Taha Rostami

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Research Interest

I want to know how we can build problem-solving agents that take advantage of both automated reasoning and machine learning worlds. More precisely, currently, I am interested to investigate the following scenarios (in no particular order):

1. ML for improving SMT solvers,
2. SMT solvers for improving ML,
3. ML for knowledge representation + (search and SMT for making better decisions)

As for engineering, I'm excited to merge and apply state-of-the-art machine learning and automated reasoning to tackle software engineering and code-related tasks. While there haven't been many opportunities, I would love to explore cutting-edge machine learning and automated reasoning in board games (especially chess), education, social science, mental health, sports, music, and more.

Education

M.Sc., Software Engineering, Tarbiat Modares University (TMU), Iran, GPA: 3.88/4.0, ranked 1st outstanding student **2019 - 2022**

B.Sc., Software Engineering, Babol Noshirvani University of Technology (BNUT), Iran, GPA: 3.55/4.0 **2014 - 2019**

Relevant Experience

Research Assistant, Safety-Critical Software & Systems lab, TMU **(Sep 2020 - Oct 2022)**

- Did research under Dr. Jalili's supervision on applied machine learning for software testing

Tutor, Faradars [link] **(Jan 2021 - Mar 2021)**

- Created and taught a C# course on Consuming Web Services

Web Developer Intern, Radman **(Jul 2018 - Sep 2018)**

- Developed a website using C#, ASP.NET Core, and SQL Server

Teaching Assistant, Advanced Programming course, BNUT **(Feb 2017 - Jun 2017)**

- Designed and oversaw a project, and delegated tasks to students

Software Developer Intern, Behineh System **(Jul 2015 - Sep 2015)**

- Developed a management software using C#, and SQL server

Selected Academic Projects (see website for full list)

Gross Domestic Product (GDP) Estimator **2023**

- Estimating GDP in absence of historical GDP data using SMT solvers and machine learning clustering algorithms

Deep Emotion [link] **2021**

- EEG-based emotion recognition using deep reinforcement learning

Harif - B.Sc Final Project [link] **2018**

- A graph-based automatic course-selection software that recommends schedules based on students' preferences

Tati Studio **2017**

- A compiler + IDE for TSLANG.

Computer Skills

- **Highly skilled in Microsoft technologies**, with 6+ years of expertise in C#, SQL Server, ASP.NET Core, ML.NET, SignalR, and more
- **Highly experienced in data science tools**, with 3+ years of experience in Python, PyTorch, TensorFlow, LightGBM, Optuna, and more
- **Familiar with** Z3, LLVM, Hugging Face, NLTK, PyG, Stable Baselines, PyGad, JavaScript, Java, C, R, Hadoop, Docker, Git, and more

Selected Courses

- **Advanced Programming:** 20/20 (read the whole Java: How to Program by Deitel)
- **Data Structures:** 20/20 (read CLRS in parts)
- **Advanced Algorithms:** 19.5/20 (read almost the whole CLRS)
- **Introduction to Programming Contests:** 19.3/20 (used available materials from Stanford's CS 97SI)
- **Fundamentals of Compiler Design:** 19.3/20 (read the whole Compiler Design by F. Shapouri)
- **Data Analysis:** 18.5/20 (read most parts of the Introduction to Machine Learning by E. Alpaydin)
- **Discrete Mathematics:** 18/20 (read the whole Discrete Mathematics by H. Yousefi)

Standard Data Structures, Algorithms, and Games Implemented From Scratch

- **Machine Learning-** Linear & Logistic Regression, Decision Tree, KNN, Random Forest, AdaBoost, Naïve Bayes, and KMeans in Python
- **AI -** Monte Carlo Tree Search in Python
- **Nature-Inspired Optimization Algorithms -** Genetic, Tribe Particle Swarm Optimization, and Discrete Grey Wolf in C# and Python
- **Graph Algorithms -** DFS, BFS, Prim, and Kruskal in C#
- **Sort Algorithms -** Bubble Sort, Merge Sort, Quick Sort, Insertion Sort, Heap Sort, and Counting Sort in C#
- **Games –** Tic-Tac-Toe, Chess, Raichu, Poker Squares, Puzzle, Snake Game, and Typing Game in C#, Java, C and Python
- **Signal Processing Algorithms -** Pan–Tompkins algorithm in MATLAB
- **Data Structures -** singly, doubly, circular array based and pointer based linked list, stack, and queue; binary, binomial and Fibonacci heap; disjoint-set forests; binary search tree; adjacent matrix and adjacent link list graph in C#

Languages

- **Persian - Native**
- **English - TOEFL iBT: Total 93, Reading 28, Listening 21, Speaking 22, Writing 22, April 01, 2023**

Publications

[1] **T. Rostami**, S. Jalili, "FrMi: Fault-revealing Mutant Identification using Killability Severity," en, Information and Software Technology, 2023 [link]

[2] **T. Rostami**, "Simpler machine learning models for predicting non-trivial equivalent mutants," en, The Journal of Systems & Software, *Under Review*, 2023 [link]

[3] **T. Rostami**, S. Jalili, "A heuristic function for improving the prediction accuracy of fault revealing mutants," fa, *in* 9th Iranian Joint Congress on Fuzzy and Intelligent Systems, 2022 [link]

[4] **T. Rostami**, S. Jalili, "A method for improving predictive mutation testing that considers the impacts of missing data," fa, *in* 12th International Conference on Information and Knowledge Technology, 2021 [link]

References

References Available Upon Request