Yagiz Savas

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Research interests

My research aims to build autonomous systems that co-exist, cooperate, and compete with other such systems with verifiable safety and security guarantees. To this end, I develop theoretical and computational methods by combining tools from diverse fields such as control theory, formal methods, and information theory.

Education

The University of Texas at Austin, TX, USA 2017- Spring 2022
Ph.D. in Aerospace Engineering
Advisor: Ufuk Topcu

The University of Texas at Austin, TX, USA 2017-2019
M.S. in Aerospace Engineering

Bogazici University, Istanbul, Turkey 2011-2017
B.S. in Mechanical Engineering

University of Southern Denmark, Odense, Denmark 2014-2015
One semester Erasmus exchange program

Journal articles

* indicates equal contribution

[1] **No-Regret Learning in Dynamic Stackelberg Games**
N. Lauffer, M. Ghasemi, A. Hashemi, **Y. Savas**, U. Topcu.
IEEE Transactions on Automatic Control, 2021. (under review)

[2] **Collaborative Beamforming Under Localization Errors: A Discrete Optimization Approach**
Y. Savas*, E. Noorani*, A. Koppel, J. Baras, U. Topcu, B. M. Sadler.
Signal Processing, 2021. (under review)

[3] **Entropy Maximization for Partially Observable Markov Decision Processes**
Y. Savas*, M. Hibbard*, B. Wu, T. Tanaka, and U. Topcu.
IEEE Transactions on Automatic Control, 2021. (accepted)

[4] **On the Complexity of Sequential Incentive Design**
Y. Savas, V. Gupta, U. Topcu.
IEEE Transactions on Automatic Control, 2021. (accepted)

[5] **On Minimizing Total Discounted Cost in MDPs Subject to Reachability Constraints**
Y. Savas, C. K. Verginis, M. Hibbard, and U. Topcu.
IEEE Transactions on Automatic Control, 2021. (accepted)

[6] **Design, Implementation, and Evaluation of a Backstepping Control Algorithm for an Active Ankle–Foot Orthosis**
O. Kirtas, **Y. Savas**, M. Bayraker, F. Baskaya, H. Basturk, and E. Samur.
Control Engineering Practice, vol. 106, 2021.

[7] **Entropy Maximization for Markov Decision Processes Under Temporal Logic Constraints**
Y. Savas, M. Ornik, M. Cubuktepe, M. O. Karabag, and U. Topcu.
IEEE Transactions on Automatic Control, vol. 65, no. 4, pp. 1552–1567, 2019.

Conference articles
(peer-reviewed)

[1] **Deceptive Decision-Making Under Uncertainty**
Y. Savas, C. K. Verginis, U. Topcu.
AAAI Conference on Artificial Intelligence, 2021. (accepted)

[2] **Optimal Routing in Stochastic Networks with Reliability Guarantees**
W. Zheng, P. Thangeda, **Y. Savas**, M. Ornik.
IEEE International Conference on Intelligent Transportation Systems, pp. 3521–3526, 2021.

[3] **Collaborative Beamforming for Agents with Localization Errors**
E. Noorani*, **Y. Savas***, A. Koppel, J. Baras, U. Topcu, B. M. Sadler.
Asilomar Conference on Signals, Systems and Computers, 2021. (accepted)

[4] **Pysical-Layer Security via Distributed Beamforming in the Presence of Adversaries with Unknown Location**
Y. Savas, A. Hashemi, A. P. Vinod, B. M. Sadler, and U. Topcu.
International Conference on Acoustics, Speech, and Signal Processing, pp. 4685–4689, 2021.

[5] **Minimizing the Information Leakage Regarding High-Level Task Specifications**
M. Hibbard* , **Y. Savas***, Z. Xu, and U. Topcu.
IFAC World Congress, vol. 53, no. 2, pp. 15388–15395, 2020.

[6] **Unpredictable Planning Under Partial Observability**
M. Hibbard , **Y. Savas**, B. Wu, T. Tanaka, and U. Topcu.
IEEE Conference on Decision and Control, pp. 2271–2277, 2019.

[7] **Entropy-Regularized Stochastic Games**
Y. Savas, M. Ahmadi, T. Tanaka, and U. Topcu.
IEEE Conference on Decision and Control, pp. 5955–5962, 2019.

[8] **Incentive Design for Temporal Logic Objectives**
Y. Savas, V. Gupta, M. Ornik, L. J. Ratliff, and U. Topcu.
IEEE Conference on Decision and Control, pp. 2251–2258, 2019.

[9] **Entropy Maximization for Constrained Markov Decision Processes**
Y. Savas, M. Ornik, M. Cubuktepe, and U. Topcu.
Allerton Conference on Communication, Control, and Computing, pp. 911-918, 2018.

[10] **A Backstepping Control Design for an Active Ankle-Foot Orthosis**
Y. Savas, O. Kirtas, H. I. Basturk, and E. Samur.
IEEE Conference on Decision and Control, pp. 262-267, 2017.

[11] **Adaptive Backstepping Control Design for Active Suspension Systems Actuated by Four-Way Valve-Piston**
Y. Savas, H. I. Basturk.
American Control Conference, pp. 438-443, 2017.

Research experience

The University of Texas at Austin, TX, USA 2017- Present
Graduate Research Assistant
Developing theory and algorithms for autonomous systems to safely co-exist with humans, effectively cooperate with friends, and successfully compete with adversaries.

U.S. Army Research Laboratory, MD, USA Summer 2019
Research Intern
Worked on wireless communication systems with an emphasis on distributed beamforming techniques.

Bogazici University, Istanbul, Turkey 2016- 2017
Undergraduate Student Researcher
Worked on adaptive controller design of an active ankle-foot orthosis and an active suspension system.

Teaching experience

The University of Texas at Austin, TX, USA Fall 2020, Fall 2021
Teaching Assistant – ASE370C: Feedback Control Systems
Prepared homework questions, held office hours, and reviewed lecture material in recitation hours.

Selected talks

Deceptive Decision-Making Against Adversaries November 2021
AFOSR Center of Excellence in Assured Autonomy in Contested Environments

Manipulative Decision-Making: Complexity and Algorithms May 2021
AFOSR Center of Excellence in Assured Autonomy in Contested Environments

Autonomous Planning While Protecting Critical Information December 2020
Texas Robotics Symposium

Distributed Beamforming in Adversarial Environments October 2020
AFOSR Center of Excellence in Assured Autonomy in Contested Environments

Entropy Maximization for Markov Decision Processes July 2019
U.S. Army Research Laboratory

Entropy Maximization for Markov Decision Processes April 2019
University of Illinois Urbana-Champaign

Service

Workshop on Learning and Control for Safety-Critical Systems May 2022
Co-organizer, American Control Conference (under review)

Reviewer

IEEE Transactions on Automatic Control	2021
Automatica	2021
IEEE Transactions on Robotics	2020, 2021
IEEE International Conference on Automation Science and Engineering	2021
American Control Conference	2017, 2020, 2021
International Conference on Computer-Aided Verification	2019
IEEE Conference on Decision and Control	2019