

Mohammad Moshawrab, Ph.D. Comp. Eng.

Software Engineer, AI Researcher



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A PhD holder in Artificial Intelligence, specializing in Machine Learning, Deep Learning, and advanced topics such as Federated Machine Learning and security. With a decade-long tenure in software engineering, I've successfully navigated web and windows application development, database engineering, and other IT subfields. My academic and professional journey reflects a mastery of diverse skills and tools within this field.

Education

Doctorate in Computer Engineering

Université du Québec à Rimouski

Sep. 2020 – July 2024

Rimouski, QC, Canada

- Thesis Title: Improving the Security of Federated Learning with Polymorphic and Homomorphic Encryption
- Courses: Artificial Intelligence, Machine Learning and Data Mining

Master of Science in Computer Science

Beirut Arab University

Sep. 2013 – May 2017

Debbieh, Lebanon

- Thesis Title: Parallelization of the AES Standard Encryption Algorithm Using Multi-Core Processor
- Courses: Project Management, IT Strategies, Parallel Programming, Human Computer Interaction, Software Verification, Technical Writing, Data Mining, Forecasting Methods and Applications, Supply Chain Management

Bachelor of Science in Computer Science

Islamic University of Lebanon

Sep. 2008 – July 2012

Khaldeh, Lebanon

- Courses: Database, Web Development, Windows Applications, Informatics, Mathematics, Operating Systems, Networking, Operation Research, ...

Work Experience

Full Stack Developer

Mediterranean Shipping Company

May 2023 – Present

Montreal, QC, Canada

- Contributed to the development of the systems used within MSC, or within other companies in its group such MEDLOG, Go Expedited, Best Choice and others
- Developed, from scratch, different web applications, web APIs, crystal reports, database files and other services and contributed to enhancing other already existing applications
- As a full stack developer, dealt with different technologies including database, backend and fronted working with ASP.NET, .NET Core, Javascript, React, Bootstrap, HTML & CSS and other stack layers
- Conducted different training sessions oriented for technical and non-technical topics

Backend Developer

Centre de Recherches Interdisciplinaires en Etudes Montréalaises (McGill University)

April 2021 – March 2023

Montreal, QC, Canada

- Contributed to the development of PDS (The Social Data Analysis Center), a digital platform aimed at understanding the unique issues and needs of Montreal's populations
- Worked extensively with .NET Core technologies, JavaScript, Razor, Blazor, Microsoft Orleans, MySQL, and other tools
- Played a key role in building the architecture of the solution beside the development role

Artificial Intelligence & Machine Learning Researcher (Intern)**April 2022 – Nov. 2022***Institut Technologique de Maintenance Industrielle*

Rimouski, QC, Canada

- Conducted different research topics in Machine Learning domain in the field of connected and smart health
- Developed different smart Machine Learning models for the prediction of Cardiovascular Diseases using the Heart Rate Variability data. Models developed outperformed the state-of-the art existing models
- Conducted a study on the digital parameters and devices in use to detect occupational physical fatigue
- Published two articles about the above-mentioned topic within the period of the internship

Teaching Assistant**Jan. 2022 – Sep. 2023***Université du Québec à Rimouski*

Rimouski, QC, Canada

- Played a pivotal role in managing courses, delivering lectures, and preparing courses presentations
- Taught courses to both Master's and Bachelor's students, fostering their understanding of complex topics and contributing to their academic growth and development

Full Stack Developer**May 2020 – Nov. 2020***Octipulse*

Beirut, Lebanon

- Contributed to the development of a versatile Content Management System catering to a diverse clientele, including prestigious entities like National Geographic Arabia, Al Ittihad News, Zahrat Al Khaleej, and Al Mayadeen International Broadcasting Network
- Worked within an international setting
- Utilized a range of technologies such as Azure services, .NET Core, CosmosDB, MS SQL, and others, ensuring robust and scalable solutions for global partners

Research & Development Engineer**Dec. 2019 – May 2020***Stragnum*

Beirut, Lebanon

- Spearheaded a comprehensive study culminating in a prototype for an Intellectual Property system leveraging Blockchain technology

Founder and Owner**Aug 2018 – Dec. 2019***iBits*

Sarafand, Lebanon

- Founded iBits, a startup offering various software solutions
- Managed a team of developers, driving the development and delivery of different applications including Point of Sale systems, Clinic Management, Cargo Management, Educational Systems, and Municipalities Data Management solutions
- This experience honed my business acumen and equipped me with valuable insights into startup dynamics and operations
- Within a year, iBits gained traction, serving tens of clients all over Lebanon
- This dream was shut-down in mid of the Lebanese economic crisis that started in October 2019

Application Administrator**June 2015 – June 2018***Phoenicia University*

Sarafand, Lebanon

- Overseen vital data management systems like the student information system, payroll, ERP, and various web platforms
- Progressed to a leadership role, by managing a dedicated team to develop and integrate systems, bridging gaps with customized solutions such as transportation management and entrance exams, and tens others.
- Mastered diverse technologies like .NET, .NET Core, JavaScript, and more
- Delivered numerous applications, integration projects with banks, and extensive SQL SSRS reports

Information Technology Instructor**Sep. 2014 – June 2015***Al Masar Institute*

Al Ghazieh, Lebanon

- Served as an IT Instructor, delivering comprehensive courses on Database Management, A+ Computer Maintenance, Java, C#, and other IT subjects across multiple class levels
- Facilitated students' mastery of diverse technical skills essential for their academic and professional development

Information Technology Specialist**Feb. 2011 – June 2015***Amal Educational Institutions (Shoumran High School)*

Al Baysaryeh, Lebanon

- Managed and set-up and maintained the IT infrastructure
- Played a key role in developing the Educational Management System using APEX SQL and Oracle. Provided comprehensive IT support to staff and conducted hardware maintenance tasks

University Projects:

- *PhD Projects:*
 - PolyFLAG_SVM: Polymorphic Federated Learning Aggregation of Gradients Support Vector Machines Framework ([Link](#))
 - PolyFLAM: Polymorphic Federated Learning Aggregation of Models Framework ([Link](#))
 - PolyFLAP: Polymorphic Federated Learning Aggregation of Parameters ([Link](#))
 - HP_FLAP: Homomorphic and Polymorphic Federated Learning Aggregation of Parameters ([Link](#))
 - Prediction of Cardiovascular Diseases with HRV data and Machine Learning Models ([Link](#))
- *Masters Project:*
 - Parallelization of the AES Standard Encryption Algorithm Using Multi-Core Processor

Qualifications

- Technical Skills: C#, NodeJS, Python, Java, C/C++, Microsoft Orleans, Javascript, Angular, Razor, Blazor, MSSQL, MySQL, MongoDB, CosmosDB, HTML5, CSS, XML, JSON, Encryption
- AI Tools: Deep Learning, Machine Learning, Federated Machine Learning, Data Mining
- Languages: English (Professional), Arabic (Native)
- Soft Skills: Problem-solving, Critical thinking, Communication, Teamwork, Adaptability, Time management, Attention to detail, Leadership, Ethical awareness, Customer focus

Scientific Contributions:

- *Cardiovascular Events Prediction using Artificial Intelligence Models and Heart Rate Variability* ([Link](#)) Aug-2022
- *Smart Wearables in Detection of Occupational Physical Fatigue: A Literature Review* ([Link](#)) Oct-2022
- *Smart Wearable Devices in the Management of Cardiovascular Diseases: A Systematic Literature Review* ([Link](#)) Jan-2023
- *Reviewing Federated Machine Learning and its Use in Diseases Prediction* ([Link](#)) Feb-2023
- *Predicting Cardiovascular Events with Machine Learning Models and Heart Rate Variability* ([Link](#)) Mar-2023
- *Reviewing Multimodal Machine Learning and its Use in Cardiovascular Diseases Detection* ([Link](#)) Mar-2023
- *Detection of Occupational Fatigue in Digital Era; Parameters In Use* ([Link](#)) Apr-2023
- *Machine Learning Models to Predict Cardiovascular Events from Heart Rate Variability Data* ([Link](#)) Apr-2023
- *Reviewing Federated Learning Aggregation Algorithms; Contributions, Limitations and Future Perspectives* ([Link](#)) May-2023
- *PolyFLAG_SVM: A Polymorphic Federated Learning Aggregation of Gradients Support Vector Machines Framework* ([Link](#)) Oct-2023
- *Securing Federated Learning; Approaches, Mechanisms and Opportunities* ([Link](#)) Sep-2024
- *A Maneuver in the Trade-Off Space of Federated Learning Aggregation Frameworks Secured with Polymorphic Encryption: PolyFLAM and PolyFLAP Frameworks* ([Link](#)) Sep-2024
- *HP_FLAP: Homomorphic & Polymorphic Federated Learning Aggregation of Parameters Framework (Under Review)*