Appliction for Digital Economics and AI Tutorial 2023

Applicant

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Course of Graduate Study Pursued

My graduate study at Cornell University and Columbia University encompasses a comprehensive range of topics in Advanced Economic Theory and Quantitative Methods:

- Advanced Economic Theory (PhD Level):
  Microeconomic Theory (I & II, one-year PhD-level Sequence), Macroeconomic Theory (I & II, one-year PhD-level Sequence), Econometrics (I & II, one-year PhD-level Sequence), Information Economics, International Development, International Finance, Public Finance (I & II), Macro Labor, Industrial Organization and Regulation, Advances in Labor Economics

- Quantitative Methods:
  Causal Inference and Machine Learning, Bayesian Time Series Methods, Empirical Strategies for Policy Research and Analysis (I & II), Semi/Non-Parametric Econometrics, Quantitative Models, Data Mining (Graduate level at Columbia University), Geographic Information System (GIS) and Quantitative Strategies (Graduate level at Columbia University), Advanced Analytic Techniques (Graduate level at Columbia University), Real Analysis (One-year sequence from Math Department at Columbia University), Topology (2018 from Math Department at Columbia University)

- Courses as Teaching Assistants:
  Statistics and Probability (One Year), Applied Econometrics, Intermediate Microeconomic Theory, Intermediate Macroeconomic Theory, Introductory Microeconomics, Introductory Macroeconomics, Digital Platform Strategy (MBA)

Listing of Committee Members:

Chris Forman
Peter and Stephanie Nolan Professor
Area Chair, Strategy and Business Economics, Cornell SC Johnson College of Business
Charles H. Dyson School of Applied Economics and Management, Cornell University

Nathan Yang
Assistant Professor of Marketing

Cornell University, Charles H. Dyson School of Applied Economics and Management

Benjamin T. Leyden
Assistant Professor of Strategy and Business Economics
SC Johnson College of Business, Cornell University

Short Description of Research Interests:

My research interests lie at the intersection of Information System and Strategy, Marketing, and Industrial Organization, with a particular focus on Digital Economics. I am fascinated by Generated-content Platforms, Multi-sided Digital Economy, and Business Strategies and Policies in Digital Advertising Markets. If given the opportunity to attend the Digital Economics and AI Tutorial, I am eager to delve into core and novel research questions and embrace interdisciplinary methods from esteemed research leaders in the realm of digital economics and artificial intelligence.

Research Projects:

1. Managing the Digital Advertising Economy: Balancing Content and Profitability
   This project examines the impact of digital monetization strategies on user-generated content (UGC) platforms, such as YouTube and BILIBILI. As crucial players in the advertising industry, these platforms facilitate collaboration between content creators and sponsors for online media curation. The study specifically investigates the effects of commission fee deductions on the revenue sharing, including ad request frequency by advertisers, creator selection, and gross merchandise volume (GMV). Surprisingly, the research reveals that more existing advertisers are transitioning to, and a larger influx of new advertisers is joining the deduction-based fee option. However, contrary to expectations, advertisers from the treated groups did not exhibit significant increases in average order placements or revenue sharing with creators, indicating limited boosts in their engagement and investment. The study suggests that the platform's management design, aimed at ceding profits through commission fee deductions, did not effectively achieve the expected outcomes.

2. Intermediaries in the Digital Economy: Evidence from Multi-sided Platforms The rapid development of the digital economy has witnessed diverse patterns of content creation and promotion, leading to the emergence of digital intermediaries as crucial liaisons in the digital content industry chain. Major content platforms have adopted ad auctions with a similar structure. On the content supply side, Multi-Channel Networks (MCNs) have evolved from YouTube, expanding across Facebook, Snapchat, and Twitter, to professionally support content creation, provide publishing guidance to creators, and assist in advertising quotation for commercial realization, earning a share from advertising revenue. On the advertising demand side, agents connect platforms and advertisers, placing orders based on institutional needs to maximize advertising benefits while controlling costs. While intermediaries appear to have economies of scale and information advantages in pricing, their specific impacts on end-users, including non-contracted creators,

need thorough investigation. Utilizing the comprehensive database of intermediary institutions from user-generated content, the research aims to quantify their operational efficiency and cost benefits. Preliminary results show that MCNs have improved the order placing frequency and the platform's operational efficiency, while intermediaries have effectively reduced quotes paid by advertisers to creators and extracted profits from transactions. This research sheds light on practices that promote Information System strategies to reduce informational inequalities.

3. Developing an Online Jewelry Platform as an Experiment Lab for Business Strategies in Digital Economics
   As conventional industries increasingly merge online and offline experiences, consumption becomes more digital and social. Leveraging the resources within jewelry supply chains, I am building a real digital platform to conduct online field experiments, yielding real-time quantitative data and invaluable opportunities for theory development and testing. AI-powered decision support tools, such as customized recommender systems, will facilitate efficient consumer and business preferences matching. This platform generates previously uncaptured variables and aims to address fundamental questions related to accommodating disruptive technologies in market design, exploring alternative research methods beyond analytical modeling and empirical studies, and evaluating the notion of optimal choice amidst precise predictions from recommender systems and preference-revealing algorithms. I am eager to discuss novel research questions with sound economic rationale and adopt useful methodologies from other researchers in the digital economics and AI tutorial, enriching my contributions to diverse disciplines.

4. Market Structure and the Emergence of Location-based Food Deserts
   This research investigates the role of strategic entry and exit through dynamic structural models in the formation of urban food markets using digital information. Detailed location-based and digital data encompassing a wide range of food-service establishments across all states in the U.S., categorized based on sectors (e.g., grocery, convenience store, healthy/non-healthy full-service/limited-service restaurant), are analyzed to reveal deterring effects within and beyond specific categories. The project extends the boundaries of location-based food markets using geographic information and discretized categories, applying machine learning methods like natural language processing. The study explores how establishments offering healthy/non-healthy products can be influenced by the decisions of other establishments, which has implications for economic policy changes in counterfactual analyses.

5. Detecting Location-based Markets using Satellite Data
   Under the guidance of Prof. Amit Khandelwal from the Economics Division at Columbia Business School, I developed a globally scalable algorithm using JavaScript to detect markets based on economic activities, utilizing satellite data. Additionally, I conducted spatial models based on machine-learning projection, aggregation, reclassification, and iteration in ArcGIS on Python. The project automated world-scale spatial statistics, including market scales, geographic centroids, transportation, population, and economic indexes within detected markets, utilizing Google Earth Engine (GEE) and Command-line Interface (CIL).