DHIA ELHAQ RZIG

Ph.D. Candidate in Computer and Information Science at the University of Michigan - Dearborn.

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EDUCATION

Ph.D. in Computer and Information Science (Ph.D.) 09.2020 – Current
Rackham Graduate School, University of Michigan – Dearborn Dearborn, MI, USA
- Cumulative GPA of 4.0. Achieved candidacy Winter 2022. Presented Proposal Fall 2023.
- Relevant Courses: Data Analytics in Software Engineering, Compiler Design, and Natural Language Processing.

Software Engineering Diploma (M.Eng.) 09.2014 – 07.2020
National Institute of Applied Sciences and Technology (INSAT). Tunis, Tunisia
- Graduation project with the remark of Very Good (17.5/20), Top 3 of Class.

Master Of Information Processing and Complexity of Living Systems (M.Res.) 09.2019 – 07.2020
Joint Degree Program of National Engineering School of Tunis (ENIT) and Paris Cité University Tunis, Tunisia
- Graduation project with the remark of Very Good (18/20), Top 5 of Class.

Thomas Jefferson Scholarship Program: Undergraduate in Computer Science 08.2017 – 05.2018
Dickinson State University Dickinson, ND, USA
- Cumulative GPA of 3.96, on presidential list for both semesters.

RESEARCH EXPERIENCE

Research Intern 05.2024 – 08.2024
Microsoft Redmond, WA, USA
- Research internship, as part of the Gray Systems Lab (Azure Data), under the supervision of Dr. Jordan Henkel (jordan.henkel@microsoft.com) on an LLM-powered Agentic Framework specialized in Data.
- Built Framework using Python and the Azure Open AI API. It is composed of multiple agents that are given generic and specialized tools which allow them to interact with file systems, databases, and multiple types of files and data, structured and unstructured.
- Framework is easily extensible to achieve multiple tasks, we used for the purposes of data generation, and question answering over heterogenous data sources, but it was designed to support various additional scenarios and tools.
- Project is slated to be included within the October 2024 Azure Data Town Hall (was postponed from the July 2024 townhall due to time constraints). The research work for this paper is ongoing and it is currently being drafted.

Application Developer 1 (Research Collaboration) 12.2023 – 05.2024
Microsoft Dearborn, MI, USA
- Research Collaboration with Dr. Jordan Henkel (jordan.henkel@microsoft.com) ,under the supervision of Dr. Foyzul Hassan (foyzul@umich.edu), on improving Prompts in open source software.
- Analyzed a large set of prompts collected in the wild to uncover the state of prompts, specifically, how prone they are to generating biased-responses, how vulnerable they are to injection attacks, and how their performance can be suboptimal on real-world benchmarks.
- Created Prompt Doctor, a VS code extension that allows developers to analyze and automatically remedy the issues with their prompts by offering automatically generated rewrites.
- The resulting paper is currently under submission.

Junior PC Member 11.2023 - 02.2024
Mining Software Repositories (MSR) 2024 Conference Dearborn, MI, USA
- Junior PC reviewer for Technical Papers track. I reviewed 4 Research Papers on various topics including Machine Learning, Continuous Integration, and Developer practices.

Graduate Student Researcher Collaborator 02.2023 – Current
Amazon Web Services Dearborn, MI, USA
- Research Collaboration with Chungha Sung (chunghs@amazon.com) under the supervision of Dr. Foyzul Hassan (foyzul@umich.edu), on Automatic CI migration.
- First example-learning-based approach which can automatically translate Ci configuration files from one syntax to another, after being provided with an appropriate learning set. This approach relies on association rule mining and frequent tree mining, techniques which are more effective on the small footprint of configuration files when compared with other ML technique.
- The resulting research paper is CIMig: An Automated Approach of Migrating Continuous Integration (CI) Systems. Pre-print available: [2211.01992] Characterizing Virtual Reality Software Testing (arxiv.org)

Graduate Student Researcher Collaborator — 06.2021 – 05.2022
Microsoft Research — Dearborn, MI, USA

- Research Collaboration with Dr. Nachiappan Nagappan (nnagappan@acm.org) and Chetan Bansal (chetanb@microsoft.com) on CI within ML projects, under the supervision of Dr. Foyzul Hassan (foyzul@umich.edu).
- First large-scale empirical analysis work that focused on analyzing Continuous Infrastructure within Machine Learning Projects
- Uncovered adoption rates, usage goals, and failure rates and underlying causes of CI in ML projects. The resulting research paper is Characterizing the usage of CI Tools in ML projects, accepted at ESEM 2022

Graduate Student Research Assistant — 09.2020 – Current
Software Engineering Lab - University of Michigan – Dearborn — Dearborn, MI, USA

- Researching DevOps tools and practices in the context of AI/ML, VR/AR software projects, and other emerging technologies.
- Implemented two projects using Python, two projects using Java, and one project using C++ for my research papers.
- Working under the supervision of Dr. Foyzul Hassan (foyzul@umich.edu).

Research Assistant — 03.2020 – 06.2020
Intelligent Software Engineering (ISE) Lab - University of Michigan – Dearborn — Dearborn, MI, USA

- Designed and implemented new Knowledge-Based components in an automated software refactoring solution using association rules mining algorithms and historical data concerning software refactoring. These components resulted in better automatically generated software refactorings.
- Work accomplished under the supervision of Dr. Marouane Kessentini (kessentini@oakland.edu).

Data Science Intern — 06.2019 – 08.2019
Mass Analytics — Tunis, Tunisia

- Designed, developed, and evaluated two Marketing-Mix-Modelling 'marketing to sales' decomposition automatic modelers that use Machine Learning, specifically Genetic algorithms, which enhanced the performance and accuracy of the Mass Analytics tool.
- Deployed these tools using Docker, enabling a cloud-based and on-premises deployment of the tool.

Student Researcher in Artificial Intelligence — 01.2019 – 05.2019
ISE Lab - University of Michigan - Dearborn and INSAT — Tunis, Tunisia

- Designed and implemented knowledge-based crossover operators for the Genetic algorithm used in the Multi-Objective Software Refactoring, which improved the efficacy and efficiency of the refactoring tool.
- Work performed Under the supervision of Dr. Meriem Chater (meriemchater@yahoo.fr) and Dr. Marouane Kessentini.

PROFESSIONAL EXPERIENCE

Student Volunteer — 07.2023 – 07.2023
International Symposium on Software Testing and Analysis (ISSTA) 2023 — Seattle, WA, USA

- Assisted with the organization of the ACM SIGSOFT International Symposium on Software Testing and Analysis 2023.

Student Volunteer — 10.2022 – 10.2022
International Conference on Automated Software Engineering (ASE) 2022 — Oakland Center, MI, USA

- Assisted with the organization of the IEEE/ACM International Conference on Automated Software Engineering 2022.

Graduate Student Instructor — 09.2020 – Current
University of Michigan – Dearborn — Dearborn, MI, USA

- Supervised labs and held office hours to help students develop their programming and software engineering skills, and I also graded assignments and tests for the courses that I assisted with.
- Classes instructed: Undergraduate Level: Computer Science II Lab, Software Engineering Tools Class, and Software Engineering II. Graduate Level: Data Analytics in Software Engineering, and Software Quality Assurance.

Data Analyst-Software Developer — 08.2019 – 10.2019
Democracy International — Tunis, Tunisia

- Built a Google Assistant bot using the Actions on Google platform, intended for a card game created by Democracy International.
- Collected real world data for election ad billboards, then cleaned it using Python and employed it to create an interactive map that shows the positions of these billboards.

PUBLICATIONS

Virtual Reality (VR) Automated Testing in the Wild: A Case Study on Unity-Based VR Applications. International Symposium on Software Testing and Analysis Conference (ISSTA): 1269–1281. Seattle, WA, USA, July 2023.

- D. Rzig, N. Iqbal, I. Attisano, X. Qin, F. Hassan
- A-level conference, Acceptance rate: 22.79%.
- First research paper tackling the subject of testing in VR projects, done in collaboration with Villanova University, I Presented this work during the conference.

Characterizing the usage of CI Tools in ML projects. Empirical Software Engineering and Measurement Conference (ESEM): 69-70. Helsinki, Finland, September 2022.

- D. Rzig, F. Hassan, C. Bansal, N. Nagappan.
- A-level conference, Acceptance rate: 25%
- First research paper tackling the subject of CI in ML projects, done in collaboration with Microsoft Research, I Presented this work during the conference.

An Empirical Study on ML DevOps Adoption Trends, Efforts, and Benefits Analysis. ELSEVIER Information and Software Technology (ELSEVIER IST), (Volume 15), 107037, December 2022.

- D. Rzig, F. Hassan, M. Kessentini
- Q1-Journal, Impact Factor: 3.9
- First research paper tackling the subject of DevOps in ML projects.

X-SBR: On the Use of the History of Refactorings for Explainable Search-Based Refactoring and Intelligent Change Operators. IEEE Transactions on Software Engineering (TSE) vol. 48, no. 10, pp. 3753-3770, October 2022.

- C. Abid, D. Rzig, T. Ferreira, M. Kessentini, T. Sharma.
- Q1 Journal, Impact Factor: 7.4.
- First Research paper tackling Automatic Refactoring with an explainable AI approach.

UNDER-SUBMISSION

PromptDoctor: Automated Prompt Linting and Repair

- D. Rzig, D.J. Paul, K. Pister, J. Henkel, F. Hassan
- First research paper tackling the automatic migration between CI systems.
- Currently submitted to FSE.

CIMig: An Automated Approach of Migrating Continuous Integration (CI) Systems.

- D. Rzig, A. Houerbi, C. Sung, F. Hassan.
- First research paper tackling the automatic migration between CI systems.
- Currently submitted to TOSEM.

An Empirical Study of Refactorings and Technical Debt in Build Systems

- A. Ghammam, D. Rzig, M. Almukhtar, W. Aljedaani, F. Hassan, M. Kessentini:
- First research paper tackling software refactoring in the context of Build systems, in collaboration with Oakland University.

Empirical Analysis on CI/CD Pipeline Evolution in Machine Learning Projects.

- A. Houerbi, R. Chavan, D. Rzig, F. Hassan
- First research paper analyzing the evolution of CI/CD in ML projects.
- Pre-print: [2403.12199] Empirical Analysis on CI/CD Pipeline Evolution in Machine Learning Projects (arxiv.org)

AWARDS AND DISTINCTIONS

- Awarded Honor Scholar award from UM Dearborn in 2024.
- Awarded an NSF Travel Grant to attend ESEM 2023
- Awarded a SIGSOFT CAPS ISSTA 2023 Travel Grant to attend ISSTA 2023
- Awarded an EXP+ Student Conference Presentation Grant from the University of Michigan – Dearborn to attend ISSTA 2023.
- Selected for the Presidential list Fall 2017 and Winter 2018 at Dickinson State University.
- Selected for the Thomas Jefferson Scholarship Program for 1 year of non-Degree study at Dickinson State University for2017-2018.

RELEVANT SKILLS

TECHINCAL SKILLS

- Python, Java, C++, C#, R, Git, SQL, NoSQL (MongoDB), UML, SPSS

LANGUAGE SKILLS

- English: Fluent Written & Spoken, French: Fluent Written & Spoken, Arabic: Native

LEADERSHIP AND ACTIVITIES

- Co-Founder and Vice President of the Doctoral Student Association at UM-Dearborn 10.2023-Current
- Brother at Alpha Kappa Psi Co-ed Business Fraternity 05.2023-Current
- Student Affairs Advisory Committee at UM-Dearborn, Member 10.2022-04.2023
- INSAT Press, English language Editor-In-Chief 08.2019-01.2020
- IEEE INSAT Student Branch, Computer Society Chapter Chair 06.2016-06.2017

CERTIFICATIONS

- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization by Deeplearning.ai. (2019)
- Neural Networks and Deep Learning by Deeplearning.ai. (2019)
- Machine Learning by Stanford Online (2019)