FOROUGH MEHRALIAN

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https://fmehralian.github.io

EDUCATION

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

Emotional Intelligence: Learning the art and science behind emotions to enhance interpersonal relationships	2023
Sighted Guide Training: Learning how to walk with someone who has vision loss	2023
Excellence in Engineering Communication: 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)