

# Pouya Shati

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<b>EDUCATION</b>	<b>University of Toronto</b> , Toronto, Canada 2019 – Present <ul style="list-style-type: none"><li>Ph.D. in Computer Science</li><li>Supervisors: Prof. Sheila McIlraith, Prof. Eldan Cohen</li><li>Thesis: Exact Methods for Interpretable and Constrained Machine Learning</li><li>Affiliated with <b>Vector Institute for Artificial Intelligence</b></li></ul> <b>Sharif University of Technology</b> , Tehran, Iran 2014 – 2019 <ul style="list-style-type: none"><li>B.Sc. in Software Engineering</li><li>Minor in Mathematics</li><li>GPA: 18.52 / 20</li><li>Major GPA: 19.34 / 20</li></ul>
<b>RESEARCH INTERESTS</b>	<ul style="list-style-type: none"><li>Exact Methods • Machine Learning • Interpretable AI • Operations Research • Boolean Satisfiability</li></ul>
<b>HONORS</b>	<ul style="list-style-type: none"><li>Accepted for the <b>ISTernship</b> program at <b>IST Austria</b> to work in <b>Prof. Chatterjee</b> group 2018</li><li>Ranked <b>270th</b> nationwide and <b>15th</b> regionwide in university entrance exam 2014</li><li>Awarded the School of Graduate Studies <b>Conference Grant</b>, University of Toronto 2024</li><li>Ranked <b>1st</b> at <b>Research Experience for Undergraduates program</b>, Computer Engineering Department, Sharif University of Technology 2016</li></ul>
<b>CONFERENCE PAPERS</b>	<ul style="list-style-type: none"><li><b>Neural Sequence Generation with Constraints via Beam Search with Cuts: A Case Study on VRP</b> Pouya Shati, Eldan Cohen, Sheila McIlraith. SoCS 2024.</li><li><b>Bi-Criteria Diverse Plan Selection via Beam Search Approximation</b> Shanhe Zhong, Pouya Shati, Eldan Cohen. SoCS 2024.</li><li><b>SAT-Based Learning of Compact Binary Decision Diagrams for Classification</b> Pouya Shati, Eldan Cohen, Sheila McIlraith. CP 2023.</li><li><b>Optimal Decision Trees For Interpretable Clustering with Constraints</b> Pouya Shati, Eldan Cohen, Sheila McIlraith. IJCAI 2023.</li><li><b>SAT-Based Approach for Learning Optimal Decision Trees with Non-Binary Features</b> Pouya Shati, Eldan Cohen, Sheila McIlraith. CP 2021.</li></ul>
<b>JOURNAL PAPERS</b>	<ul style="list-style-type: none"><li><b>SAT-based Optimal Classification Trees for Non-Binary Data</b> Pouya Shati, Eldan Cohen, Sheila McIlraith. Constraints, 28(2): 166-202.</li><li><b>The Evolution of Indirect Reciprocity Under Action and Assessment Generosity</b> Laura Schmid, Pouya Shati, Christian Hilbe, Krishnendu Chatterjee. Scientific reports, 11(1): 1-14.</li></ul>
<b>PROFESSIONAL ATTENDANCES</b>	<ul style="list-style-type: none"><li><b>The 17th International Symposium on Combinatorial Search + Doctoral Consortium</b> 2024</li><li><b>The 34th International Conference on Automated Planning and Scheduling (ICAPS)</b> 2024</li><li><b>Optimization Days 2024</b> 2024</li><li><b>The 29th International Conference on Principles and Practice of Constraint Programming + Doctoral Consortium</b> 2023</li><li><b>Verification of Concurrent Systems Summer School</b> 2017</li><li><b>The Second IPM Advanced School on Computing: Theory and Practice of Programming Languages</b> 2017</li></ul>
<b>WORK EXPERIENCES</b>	<ul style="list-style-type: none"><li>Part-time research-oriented internship at <b>Fujitsu Laboratories of America, Inc.</b> 2021 Supervisor: Dr. Hayato Ushijima-Mwesigwa</li></ul>

**RESEARCH PROJECTS**

- **Improving Reward Machine Expressiveness for Formal Goal Specification in RL**  
Supervisors: Prof. Sheila McIlraith and Prof. Eldan Cohen.
- **An Improved Coding for Straggler Mitigation in Distributed Matrix Multiplication**  
Bachelor thesis. Supervisor: Prof. Hamid Zarrabi-Zadeh
- **An Investigation of Direct and Indirect Reciprocity in the Contexts of Quantitative Information, Incomplete Information, and Communication**  
Supervisor: Prof. Krishnendu Chatterjee
- **Procedural Generation of Video Game Levels With Constraints**  
Supervisor: Prof. Elias Khalil
- **Exploitation of Dependencies via Recourse Decomposition for Two-stage Stochastic Problems**  
Supervisor: Prof. Merve Bodur
- **Unsupervised Learning of 3D Objects Using Synthetic 2D Images of Faces**
- **Probabilistic Verification of Program Fairness**
- **Using Multidimensional Chromosomes for Genetic Evolution of Cellular Automata**  
Supervisor: Prof. Mohammad Izadi
- **Emergence of Cooperative Behavior by Using Genetic Algorithms for Playing Prisoner’s Dilemma with Finite-Automata Strategies**  
Supervisor: Prof. Mohammad Izadi,
- **Extended Büchi Automaton of Records, a Formal Semantic for the Reo Coordination Language**  
Supervisor: Prof. Mohammad Izadi

**SELECTED COURSES**

- **Machine Learning for Mathematical Optimization, A+**
- **Stochastic Programming and Robust Optimization, A+**
- **Neural Networks and Deep Learning , A+**
- **Topics in Knowledge Representation and Reasoning, A+**
- **Advanced Propositional Reasoning, A+**
- **Topics in Verification Program Synthesis, A+**
- **Topics in Machine Learning, AI and Ethics, A+**
- **Computability and Logic, A+**
- **Algorithmic Game Theory, 20/20**
- **Theory of Computation and Computational Complexity, 20/20**
- **Approximation Algorithms, 20/20**
- **Economical and Social Networks, 20/20**
- **Graph Theory and its Applications, 20/20**
- **Compiler Design, 20/20**
- **Algebra 1, 19.6/20**
- **Computer Architecture, 19.9/20**

**TEACHING ASSISTANTSHIP**

- **Theory of Languages and Automata (Head TA)** Fall 2017, Winter 2017
- **Design of Algorithms (Head TA)** Fall 2017
- **Discrete Structures (Head TA)** Fall 2016
- **Introduction to the Theory of Computation** Fall 2020, Fall 2023
- **Algorithm Design, Analysis and Complexity** S’20, S’21, F’22, W’23, W’24
- **Computational Complexity and Computability** Winter 2020, Winter 2021, Winter 2022
- **Enriched Introduction to the Theory of Computation** Winter 2020, Winter 2022
- **Software Verification and Testing** Fall 2019
- **Programming Languages** Fall 2018
- **Algorithmic Game Theory** Fall 2018
- **Artificial Intelligence** Winter 2018
- **Compiler Design** Winter 2017
- **Discrete Structures** Winter 2017, Winter 2016
- **Advanced Programming in Java** Winter 2016

**CODING PROJECTS**

- Design and graphics programming for **Sharif AI Challenge 2016** 2016
- Lead game design of **Sharif AI Challenge 2017** 2017
- Membership of the committee and lead game design of **Sharif AI Challenge 2018** 2018
- **Rasan** game, developed for the visually impaired in **Khwarizmi Student Competition** 2012

**LANGUAGES**

- Persian: Native, English: Fluent

**TOOLS**

- PyTorch, Java, Various SAT and MaxSAT solvers, Gurobi, MiniZinc, Google OR-Tools, Unity, L<sup>A</sup>T<sub>E</sub>X