Ph.D. in Information Technology
Thesis Defense

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Online by Teams

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PRICING AND ADVERTISING STRATEGIES IN E-COMMERCE SCENARIOS
Supervisor: Prof. **Nicola Gatti**

Abstract:

This thesis revolves around the problem of selling and advertising products on the Web and exploits techniques from the fields of algorithmic game theory, mechanism design, and online learning. We study scenarios in which strategic agents, such as sellers, advertisers, and buyers, interact on Web platforms, and we analyze optimization problems faced by each party involved in the interaction. For instance, online marketplaces matching sellers/advertisers to buyers need to design mechanisms that incentivise agents to participate, while providing guarantees on their revenue. Taking the perspective of the online platform, we employ techniques and performance criteria from the mechanism design literature in order to design novel auction mechanisms and characterize their performance, with the goal of providing solutions for new e-commerce scenarios which emerged through recent advancements of digital advertising platforms. Moreover, we study how to address problems faced by agents interacting on the platforms, such as sellers and advertisers. In particular, when an agent has to sell and/or advertise their products on the Web, they have to repeatedly interact with the mechanism operated by the platform. The structure of such interaction is distributed over time: agents are required to perform sequential actions, after which they observe a reward produced by the environment that also depends on their decisions.In this setting, online learning techniques are well suited to design no-regret algorithms which allow agents to learn effective strategies while addressing the exploration/exploitation dilemma. Inspired by novel real-world scenarios, we study non-standard learning processes in which, for instance, the feedback returned by the environment is affected by delays, or agents' actions are subject to time-varying constraints.These scenarios are common in practice when, for instance, agents are financially constrained by their budget or want to reach a target profitability in the form of a return-on-investment (ROI) constraint.

To conclude, this thesis extends classical models for online markets incorporating novel e-commerce frameworks that have emerged as a result of the continuous expansion of Web platforms. In doing so, it bridges the gap between theory and the latest real-world applications.

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