Bio Sketch of Amiram (Ami) Moshaiov

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Amiram Moshaiov is a faculty member of the Iby and Aladar Fleischman Faculty of Engineering, School of Mechanical Engineering, and a member of the Sagol School of Neuroscience at Tel-Aviv University. During the 80's he was a faculty member at MIT, USA. At TAU he heads a Research Group on Computational Intelligence which consists of 1 Post Doc, 6 PhD students & 3 MSc students (as of 2021).

Moshaiov was an Associate Editor of the IEEE Trans. on Emerging Topics in Computational Intelligence, as well as of the Journal of Memetic Computing. In addition, he has been a reviewer to many other scientific journals. Moshaiov was also a member of the Management Board of the European Network of Excellence in Robotics. Currently he is a member of the IEEE Task Force on Evolutionary Deep Learning and Applications, the IEEE TF on Transfer Learning and Transfer Optimization, and the IEEE TF on Artificial Life and Complex Adaptive Systems. He is also a member of the EURO Working Group on Multicriteria Decision Aiding.

Moshaiov has been a member and associate editor in many international program committees of conferences such as: The IEEE Int. Conf. on Systems, Man, and Cybernetics, The IEEE/RSJ Int. Conf. on Intelligent Robots and Systems, The IEEE Congress on Evolutionary Computation, The International Joint Conference on Neural Networks, The IEEE World Congress on Computational Intelligence, The IEEE Sym. on Artificial Life, The IEEE Sym. on Comp. Intelligence for Security and Defense Applications, The IEEE Sym. on Comp. Intelligence in Multi-criteria Decision Making, The Int. Conference on Parallel Problem Solving from Nature, The International Conf. on Simulated Evolution And Learning, The European Robotic Symposium, The Int. IFAC Symposium on Robot Control, The Int. Symposium on Tools and Methods of Competitive Engineering, The Int. Conf. on Engineering Design, The Int. Conference on Mechatronics, The IEEE Int. Conference on Control Applications, and The IEEE Int. Conference on Computational Cybernetics.

His research interests are in methods such as: Computational Intelligence including Evolutionary Computation, Artificial Neural Networks, Fuzzy Logic and their hybridizations, Interactive Evolutionary Computation, Multi-criteria Decision Making, Multi-Objective Optimization and Adaptation, Multi-Concept Optimization, and Multi-Objective Games.

He is interested in application areas such as: Engineering Design, Operation and Management Research, Behavioral and Cognitive Robotics, Mechatronics, Control, Bio-Mechanics, Complex Adaptive Systems, Cybernetics and Artificial Life (Bio-Plausible Simulations), Computer Vision, Data Science, Big Data and Defense (air, land, sea, and cyber).

Main research areas of Moshaiov's Computational Intelligence Research Group include:

1. Multi-Payoff Games: Theory & Evolutionary Search of Rationalizable Strategies to such Games
2. Multi-objective Topology and Weight Evolution of Artificial Neural-Networks
3. Multi-objective Optimization & Multi-Criteria Decision-Making
4. Multi-objective Concept Exploration, Optimization & Selection
5. Multi-objective Neuro-Fuzzy Inference Systems

Funded Research Projects in 2020-21

1. Developing Controllers for Traversability of Autonomous Mobile Robots in Rugged Terrains – Funded by the Israeli Ministry of Science and Technology
2. AI to the Rescue: Life-and-Death Decision-Making under Conflicting Criteria – Funded by the Volkswagen Foundation
3. Communication Network Design by Multi-Concept Optimization under Conflicting Objectives – Funded by the Israeli Defense Ministry.

Computational Intelligence Research Group of A. Moshaiov (March 2022)

School of Mechanical Engineering & Sagol School of Neuroscience, Tel-Aviv University

(5 Phd students, 5 MSc students)

Multi/Many-objective Machine Learning: Structure and Weight Evolution of ANNs and of Neuro-Fuzzy Systems

1. Salih, A. and Moshaiov, A. Promoting Transfer of Robot Neuro-Motion-Controllers by Many-Objective Topology and Weight Evolution, *In review, 2021.*
2. Salih, A. and Moshaiov, A. Evolving Topology and Weights of Specialized and Non-Specialized Neuro-controllers for Robot Motion in Various Environments,
   In review, 2021.
3. Salih, A. and Moshaiov, A. Benchmarking Many-Objective Topology and Weight Evolution of Neural Networks: A Study with NEWS/D,
   Proceedings of the IEEE Symposium Series on Computational Intelligence, 2021.
4. Moshaiov, A. and Salih, A. Multi-Objective Structure and Parameter Evolution of Neuro-Fuzzy Systems,
   Proceedings of the IEEE Symposium Series on Computational Intelligence, 2021.
5. Salih, A. and Moshaiov, A. Modified Decomposition Framework and Algorithm for Many-objective Topology and Weight Evolution of Neural Networks,
   Proceedings of IEEE Congress on Evolutionary Computation, 2021.
6. Abramovich, O. and Moshaiov, A. Multi-objective Topology and Weight Evolution of Neuro-controllers,
   Proceedings of the IEEE Congress on Evolutionary Computation, 2016.
7. Salih, A. and Moshaiov, A. Multi-objective Neuroevolution: Should the Main Reproduction Mechanism be Crossover or Mutation?
   Proceedings of the IEEE Conference on Systems, Man and Cybernetics, 2016.

Multi-objective Games

1. Eisenstadt, E. and Moshaiov, A. Decision Analysis of Rationalizable Strategies in Non-zero-sum Multi-payoff Games, *In review, 2021.*
2. Eisenstadt, E. and Moshaiov, A. Co-Evolving Rationalizable Strategies for Combinatorial Multi-Objective Games, *In review, 2021.*
3. Harel, M., Moshaiov, A. and Alkaher, D. Rationalizable Strategies for the Navigator-Target-Missile Game,
   AIAA Journal of Guidance, Control, and Dynamics, 2020.
4. Eisenstadt, E. and Moshaiov, A. Mutual Rationalizability in Vector-payoff Games,
   Proc. of the Int. Conf. on Evolutionary Multi-Criterion Optimization, 2019.
5. Eisenstadt, E. and Moshaiov, A. Decision-making in Non-cooperative Games with Conflicting Self-objectives,
   Journal of Multi-Criteria Decision Analysis, 2018.
6. Alkaher, D. and Moshaiov, A. Non-dominated Strategies for Cautious to Courageous Aerial Navigation,
   AIAA Journal of Guidance, Control, and Dynamics, 2018.
7. Eisenstadt, E. and Moshaiov, A. Novel Solution Approach for Multi-objective Attack-Defense Cyber Games with Unknown Utilities of the Opponent,
   IEEE Transactions on Emerging Topics in Computational Intelligence, 2017.
8. Harel, M., Eisenstadt, E. and Moshaiov, A. Solving Multi-objective Games using A-priori Auxiliary Criteria,
   Proceedings of the IEEE Congress on Evolutionary Computation, 2017.
9. Eisenstadt, E., Moshaiov, A. and Avigad G. The Competing Travelling Salespersons Problem under Multi-criteria,
   Proceedings of the International Conference on Parallel Problem Solving from Nature, PPSN 2016.

Multi-objective Optimization; Multi-Criteria Decision-Making; Concept-based Exploration, Optimization & Selection

1. Moshaiov, A. et al. Comparing MMEAs with Unbounded Archives for Problems with Solutions of Fixed and Variable Length,
   In review.
2. Moshaiov, A. et al. Multi-Modal Multi-Objective Evolutionary Optimization for Problems with Solutions of Variable-Length,
   Proceedings of IEEE Congress on Evolutionary Computation, 2021.
3. Salgotra, R., et al. Optimal Control Policies to Address the Pandemic Health-Economy Dilemma,
   Proceedings of IEEE Congress on Evolutionary Computation, 2021.
4. Moshaiov, A. Tutorial on Multi-concept Optimization, IEEE-SMC 2019 and IEEE-CEC 2018
   https://www.smc2019.org/assets/data/wt_rep/SMC2019_T2.pdf
5. Farhi, E. and Moshaiov, A. Window-of-Interest-based Multi-objective Evolutionary Search for Satisficing Concepts,
   Proceedings of the IEEE Conference on Systems, Man and Cybernetics, 2017.
6. Moshaiov, A. The Paradox of Multimodal Optimization: Concepts vs. Species in Single and Multi-objective Problems,
   Proceedings of the IEEE Congress on Evolutionary Computation, 2016.
7. Moshaiov, A., Snir, A. and Samina, B. Concept-based Evolutionary Exploration of Design Spaces by a Resolution-Relaxation-Pareto Approach, *Proceedings of the IEEE Congress on Evolutionary Computation, pp. 1845 – 1852, 2015.*