



Real-time bidder feedback in continuous combinatorial auctions

A novel computational framework capable of providing real-time bidder support for combinatorial auctions.

IP Status: US Patent Pending; Application No. 17/952,896.

Applications

- Online auctions
- Large-scale asset sales
- Procurement and reverse auctions

Key Benefits & Differentiators

- Real-time feedback: Enables bidders to receive instant information on bid viability and competitiveness
- Optimized bidder decisions: Computes critical metrics such as bid winning probability and deadness levels
- Scalable: Implements data structures and algorithms for practical auction sizes

Technology Overview

Combinatorial auctions, where bidders can place bids on individual items or item bundles, are crucial for many industries but remain difficult to implement in general-purpose marketplaces. A major challenge is the lack of real-time bidder support, which limits auction transparency and bidder strategy optimization. Traditional single-item auctions, such as those on platforms like eBay, provide immediate feedback, but multi-item multi-unit (MIMU) and single-item multi-unit (SIMU) auctions require significantly more complex computations to evaluate bids dynamically. This complexity has hindered the adoption of combinatorial auctions in broader business and consumer markets.

Researchers at the University of Minnesota have developed computational infrastructures capable of providing real-time bidder support for combinatorial auctions of practically relevant sizes. This framework provides real-time feedback to bidders in continuous combinatorial auctions, where participants can join and leave the auction at any time. The approach accommodates both OR bidding and XOR bidding, ensuring flexibility in bidding preferences. To optimize bidder decision-making, the technology breaks down an auction into sub-auctions, allowing bidders to assess their best strategies based on known bids. Additionally, this technology can be extended to combinatorial reverse auctions, a commonly used mechanism for industry procurements.

Phase of Development

TRL: 4-5

Prototype; algorithm developed (python code w/ simulation).

Desired Partnerships

Technology ID

2019-155

Category

All Technologies

Software & IT/Algorithms

Software & IT/End User Software

Learn more



This technology is now available for:

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

Researchers

- [Alok Gupta, PhD](#) Curtis L. Carlson Chair in Information Management, Information & Decision Sciences, Carlson School of Management
- [Gediminas Adomavicius, PhD](#) Professor, Information & Decision Sciences, Carlson School of Management
- [Mochen Yang, PhD](#) Associate Professor, Information & Decision Sciences, Carlson School of Management

References

1. Gediminas Adomavicius, Alok Gupta, Mochen Yang(2022) , <https://pubsonline.informs.org/doi/10.1287/isre.2021.1068>, Information Systems Research, 33, 1174-1195
2. Gediminas Adomavicius, Alok Gupta, and Mochen Yang(2019) , <https://misq.umn.edu/designing-real-time-feedback-for-bidders-in-homogeneous-item-continuous-combinatorial-auctions.html>, MIS Quarterly, 43, 721-743