Incentive Design in Peer Review: Rating and Repeated Endogenous Matching

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Abstract

Peer review (e.g., grading assignments in Massive Open Online Courses (MOOCs), academic paper review) is an effective and scalable method to evaluate the products (e.g., assignments, papers) of a large number of agents when the number of reviewing experts (e.g., teaching assistants, editors) is limited. Peer review poses two key challenges: 1) identifying the reviewers intrinsic capabilities (i.e., adverse selection) and 2) incentivizing the reviewers to exert high effort (i.e., moral hazard). Some works in mechanism design address pure adverse selection using one-shot matching rules, and pure moral hazard was addressed in repeated games with exogenously given and fixed matching rules. However, in peer review systems exhibiting both adverse selection and moral hazard, one-shot or exogenous matching rules do not link agents current behavior with future matches and future payoffs, and as we will prove, induce myopic behavior (i.e., exerting the lowest effort) resulting in the lowest review quality. In this paper, we propose for the first time a solution that simultaneously solves adverse selection and moral hazard. Our solution exploits the repeated interactions of agents, utilizes ratings to summarize agents past review quality, and designs matching rules that endogenously depend on agents ratings. Our proposed matching rules are easy to implement and require no knowledge about agents private information (e.g., their benefit and cost functions). Yet, they are effective in guiding the system to an equilibrium where the agents receive ratings that precisely reflect their review quality and are incentivized to exert high effort. Using several illustrative examples, we quantify the significant performance gains obtained by our proposed mechanism as compared to existing one-shot or exogenous matching rules.

References

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