Junkai Song

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Education

The University of Hong Kong, Hong Kong SAR, China 09/2020 – 06/2024 (expected)

B.Eng. in Computer Science. GPA: 3.79 / 4.30

University of California, Berkeley, Berkeley, CA 06/2021 – 08/2021

Non-Degree, Summer Sessions. GPA: 4.00 / 4.00

Publications

Author names are in alphabetic order.

Contention Resolution for the ℓ-fold union of a matroid via the correlation gap

Chandra Chekuri, Junkai Song, Weizhong Zhang. To appear in **SOSA 2024**.

Online Matching with Stochastic Rewards:
Advanced Analyses Using Configuration Linear Programs

Zhiyi Huang, Hanrui Jiang, Aocheng Shen, Junkai Song, Zhiang Wu, Qiankun Zhang. To appear in **WINE 2023**.

Manuscripts

Improvements on Priority k-Center: Outliers and Beyond

Chandra Chekuri, Junkai Song.

Research Experience

The University of Hong Kong, Hong Kong SAR, China
Advisor: Prof. Zhiyi Huang 03/2022 – 11/2022

- Examined the effectiveness of the blossom LP for Fully Online Matching on general graphs.
- Developed a novel approach to characterize the joint matching outcome of an offline vertex and all its neighbors for Online Matching with Stochastic Rewards, which led to the first primal dual analysis for the Ranking algorithm in this setting, improving the competitive ratio from 0.534 to 0.572.
- Implemented the discretization and alternating optimization approach using numerical optimization software to obtain competitive ratios.

University of Illinois Urbana-Champaign, Urbana-Champaign, IL
Advisor: Prof. Chandra Chekuri 06/2023 – 09/2023

- Improved the algorithms for Priority k-Center with Outliers problem in various settings, achieving a remarkable improvement of the approximation ratio from 9 to $1 + 3\sqrt{3} \approx 6.196$ in the general setting.
- Formalized Priority Colorful k-Center problem and developed the first set of approximation algorithms.
- Proved the tight correlation gap for ℓ-fold matroids extending the known results for uniform matroids, thereby yielding a corresponding optimal Contention Resolution Scheme for this class of matroids.
- Explored Online Contention Resolution Schemes as well as explicit Contention Resolution Schemes and achieved some promising initial results.

Selected Awards

- Dean's Honours List (Top 5%), Faculty of Engineering, HKU 2021-2022
- 9th place, Gold Medal, ICPC Jinan Regional Contest 2020 2020
- 17th place, Gold Medal, ICPC Shanghai Regional Contest 2021 2021
- 7th place, Gold Medal, ICPC Macau Regional Contest 2023 2023
- Undergraduate Research Fellowship Programme Membership, HKU 2023
- Reseach Internship Award, HKU 2023

Skills

Programming Languages: C/C++, Python, Java, Bash, SQL
Tools: Git, Markdown, LaTeX