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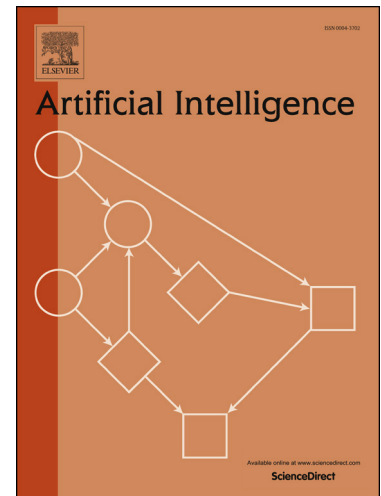
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Optimal Defense Against Election Control by Deleting Voter Groups

Yue Yin^{a,*}, Yevgeniy Vorobeychik^{b,**}, Bo An^c, Noam Hazon^d

^a*Key Lab of Intelligent Information Processing, ICT, CAS
University of Chinese Academy of Sciences, Beijing, China*

^b*Electrical Engineering and Computer Science
Vanderbilt University, Nashville, TN*

^c*School of Computer Science and Engineering
Nanyang Technological University, Singapore*

^d*Dept. of Computer Science
Ariel University, Israel*

Abstract

Election control encompasses attempts from an external agent to alter the structure of an election in order to change its outcome. This problem is both a fundamental theoretical problem in social choice, and a major practical concern for democratic institutions. Consequently, this issue has received considerable attention, particularly as it pertains to different voting rules. In contrast, the problem of how election control can be prevented or deterred has been largely ignored. We introduce the problem of optimal defense against election control, including destructive and constructive control, where manipulation is allowed at the granularity of groups of voters (e.g., voting locations) through a denial-of-service attack, and the defender allocates limited protection resources to prevent control. We consider plurality voting, and show that it is computationally hard to prevent both types of control, though destructive control itself can be performed in polynomial time. For defense against destructive control, we present a double-oracle framework for computing an optimal prevention strategy. We show that both defender and attacker best response subproblems are NP-complete, and develop exact mixed-integer linear

*Principle corresponding author

**Corresponding author

Email addresses: melody1235813@gmail.com (Yue Yin),
yevgeniy.vorobeychik@vanderbilt.edu (Yevgeniy Vorobeychik),
boan@ntu.edu.sg (Bo An), noamh@ariel.ac.il (Noam Hazon)

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