

FOROUGH MEHRALIAN

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EDUCATION

Ph.D. in Software Engineering - <i>University of California, Irvine, USA</i>	Sep 2018 - Jun 2024 (Expected)
M.Sc. in Software Engineering - <i>Sharif University of Technology, Iran</i>	Sep 2015 - Jan 2018
B.Sc. in Computer Engineering - <i>Sharif University of Technology, Iran</i>	Sep 2011- Sep 2015

WORK EXPERIENCE

Research Assistant - Software Engineering and Analysis Lab, UC Irvine, California Jun 2019 - Present

Awarded a \$1.2M grant from **National Science Foundation** to advance software accessibility, including the following projects:

Data-Driven Accessibility Repair of Mobile Apps

- Designed and implemented a context-aware **Deep Learning** Encoder-Decoder model using **LSTM** and **ResNet** in **PyTorch**.
- Improved accuracy of the prior context-agnostic model by 24% in predicting correct labels for unlabeled icons.

Automated Accessibility Testing of Mobile Apps

- Introduced a novel automated accessibility testing oracle considering the discrepancy between different interaction modes, i.e., with and without Assistive Technologies.
- Implemented an automated dynamic analysis tool consisted of a server implemented in **Python**, **Unix Shell**, **WebSocket**, and **Flask** and a client, an Android Accessibility Service implemented in **Kotlin** and **Java**.
- Achieved 83% accuracy in detecting over accessibility issues and found up to 50% more accessibility defects than the state-of-the-art.

Data-Driven Energy Testing of Mobile Apps

- Proposed and implemented a novel **Deep Learning**-based test oracle for energy defects in Android using **LSTM** and **Attention Mechanism** in **PyTorch**.
- Achieved overall precision and recall of 99% in detecting energy defects in only 33 milliseconds on average.

Software Engineer - Candelis Inc., Newport Beach, California Jun 2021 - Sep 2023

- Enabled web-based access to DICOM data by implementing the **DICOMWEB** standard. Developed Store, Retrieve, and Query APIs as a new service using **REST** in **C++** with automated test scripts in **PHP**.
- Engineered a cost-efficient archive and backup mechanism in **C++** for DICOM data, resulting in a remarkable **72.5% reduction** in storage expenses per gigabyte, leveraging **Amazon S3's** storage classes.
- Enhanced defect localization by spearheading the development of the backend for the **Performance Monitoring** dashboard. Provided insights into critical system metrics, including hardware measures, database statistics, and DICOM-specific metrics.

Software Engineer - Café Bazaar, Tehran, Iran Jun 2018 - Aug 2018

- Developed a **Micro-Service** using **Django** for Bazaar, Iran's largest app store with over 40 million users, to display ads on their search page. Utilized **Docker** and **Kubernetes** for containerization and orchestration of the micro-service, respectively.

PUBLICATIONS

F. Mehralian*, N. Salehnamadi*, and S. Malek. "Too Much Accessibility is Harmful! Automated Detection and Analysis of Overly Accessible Elements in Mobile Apps" In *Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, 2022

N. Salehnamadi*, **F. Mehralian***, and S. Malek. "Groundhog: An Automated Accessibility Crawler for Mobile Apps." In *Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, 2022

F. Mehralian, N. Salehnamadi, S. Malek. "COALA: Context-Aware label generation for icons in Android apps" In *Proceedings of the 2021 15th Joint Meeting on Foundations of Software Engineering (ESEC/FSE)*, 2021.

R. Jabbarvand, **F. Mehralian**, and S. Malek. "Automated Construction of Energy Test Oracle for Android" In *Proceedings of the 2020 14th Joint Meeting on Foundations of Software Engineering (ESEC/FSE)*, 2020.

SKILLS

Programming Languages: Python, Java, C/C++

Database: PostgreSQL, SQLite, MySQL, Redis

Technologies and Frameworks: PyTorch, Keras, Matlab, Django, Docker, Kubernetes

Software Engineering: Agile and RUP methodologies, Software Testing, Object Oriented Design and Patterns, Program Analysis

HONORS AND AWARDS

Recipient of the Richard N. Taylor Graduate Award in Software Engineering	2023
Recipient of the Grad Division Dissertation Fellowship in recognition of my outstanding academic achievement	2023
Recipient of the Dissertation Writing Fellowship from the Informatics Department	2023-2024
Recipient of the NSF travel award to attend Automated Software Engineering conference, Pittsburgh	2022
Recipient of the NSF travel award to attend Automated Software Engineering conference, San Diego	2019
Recipient of the Grace Hopper scholarship to attend the conference in Florida	2019
Recipient of Chair's Award at University of California, Irvine	2018
Received an invitation to the PhD interview without an exam in recognition of exceptional talent as an MSc student	2017
Recipient of National Elites Foundation scholarship	2016-2017
Received a MSc admission offer to Sharif University of Technology without an exam as an exceptionally talented BSc student	2015
Recipient of the grant and membership of Iran's National Elites Foundation	2012
Ranked in the top 0.5% nationwide on BSc entrance exam.	2011
Member of the National Organization for Development of Exceptional Talents (NODET)	2004-2011

NOTABLE COURSE PROJECTS

Text Generation with GANs: Using [MaskGAN](#) to replicate their text generation experiment on IMDB reviews.

Modularization of EqualsVerifier: Migrating an open-source project from Java 8 to Java 9.

Handwritten Digit recognizer: MATLAB implementation of several Machine Learning classifiers for detecting handwritten digits.

Knowledge Management System: Defining and documenting requirements of a knowledge management system using RUP methodology and implementing it in Java.

Pomodoro: UI design and backend implementation of an Android application to manage daily tasks using a time management method called Pomodoro.

Book Search Engine: An information retrieval system used for book searching written in Java using Lucene.

Online Store Website: An online store website implemented using Python and Django framework.

Numerical Methods: A graphical MATLAB application developed supporting over 20 numerical algorithms.

CERTIFICATES & TRAINING

<u>Emotional Intelligence</u> : Learning the art and science behind emotions to enhance interpersonal relationships	2023
<u>Sighted Guide Training</u> : Learning how to walk with someone who has vision loss	2023
<u>Excellence in Engineering Communication</u> : Learning communication and public speaking techniques for graduate students in engineering	2020

LEADERSHIP EXPERIENCE & COMMUNITY INVOLVEMENT

Teacher Assistant, UC Irvine and Sharif University of Technology

- Led a team of TAs in the creation and implementation of lab syllabus and holding weekly sessions.
- Conducted office hours to assist students with course material and assignments.
- Organized and led Q/A discussion sessions, resulting in improved student engagement and comprehension.

Tour leader and Sighted guide, 38th Annual CSUN Assistive Technology Conference

- Led a group of visually impaired attendees throughout the conference venue.
- Provided sighted tour for the attendees and described visual elements of exhibits.

Member of live virtualization team, the first Virtual ICSE, International Conference on Software Engineering

- Provided technical support for presenters and attendees and troubleshooted technical issues during the conference.
- Collaborated with conference organizers to ensure smooth and successful virtual conference delivery.

Peer reviewer, Journal of Science of Computer Programming, 2023

External reviewer, International Conference on Software Architecture (ICSA'22)

Peer reviewer, International Conference on Mobile Software Engineering and Systems (MobileSoft'21)