Mohammadreza Ghobakhlou

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RESEARCH INTEREST

Programming Languages	Program Synthesis	Deep Learning
Software Verification	Software Defined Networks	Model Learning

EDUCATION

Master's Degree in Data Science — Tehran, Iran
Tehran Institute for Advanced Studies (TeIAS) - **GPA: 4/4 - 18.2/20** — 2021 - Now
Thesis: Predicting Faults in Software Defined Networks (SDNs)

B.Sc. in Computer Engineering — Tehran, Iran
Sharif University of Technology - GPA: 2.8/4 - 13.83/20 — 2015 - 2021
Thesis: Implementation of Single Sign-On (SSO) Protocols

EXPERIENCES

Research Assistant

- Predicting Faults in SDNs — February,2023 - Now
Description: Extracting SDN's controller behavioral specifications from real SDNs log datasets and identifying their possible faulty behaviours.
Supervisors: Dr. Hossein Hojjat

- Active Model Learning — August,2022 - January 2023
Description: Tried to find a way to learn about the automata model that can be very large and complicated by learning each subsystem independently and merging them to conduct the whole system's model.
Supervisors: Dr. Hossein Hojjat and Dr. Mohammad Reza Mousavi

- SSO Protocols Research and Implementation — 2020 - 2021
Description: Implemented simple secure SSO authentication using SAML, OIDC, and OAuth protocols.

Teaching Assistant

- Head TA of Python Programming for Economics and Finance - TeIAS — 2023
- Program Synthesis - TeIAS — 2023
- Applied Data Science - TeIAS — 2022
- Signals & Systems - Sharif University of Technology — 2018
- Head TA of Fundamentals of Programming (Python) - Sharif University of Technology — 2018
- Fundamentals of Programming (Python) - Sharif University of Technology — 2017
- Advanced Programming (Java) - Sharif University of Technology — 2016

Lecturer

- Teaching Python Programming to bachelor's students — 2020-2022
- Teaching National University Entrance Courses — 2015-2021

Computing Systems Administrator

Constructed the server configuration settings for the TeIAS Computing Center's infrastructure. — 2023-now

PROJECTS

Development of a Firewall for the POX SDN Controller
- Designed and implemented of a Python-based firewall module tailored for the POX SDN Controller, with comprehensive testing conducting within the Mininet simulation environment.

Automata Learning using the LearnLib Framework
- Experienced in automata learning using the LearnLib framework, specifically employing the L* and TTT algorithms for active learning and system verification.

Exploring COMPAS Recidivism Racial Bias and Model Explainability with LIME and SHAP (Ethics in AI course project)
- Showed the algorithm is biased in favor of white defendants, and against black inmates.

Reimplementation of the paper "Synthesis and Machine Learning for Heterogeneous Extraction" (Program Synthesis course project)
- Combined techniques from the Program Synthesis and Machine Learning communities to extract structured information from heterogeneous data.

Extension and Further Analysis of Contrastive Framework in the Task of Text Summarization (Natural Language Processing course project)
- Investigated the performance of the contrastive framework in the task of summarization. Maked the representation space of the language model more isotropic and then used this quality to generate a more diverse text.

Tested Java source code using the Randoop and EvoSuit (Software Testing course project)
- Evaluated Java source code using the Randoop and EvoSuite tools, harnessing their automated testing capabilities to ensure code robustness and functionality.

Microsoft Malware Prediction (Machine Learning course project)
- Predicted if a machine will soon be hit with malware or not using Machine Learning.

New York City taxi trip duration prediction using XGBoost (Applied Data Science course project)
- Builded the model that predicts the total ride duration of taxi trips in New York City.

Real-time Augmented Reality
- Derived from the homography the transformation from the reference surface coordinate system to the target image coordinate system and projecting the 3D model in the image (pixel space).

INTERNSHIP AND SUMMER-SCHOOL EXPERIENCES

Summer School in Engineering Trustworthy Data-Intensive Systems at TeIAS August 15^{th}-17^{th} 2022
- Deep insights into various aspects of dealing with massive amounts of data.

Summer School in Theoretical Aspects of Data Science and Machine Learning at TeIAS July 11^{th}-14^{th} 2022
- Studied theoretical aspects of Data Science and Machine Learning. This area of research is a rich and vibrant field within theoretical Computer Science that draws from deep connections to statistics, geometry, and combinatorics.

Software Engineer Intern at Yektanet Company, Tehran, Iran. Aug-Sep 2020
- Established an internal recruitment software system for the human resources unit.

SELECTED COURSES

- Ethics in AI and Data Science (Prof. Mohammad Reza Mousavi)	A+
- Program Synthesis (Dr. Hossein Hojjat)	A+
- Natural Language Processing (Dr. Mohammad Taher Pilehvar)	A
- Machine Learning (Dr. Mohammad Haft-Javaherian)	A+
- Software Testing (Dr. Ramtin Khosravi)	A+
- Applied Data Science (Dr. Amir Hesam Salavati)	A+
- Advanced Algorithm (Dr. Hossein Hojjat)	A
- Theory of Machines and Languages (Prof. Ali Movaghar)	A

Online Courses

- Functional Programming Principles in Scala (EPFL) — Coursera
- Machine Learning (Stanford University) — Coursera
- Pandas, Data Visualization, Data Cleaning, and Feature Engineering — Kaggle

HONORS

- **TeIAS Graduate Scholarship** for Data Science, Tehran, Iran.
- Ranked **62nd** in M.Sc. National University Examination (top 1%).
- Ranked **130th** among more than 240,000 participants in the Iranian Nation-wide University Entrance Exam.

TECHNICAL SKILLS

Programming Languages Languages:	Python, Scala, Java, Matlab, Julia, C/C++, and R
Machine Learning Frameworks:	PyTorch, Keras, TensorFlow, SciKit-Learn
Python Packages:	Numpy, Pandas, SciPy, Matplotlib, Seaborn
Miscellaneous:	LaTeX, Git, and Bash

LANGUAGES

English: Fluent
Persian: Native