QINGYUN WU

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EDUCATION

Stanford University   2014-June 2020

· Ph.D. candidate in **Economics**; and also in **Operations Research**
· Research advisors: Alvin E. Roth (Primary), Itai Ashlagi and Fuhito Kojima
· Research interest: game theory, market design, discrete mathematics and stochastic process
· Research assistant for Prof Alvin Roth: built mathematical models and analyzed simulations on the structure and evolution of matching markets
· Teaching assistant for two graduate-level courses on optimization and algorithms
· Coursework: game theory, matching, auction, machine learning, algorithms, probability, stochastic systems, optimization, time series and econometrics

University of California, Berkeley   2010-2014

· B.A. in **Mathematics** - Highest Honors; B.A. in **Statistics**; Minor in **Industrial Engineering and Operations Research (IEOR)**
· High distinction in general scholarship
· Received 14 A+ grades out of 18 math courses taken at Berkeley

HONORS AND AWARDS

William Lowell Putnam Mathematical Competition

· Highest rank: 110th   2013
· Official team member of University of California, Berkeley   2012 & 2013
· UC Berkeley Team placed 6th in the 2013 competition, receiving honorable mention   2013

Phi Beta Kappa   2014
Dorothea Klumpke Roberts Prize (in Mathematics)   2014

RESEARCH

1. Wu, Qingyun and Alvin E. Roth. "The Lattice of Envy-free Matchings." *Games and Economic Behavior* 109 (2018): 201-211.

Modeling how a decentralized sequence of offers, in which firms fill vacant positions, and cause vacancies in other firms, produces a sequence of envy-free matchings, and eventually converges to a stable matching, through Tarski's fixed point theorem.

2. Forbidden Transactions and Black Markets (with Chenlin Gu and Alvin E. Roth), Revise and Resubmit: *Journal of Economic Theory*.

Modeling the evolution of black markets with a Markov process emphasizing the role of social repugnance. Analyzing paths to convergence in addition to the conventional limit behavior by constructing an auxiliary random walk. Simulations carried out in Python and R.

3. Entering Classes in the College Admissions Model, Revise and Resubmit: *Games and Economic Behavior*.

Characterizing properties of entering classes in the college admissions problem with a lattice-theoretic approach. Discovering new insights in a classic model actively researched for 30 years.

4. Competition Between Streaming Platforms

Analyzing the effect of linear payment schemes on the decentralized matching between streamers and streaming platforms. Investigating the stabilization of job-hopping processes and the resulting equilibrium by constructing a potential function. Panel regression analysis for a dataset on the Chinese streaming market is carried out in R to justify theoretical assumptions.

5. Dynamic Matching with Teams

Motivated by real-life matchmaking issues in video games. Derived theoretical optimal policy for matchmaking with trade-offs between game balance and waiting time. A generalized model with role selections was solved by dynamic programming, implemented in Python.

MACHINE LEARNING PROJECTS

Credit card fraud detection: using upsampling and downsampling to balance the dataset; selecting model by AUC ROC curve and tuning parameters with F-score; achieving 0.85 precision and 0.84 recall with AdaBoost - 18% improvement in F-score comparing to a naive logistic regression.

Stock price prediction: using percentage changes in the past 14 days to predict if American Airlines stock price will go up or down tomorrow; achieving 54.2% accuracy with AdaBoost - comparing to a 50.7% base rate of always guessing up, which is the prediction of logistic regression and SVM.

House price prediction: through Box-Cox transformation, feature engineering and hyperparameter optimization, reduced mean squared error by 44.7% with XGBoost over linear regression/Ridge/LASSO.

PROGRAMMING SKILLS

Analytics & Optimization	Python (proficient), R (proficient), SQL, Matlab, AMPL, TreeAge
Mathematics	Mathematica, CG-Suite, Polymake, Sage
Miscellany	LaTeX(proficient), HTML

PROFESSIONAL ACTIVITIES

Invited talks: ASSA 2018 session - "New Insights on Classic Questions in Matching Theory"; Guest lecture in Econ 285, Fall 2018 - "Forbidden Transactions and Black Markets".

Referee for: Games and Economic Behavior, International Journal of Game Theory, Mathematics of Operations Research, Mathematical Social Sciences.