FOROUGH MEHRALIAN

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RELATED 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, which include 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 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

Ph.D. in Software Engineering - *University of California, Irvine, USA* Sep 2018 – Dec 2023 (Expected)

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

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 **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 **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

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.

External reviewer, International Conference on Software Architecture (ICSA`22)
Peer reviewer, International Conference on Mobile Software Engineering and Systems (MobileSoft`21)