (Tim Simcoe, BU)
Applied Network Theory and Analysis (Sinan Aral, MIT)
Advanced Quantitative Research Methodology (Gary King, Harvard)
Machine Learning in Econometrics (Sendhil Mullainathan, Harvard)
Design and Analysis of Experiments (Dean Eckles, MIT)
Network Science (Albert-Laszlo Barabasi, Northeastern)

Economics

Microeconomics 1 and 2
Advanced Information Economics
Contract Theory and Theory of Incentives
Game Theory
Industrial Organization
Econometrics 1 and 2
System and Panel Econometric models
Advanced Microeconometrics
Time Series Econometrics

Computer Science

Advanced Machine Learning
Algorithms Design and Analysis
Convex Optimization

Neural Networks for Natural Language Processing

Deep Learning

Tools, Techinqiues, and Theories for Data Mining

Computational tools for Data Science

Machine Learning Methods for Social Science Research

RESEARCH

Content Growth and Attention Contagion in Information Networks: A Natural Experiment on Wikipedia

Kai Zhu, Dylan Walker, Lev Muchnik

- Accepted at ***Information Systems Research***
- Presented at *WWW 2017*, *CODE 2017*, *WISE 2017*, *SCECR 2018*, *HBS 2018*, *WEBEIS 2019*

Abstract: Open collaboration platforms have fundamentally changed the way knowledge is produced, disseminated and consumed. In these systems, contributions arise organically with little to no central governance. While such decentralization provides many benefits, a lack of broad oversight and coordination can leave questions of information poverty and skewness to the mercy of the system's natural dynamics. Unfortunately, we still lack a basic understanding of the dynamics at play in these systems, and specifically, how contribution and attention interact and propagate through information networks. We leverage a large-scale natural experiment to study how exogenous content contributions to Wikipedia articles affect the attention they attract and how that attention spills over to other articles in the network. Results reveal that exogenously added content leads to significant, substantial and long-term increases in both content consumption and subsequent contributions. Furthermore, we find significant attention spillover to downstream hyperlinked articles. Through both analytical estimation and empirically-informed simulation, we evaluate policies to harness this attention contagion to address the problem of information poverty and skewness. We find that harnessing attention contagion can lead to as much as a twofold increase in the total attention flow to clusters of disadvantaged articles. Our findings have important policy implications for open collaboration platforms and information networks

A Warped Mirror: Skewed Attention in Media Coverage of Gun Violence

Kai Zhu, Dylan Walker

Abstract: The public's perception and understanding of the gun violence epidemic in our country is driven by their exposure to media coverage of gun violence, predominantly through televised news. While high-profile incidents like mass shootings and school shootings gain significant attention and coverage on national news, the vast majority of gun violence is inherently local. We study local news coverage of a wide variety of gun violence incidents throughout the United States on hundreds of local TV channels over a period of four years. We found that some types of gun violence, such as suicide, accidents, domestic violence and sex crimes are systematically covered less relative to their actual occurrence, while others, such as assault weapon incidents, are systematically covered more. Importantly, areas of high vs. low gun ownership received different exposure to different incident types through local news coverage, further dividing this already divided population.

How Media Ownership Impacts Information Skews: A Study of Televised News Using Massive-Scale Text Transcripts

Kai Zhu, Dylan Walker

- Presented at *PaCSS 2018*, *SCECR 2019*; To be presented at *WISE 2019*

Abstract: Broadcast TV in the United States is an information system comprised of hundreds of local television stations that both produce their own information and syndicate information from other sources (such as major networks). In this system, a few media conglomerates are behind the vast amount of information produced and disseminated. There has been an increasing trend of media consolidation in recent years and this raises the very real concern that conglomerate owners have both the means and motive to skew information. When large owners act coherently, they can skew information to emphasize views, perspectives, framing, coverage and attention. This is important because broadcast media has a dramatic impact on political and social outcomes and undeniably shapes the national dialogue surrounding important issues. Unfortunately, we know little about how ownership affects information skew and lack a systematic empirical evaluation of content and ownership at sufficient scale and detail. In this study, we quantify and investigate the consequences of information system ownership, specifically in terms of diversity of information and political polarization, in one of our most important mass information systems - broadcast televised news. We aim to understand how does media ownership impact information diversity, political polarization, and topic coverage in TV news. To examine the impact of ownership, we focus on the natural experiments of hundreds of station acquisitions by new owners over a six year time span. The change of ownership allow us to disentangle the impact of owner of a TV station from other characteristics that may also correlated with the information produced by a station.