Jakub Černý

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Research Interests

Artificial intelligence, multi-agent systems, computational game theory, decision making, bounded rationality, uncertainty, robustness, security, optimization, coordination.

Education

Nanyang Technological University **School of Computer Science and Engineering**
PhD., Complex Systems *2019 – 2023*
Thesis: Commitment and Correlation in Boundedly Rational Interactions

Charles University **Faculty of Mathematics and Physics**
Mgr. (MSc.), Applied Mathematics – Discrete Models and Algorithms *2014 – 2017*
Thesis: Computational Bounded Rationality

Czech Technical University in Prague **Faculty of Electrical Engineering**
Ing. (MSc.), Artificial Intelligence, minor: Robotics *2014 – 2016*
Thesis: Stackelberg Extensive-Form Correlated Equilibrium with Multiple Followers

Czech Technical University in Prague **Faculty of Electrical Engineering**
Bc. (BSc.), Computer Science, minor: Mathematics *2011 – 2014*
Thesis: Playing General Imperfect-Information Games Using Game-Theoretic Algorithms

Research Experience

Agent Mediated Intelligence Research Group at NTU
Research Associate *10/2018 – 01/2019*
Research project: Solving Large-Scale General-Sum Dynamic Games.

Artificial Intelligence Center at CTU **US Army Research Lab Research Alliance**
Research Assistant, coop. with CMU and UTEP *07 / 2016 – 09/2018*
Research project: Defeating the Dark Triad in Cyber Security Using Game Theory.

Agent Technology Center at CTU
Research Assistant *01 – 12 / 2015*
Research project: General Game Description Language for Computational Game Theory.

Research Visits and Internships

NortonLifeLock / Avast Software (Dr. Somol)
Research internship *02 – 06 / 2021*

US Army Research Laboratory at Adelphi (Dr. Colbert, Dr. Ben-Asher)
Research internship *06 / 2018*
Computing defender strategies against behavioral learning models of attackers in computer networks.

CMU: CyLab (Prof. Christin) and DDM Lab (Prof. Gonzalez); UTEP (Prof. Kiekintveld)
Research Alliance visit *06 / 2017*
Modeling cyber security scenarios via game theory.

Agent Technology Center at CTU (Prof. Bošanský)
Research internship *08 – 09 / 2014*
Developing double-oracle game-theoretic algorithms based on reverse game tree traversal.

Publications

Working papers

Discrete-Time Stochastic Multi-Player Stopping Games with Affine Payoffs (G. Bouveret, ***J. Černý*** *and A. Neufeld).*

Price of Anarchy in a Double-Sided Critical Goods Distribution System (D. Sychrovský, ***J. Černý****, S. Lichau and M. Loebl).*

Unified Perspective on Deep Equilibrium Finding (X. Wang, ***J. Černý****, S. Li, Z. Yin, H. Chan and B. An).*

Offline Equilibrium Finding (S. Li, X. Wang, ***J. Černý****, Y. Zhang, H. Chan and B. An).*

Solving Pursuit-Evasion Games Using Pre-Trained Strategies (S. Li, X. Wang, Y. Zhang, H. Chan, ***J. Černý*** *and B. An).*

Journal papers

The Dark Triad and Strategic Resource Control in a Competitive Computer Game (S. Curtis, A. Basak, J. Carre, B. Bošanský, ***J. Černý****, N. Ben-Asher, M. Gutierrez, D. Jones and C. Kiekintveld).* In Personality and Individual Differences. Elsevier, 2020.

Conference papers

*Quantal Correlated Equilibrium in Normal Form Games (****J. Černý****, B. An and A. N. Zhang).* In Proceedings of the 2022 ACM Conference on Economics and Computation. ACM, 2022.

*Computing Quantal Stackelberg Equilibrium in Extensive-Form Games (****J. Černý****, V. Lisý, B. Bošanský and B. An).* In Proceedings of 35th AAAI Conference on Artificial Intelligence. AAAI Press, 2021.

Computing Ex Ante Coordinated Team-Maxmin Equilibria in Zero-Sum Multiplayer Extensive-Form Games (Y. Zhang, B. An and ***J. Černý****).* In Proceedings of 35th AAAI Conference on Artificial Intelligence. AAAI Press, 2021.

Complexity and Algorithms for Exploiting Quantal Opponents in Large Two-Player Games (D. Milec, ***J. Černý****, V. Lisý and B. An).* In Proceedings of 35th AAAI Conference on Artificial Intelligence. AAAI Press, 2021.

*Dinkelbach-Type Algorithm for Computing Quantal Stackelberg Equilibrium (****J. Černý****, V. Lisý, B. Bošanský and B. An).* In Proceedings of the 29th International Joint Conference on Artificial Intelligence. AAAI, 2020.

*Finite State Machines Play Extensive-Form Games (****J. Černý****, B. Bošanský and B. An).* In Proceedings of the 2020 ACM Conference on Economics and Computation. ACM, 2020.

Evaluating Models of Human Behavior in an Adversarial Multi-Armed Bandit Problem (M. Gutierrez, ***J. Černý****, N. Ben-Asher, E. Aharonov-Majar, A. Basak, B. Bošanský, C. Kiekintveld and C. Gonzalez).* In Proceedings of the 41th Annual Meeting of the Cognitive Science Society, 2019.

*Incremental Strategy Generation for Stackelberg Equilibria in Extensive Form Games (****J. Černý****, B. Bošanský and C. Kiekintveld).* In Proceedings of the 2018 ACM Conference on Economics and Computation. ACM, 2018.

An Initial Study of Targeted Personality Models in the FlipIt Game (A. Basak, ***J. Černý****, M. Gutierrez, S. Curtis, C.Kamhoua, D. Jones, B. Bošanský and C. Kiekintveld).* In Proceedings of the 2018 Conference on Decision and Game Theory for Security, 2018.

Workshop papers and posters

AAMAS 2019: International Workshop on Optimization in Multiagent Systems (OptMAS)

EC 2019: Workshop on Machine Learning in the Presence of Strategic Behavior

ICALP 2017: Game Solving: Theory and Practice Workshop

US ARL Bootcamp 2017, 2018: Cyber Security Collaborative Research Alliance Poster Sessions

Awards and Honors

A*STAR SINGA Award and Merit Award Laureate
PhD scholarship and monthly allowance for pursuing studies in Singapore *2018*

Cisco Outstanding Thesis Award Laureate
Award for best master thesis related to security *2016*

ACM Spy Award Nominee
Master thesis shortlisted among top 10 CTU theses *2016*

CTU FEE Dean's Awards Laureate
MSc/BSc studies finished summa cum laude – among top 6%/2% of students (faculty-wide) *2016/2014*

CTU Merit Scholarship Recipient
Scholarship for excellent study results by Czech Technical University *2012 – 2015*

Teaching Experience

CTU: Parallel and Distributed Computing
Teaching assistant *02 – 05 / 2018*
Co-created the tutorials for a new course from scratch, including homeworks and automatic evaluation.

Related Skills

Programming: C++; Python; Java; Matlab; Prolog; Scheme; Haskell; TEX

Modeling: Formal cognitive modeling of rationality; process modeling using one-shot and sequential games

Problem-Solving: Constructing optimal decisions as equilibria; linear, convex and non-convex optimization with CPLEX; grid computing on supercomputers using PBSPro, Slurm

Refereeing: AAMAS/GAIW 2018 – 2021; AAAI 2021, 2023; DAI 2020; EC 2019 – 2022; ICLR 2022*, 2023; ICML 2021; IJCAI 2019, 2020; NeurIPS 2020 – 2022; WINE 2020

* Outstanding reviewer award

Languages

Czech: Native proficiency

English: Prof. working proficiency

French: Elementary proficiency

Japanese: Elementary proficiency

Certificates

GRE: Quantitative: 164/170, Verbal: 158/170

TOEFL: Total: 111/120; Reading: 30/30, Listening: 30/30, Speaking: 26/30, Writing: 25/30

References

Prof. Bo An **boan@ntu.edu.sg**
School of Computer Science and Engineering, Nanyang Technological University *Tel. +65 6790 5389*

Prof. Martin Loebl **loebl@kam.mff.cuni.cz**
Department of Applied Mathematics, FMP, Charles University *Tel. +420 22191 4233*

Prof. Branislav Bošanský **bosansky@fel.cvut.cz**
Department of Computer Science, FEE, Czech Technical University *Tel. +420 22435 7581*

Prof. Christopher D. Kiekintveld **cdkiekintveld@utep.edu**
Department of Computer Science, University of Texas at El Paso *Tel. +1 (734) 818-0259*