

Matteo Castiglioni

Curriculum Vitae et Studiorum



Personal Information

Date of Birth June 21, 1994
Place of Birth Tradate, Varese
Citizenship Italian
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Work Information

University Politecnico di Milano
Department Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB)
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Education

- 2018**
2020 **PhD in Computer Science and Engineering**, *Politecnico di Milano*, Milano,
Advisor: Prof. Nicola Gatti.
- 2016**
2018 **MSc in Computer Science and Engineering**, *Politecnico di Milano*, Milano,
Thesis: Leadership in singleton congestion games : what is hard and what is easy
Advisor: Prof. Nicola Gatti.
Mark *110 cum laude/110*
- 2013**
2016 **BSc in Computer Science and Engineering**, *Politecnico di Milano*, Milano.
Mark *110/110*
- 2013** **Diploma ad indirizzo scientifico**, *Liceo Scientifico F. Bentivoglio*, Tradate (VA).
Mark *84/100*

Research Interests

My current research focuses on *Artificial Intelligence*, especially Algorithmic Game Theory, Social Influence and Computational Complexity

Algorithmic Game Theory I am intrested in the computational complexity of finding equilibria, and the development of efficient algorithm to compute equilibria. In particular, my research focuses on Leader-follower games and signaling games.

Social Influence I am intrested in the study of the diffusion of information in social networks, the development of algorithms to maximize the influence and their computational complexity. My research focuses on the study of social influence and election manipulation.

PhD research project

- Title *Election Control through Social Influence*
- Advisors Prof. Nicola Gatti
- Description In many of the recent political elections around the world, there has been evidence of the impact that false or incomplete news influenced the electoral outcome. My objective is studying how a malicious agent can change the result of an election spreading informations. In particular, we ask whether a manipulator can alter the outcome of the election controlling the spreading of information (e.g., fake news) in a social network. As a second case of study, we analyze how should an agent disclose informations to win the elections.

Master thesis

- Title *Leadership in singleton congestion games : what is hard and what is easy*
- Supervisors Prof. Nicola Gatti
- Description We study the problem of computing Stackelberg equilibria in congestion games, focusing on the case where each player can choose a single resource (a.k.a. singleton congestion games) and one of them acts as leader. In particular, we address the cases where the players either have the same action spaces (i.e., the set of resources they can choose is the same for all of them) or different ones, and where their costs are either monotonic functions of the resource congestion or not. We show that, in the case where the players have different action spaces, the cost the leader incurs in a Stackelberg equilibrium cannot be approximated in polynomial time up to within any polynomial factor in the size of the game unless $P = NP$, independently of the cost functions being monotonic or not. We show that a similar result also holds when the players have nonmonotonic cost functions, even if their action spaces are the same. We also improve an algorithm for the computation of a socially optimal equilibrium in singleton congestion games with the same action spaces without leadership, and extend it to the computation of a Stackelberg equilibrium for the case where the leader is restricted to pure strategies. For the cases in which the problem of finding an equilibrium is hard, we show how, in the optimistic setting where the followers break ties in favor of the leader, the problem can be formulated via mixed-integer linear programming techniques, which computational experiments show to scale quite well.

Publications

Conference Papers

- Castiglioni M., Marchesi A., Celli A. Gatti N.
Multi-Receiver Online Bayesian Persuasion
The 38th International Conference on Machine Learning, ICML 2021, Virtual conference, Worldwide
- Castiglioni M., Marchesi A., Gatti N.
Bayesian Agency: Linear Versus Tractable Contract
The 22nd ACM Conference on Economics and Computation, EC 2021, Virtual conference

Castiglioni M., Celli A., Marchesi A., Gatti N.
Signaling in Bayesian Network Congestion Games: the Subtle Power of Symmetry
The 35th AAAI Conference on Artificial Intelligence, AAAI 2021, Virtual conference

Castiglioni M., Gatti N.
Persuading Voters in District-based Elections
The 35th AAAI Conference on Artificial Intelligence, AAAI 2021, Virtual conference

Castiglioni M., Celli A., Marchesi A., Gatti N.
Online Bayesian Persuasion
34th Conference on Neural Information Processing Systems, NeurIPS 2020, Virtual conference

Castiglioni M., Ferraioli D., Gatti N.
Election Control in Social Networks via Edge Addition or Removal
34th AAAI Conference on Artificial Intelligence, AAAI 2020, New York, USA

Castiglioni M., Celli A., Gatti N.
Persuading Voters: It's Easy to Whisper, It's Hard to Speak Loud
34th AAAI Conference on Artificial Intelligence, AAAI 2020, New York, USA

Castiglioni M., Marchesi A., Gatti N.
Be a Leader or Become a Follower: The Strategy to Commit to with Multiple Leaders
28th International Joint Conference on Artificial Intelligence, IJCAI 2019, Macao, China

Marchesi A., Castiglioni M., Gatti N.
Leadership in Congestion Games: Multiple User Classes and Non-Singleton Actions
28th International Joint Conference on Artificial Intelligence, IJCAI 2019, Macao, China

[Journal Papers](#)

Castiglioni M., Marchesi A., Coniglio S., Gatti N.
Leadership in singleton congestion games: What is hard and what is easy
Artificial Intelligence, 2019

Awards

National Doctoral Scholarship

Three-years doctoral scholarship sponsored by the Ministry of Education, Universities and Research

Students Supervision

Giulia Landriani, with Election manipulation on social networks with messages on multiple candidates. M.Sc. in Mathematical Engineering, Politecnico di Milano, Italy

Giovanni Vignocchi, with persuading voters in district-based elections. M.Sc. in Computer Science and Engineering, Politecnico di Milano, Italy

Qualifications

2016

TOEIC, Mark 940/990, Milano.
Certificate of English language

Languages

Italian Native
English Fluent

Mother Tongue

Daily practice, all work performed in English

Skills

Programming Languages Python, Java, C, Matlab, Ampl

Personal Interests

Sport Basket

Autorizzo al trattamento dati ai sensi del GDPR 2016/679 del 27 aprile 2016 (Regolamento Europeo relativo alla protezione delle persone fisiche per quanto riguarda il trattamento dei dati personali). Autorizzo la pubblicazione del Curriculum Vitae sul sito istituzionale del Politecnico di Milano (sez. Amministrazione Trasparente) in ottemperanza al D. Lgs n. 33 del 14 marzo 2013 (e s.m.i.).