

KUN WANG

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Education

Shanghai Jiao Tong University Shanghai,China
M.sc. of Computer Science and Engineering Sept. 2019 – Mar. 2022 (Expected)

- Research Direction: multi-armed bandits, information theory and other theoretical work
- Core Courses: Coding and Information Theory, Statistical Machine Learning, Matrix Theory, Random Process, Reinforcement Learning, Optimization Method

Xidian University Shaanxi,China
B.Eng. of Information Security (Honor Class) Sept. 2015 – July 2019

- **Rank 1/39**, Score: 86.4/100, GPA: 3.7/4
- Core Courses: Modern Cryptography, Probability Theory, Abstract Algebra, Signal and System, Principles of Communication

Research Interests & Publications

Research Interests

My current research interests focus on multi-armed bandit, optimization and differential privacy. I also have broad interests in information theory, coding theory, cryptography, online learning and other theoretical areas.

Publications & Manuscripts

- [1] **Kun Wang**, Canzhe Zhao, Shuai Li, and Shuo Shao. Conservative contextual combinatorial cascading bandit. arXiv preprint arXiv:2104.08615, 2021.
- [2] **Kun Wang**, Jing Dong, Baoxiang Wang, Shuai Li, and Shuo Shao. Cascading bandit under differential privacy. arXiv preprint arXiv:2105.11126, 2021

Research Experience

Cascading Bandit under Differential Privacy Feb. - June 2021
Shanghai Jiao Tong University | Advisor: Prof. Shuai Li Shanghai, China

- Studied cascading bandit under differential privacy and local differential privacy, respectively.
- Under DP, proposed a UCB-based algorithm which guarantees ϵ -indistinguishability and gave a regret of $\mathcal{O}((\frac{\log T}{\epsilon})^{1+\xi})$ for an arbitrarily small ξ . This result significantly improves $\mathcal{O}(\frac{\log^3 T}{\epsilon})$ in the previous work.
- Under LDP, designed two novel algorithms by the tradeoff between the error probability and privacy budget to reduce the dependence on the size of arm subset K .

Contextual Combinatorial Cascading Bandit with Safety Guarantee Feb. - June 2021
Shanghai Jiao Tong University | Advisor: Prof. Shuai Li Shanghai, China

- Proposed C^4 -bandit model, aiming to guarantee the performance of initial exploration steps. In this model, the designed algorithm is better than a baseline strategy.
- Extended an online learning algorithm, called Upper Confidence Bound (UCB), to deal with a critical tradeoff between exploitation and exploration and employed the conservative mechanism to handle the safety constraints properly.
- Further, rigorously proved $\tilde{\mathcal{O}}(\sqrt{T})$ gap-independent upper bound in two situations: known baseline reward and unknown baseline reward.
- Reduced the conservative-incurred regret to $\mathcal{O}(1)$ for the first time.

Regional Bandit with Unknown Group	Jan. - Dec. 2020
<i>Shanghai Jiao Tong University Advisor: Prof. Shuo Shao</i>	<i>Shanghai, China</i>

- Studied regional bandit when the group information is unknown.
- Estimated the covariance matrix and used it as the relevance metric between arms. Then clustered related arms based on the covariance matrix.
- Designed a novel algorithm making use of the new group information, then conducted a detailed analysis and gave an $\mathcal{O}(\log T)$ regret.

The Construction of Cybersecurity Knowledge Graph	June - Aug. 2018
<i>Tsinghua University Advisor: Prof. Jiahai Yang</i>	<i>Beijing, China</i>

- Basically established cybersecurity knowledge graph, which includes three steps: Information Extraction from the data source (structured and unstructured data), Ontology Construction (assets, vulnerability, attack), and Cybersecurity Base Construction.

Internship

Software Engineer	Nov. 2018 - Jan. 2019
<i>Baidu Inc. - Search Team</i>	<i>Beijing, China</i>

- Implemented an assortment of interfaces for analyzing user feedback like CTR in the Hadoop framework and realized the visualization.
- Improved users' click frequency by recommending items related to search keywords located at the bottom of the search page.

Software Engineer	July - Nov. 2018
<i>Bailian Inc. - Infrastructure Team</i>	<i>Beijing, China</i>

- Developed **Org-chart** project from the ground up, which aims to supplement users' information by search engine and infer interpersonal connections.
- Implemented a crawler system to collect data from public information like news and LinkedIn. It can bypass the defense mechanism using dynamic IP.
- Supplemented blank information of individuals by extracting relevant information based on TF-IDF metric.

Selected Honors & Awards

Awards for Professional Competitions

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| • The Bronze Medal of ACM/ICPC Asian Regional, Xi'an, China | 2018 |
| • The Silver Medal of Group Programming Ladder Tournament, China | 2018 |
| • The Second Prize of The Mathematical Contest in Modeling | 2018 |
| • The First Prize of Contemporary Undergraduate Mathematical Contest in Modeling, Shaanxi, China | 2017 |
| • The First Prize of Internet+ Innovation and Entrepreneurship Competition, China | 2017 |

Honors for Excellence

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| • First-Class Scholarship (Top 5%) | 2018-2021 |
| • Outstanding Student (Top 1%) | 2016,2018 |
| • Special Scholarship (Top 1%) | 2015-2018 |
| • National Encouragement Scholarship (Top 3%) | 2017 |
| • Freshman Special Scholarship (Top 1%) | 2015 |

Skills & Hobbies

Programming Language: Python, C/C++, Java, HTML/CSS

Human Language: Mandarin (native), English

Numeric Computing Software: Mathematica, Wolfram Alpha, Matlab

Machine Learning Framework: Tensorflow, Pytorch

Distributed Computing Framework: Hadoop, Apache Spark

Documentation: LaTex, Microsoft Office

Hobbies: Anime, Fitness, Swimming