Shuhao Tang

(862) 230 – 1705 | st1116@rutgers.edu | Personal Website: https://shuhaotang.github.io/home/

EDUCATION

RUTGERS BUSINESS SCHOOL, RUTGERS UNIVERSITY Newark & New Brunswick, NJ
Ph.D. Candidate in **Operations Research** (GPA: 4 / 4, Full Scholarship) Aug 2022 - Present

- Research Interests: Online Learning, Reinforcement Learning, Exploration & Exploitation, Optimization, **Data**-driven Problem, Stochastic Inventory Control, Pricing, Revenue Management
- Coursework: Optimization, Regression Models, Statistics

COLUMBIA UNIVERSITY New York, NY
M.S. in Operations Research Aug 2019 - Feb 2021

TONGJI UNIVERSITY Shanghai, China
B.E. in Vehicle Engineering Sep 2014 - Jul 2019

- Award: Tongji University Excellent Undergraduate (**TOP 5%** Graduates)

PAPER - TO BE SUBMITTED

Road to the Best (s, S, p) Policy in Joint Inventory-price Control Involving Demand Ambiguity
Co-author: Prof. Jian Yang | Available at SSRN: https://ssrn.com/abstract=4965349
Keyword: Online Learning, Exploration & Exploitation, Adaptive Policy, Regret Analysis, Ambiguity
Policy (Algorithm) Design:

- Proposed an adaptive policy INT-ILD in which **exploration** involving all-price sweeps and **exploitation** relying on best policies catered to empirically acquired demand models are carried out intermittently
- Converted existing ideas related with UCB into EPO-UCB policy according to our problem setting
- Brought out the full potential of the UCB idea, and devised INT-UCB policy by combining UCB and the idea of interval-based intermittent learning-doing

Theoretical Contributions (**Regret** Analysis):

- Proved that this adaptive policy INT-ILD could achieve an $O(T^{2/3})$ regret guarantee (with fixed setup costs)
- Proved that INT-UCB policy could achieve an $O(T^{1/2})$ regret guarantee (without fixed setup costs)

Empirical Study (**Online** & **Offline**):

- Demonstrated INT-ILD's superior performance compared to other policies from two perspectives - efficiency and effectiveness, achieving at least **3000% shorter** runtime and **20% lower** regret, and verified the two theoretical bounds empirically
- Designed and adjusted the pseudo code for three policies according to the final objective and online settings
- Split the time-consuming computational system into convenient and efficient separately-running systems
- Adapted the parameters to the online settings, and modified them to balance **accuracy** and **efficiency**, ensuring the results' accuracy while also attaining at least **4000% faster** runtime
- Provided insights on various policies' regret growth trends and behind reasons according to the data results, and analyzed the advantage and disadvantage of our online computational study
- Built a Markov decision process model, and carried out an offline computational study to validate (s, S, p) for its benchmark role by testing 2500 random problem instances with randomly generated parameters

ACADEMIC EXPERIENCE

Columbia University New York, NY
Research Assistant (Statistical Data Analysis, Healthcare) Feb 2020 - Dec 2020
Topic: Incidence and Determinants of Dental Restoration Failure at a U.S Dental School
Matching Algorithm Design:

- Formulated specific algorithms to match treatment records, and tuned matching standards to real-world data

Statistical Analysis for **Censored** Data:

- Matched treatment records based on the proposed algorithm, chose the Kaplan-Meier estimator to deal with censored data, plotted and compared survival curves among various groups, and calculated the test statistics
- Extracted and organized crucial data from databases of dental treatment records
- Analyzed 11 selected discrete or continuous variables, and obtained significant risk classifications for patients
- Discussed results of each step with Columbia Dental School's professors and Prof. Van-Anh Truong

PROFESSIONAL EXPERIENCE

Roland Berger (a global strategy consulting firm) Shanghai, China
Strategic Consultant Intern Sep 2018 - Nov 2018

- Conducted Strategic Planning of Automatic Driving for a leading technology company

SKILLS

Technical: Python, R, C++, Gurobi, AMPL, MATLAB, Excel, PowerPoint, Word, Tableau, AutoCAD