

# FOROUGH MEHRALIAN

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## WORK EXPERIENCE

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

- 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.
  - Awarded a \$1.2M grant from **National Science Foundation**.
- 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.
- 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 2022

- Designed and implemented the **DICOMWeb** standard, enabling web-based access to DICOM data. This involved developing the Store, Retrieve, and Query APIs as a new service using **REST** in **C++**.
- Designed and implemented a cost-efficient archive and backup mechanism for the DICOM data using various **Amazon S3's** Intelligent-Tiering and Glacier storage classes, implemented in **C++**.
- Integrated **Prometheus** for time-series monitoring of key performance metrics and utilized **Grafana** to visualize the data and gain insights into the system behavior.

**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.
- Migrated the previous **Redis** database to **PostgreSQL** and optimized the queries to ensure the performance and scalability.
- Implemented a **Second-bid Auction** strategy for the advertisements and conducted beta testing for the service.

## EDUCATION

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Ph.D. in Software Engineering - *University of California, Irvine, USA* Sep 2018 - Present

M.Sc. in Software Engineering - *Sharif University of Technology, Iran* Sep 2015 - Jan 2018  
→ Thesis: Recommending feature changes for mobile apps via mining user reviews

B.Sc. in Computer Engineering - *Sharif University of Technology, Iran* Sep 2011- Sep 2015

## PUBLICATIONS

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**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++, Android

Database: PostgreSQL, SQLite, MySQL, Redis

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

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

## HONORS AND AWARDS

Recipient of the <b>NSF travel award</b> to attend Automated Software Engineering conference, Pittsburgh	2022
Recipient of the <b>NSF travel award</b> to attend Automated Software Engineering conference, San Diego	2019
Recipient of the <b>Grace Hopper scholarship</b> to attend the conference in Florida	2019
Recipient of <b>Chair's Award</b> at University of California, Irvine	2018
Received an invitation to the PhD interview without an exam in recognition of <b>exceptional talent</b> as an MSc student	2017
Recipient of <b>National Elites Foundation scholarship</b>	2016- 2017
Received a MSc admission offer to Sharif University of Technology without an exam as an <b>exceptionally talented</b> BSc student	2015
Recipient of the grant and membership of Iran's <b>National Elites Foundation</b>	2012
Ranked in the <b>top 0.5%</b> nationwide on BSc entrance exam.	2011
Member of the National Organization for Development of Exceptional Talents ( <b>NODET</b> )	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>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

## VOLUNTEERING & SERVICE

Sighted guide at 38th Annual CSUN Assistive Technology Conference	2023
External reviewer of International Conference on Software Architecture (ICSA)	2022
Peer reviewer of International Conference on Mobile Software Engineering and Systems (MobileSoft)	2021
Member of <a href="#">live virtualization team</a> at International Conference on Software Engineering (ICSE)	2020

## TEACHING ASSISTANT

### University of California, Irvine

- Human Computer Interaction, *Prof. Stacy Branham*
- Distributed Software Architecture, *Prof. Sam Malek*
- Software Design, *Prof. Joshua Garcia*
- Introduction to Software Engineering, *Prof. Hadar Ziv*

### Sharif University of Technology, Tehran

- Software Engineering Lab (Head of TAs), *Prof. Hassan Mirian*
- Data Mining, *Prof. Hamid Beigy*
- Database Design, *Prof. Abbas Heydarnoori*