Ahmad M. Mustapha

Phone Number: **+961 71 177 395**
E-mail: **ahmad.m.mustapha@hotmail.com**

About Me	I am a multipotentialite engineer with diverse experience in both academia and industry in multiple domains like Machine Learning, Artificial Intelligence, Data Science, and Backend Development. I strive and enjoy positions that require ideation, problem-solving, analytical, and creative skill sets.

Education

From 2018 to 2020	**American University of Beirut (AUB)** Master in Electric and Computer Engineering Major in Machine Intelligence **Relevant Courses Taken:** Applied Parallel Programming CUDA, Natural Language Processing, Adv. Data Science	Beirut, Lebanon
From 2015 to 2017	**Lebanese University** Master in Information systems and Data Intelligence **Relevant Courses Taken**: Data Mining, Big Data, Machine Learning, Decision Support, Distributed Applications, Real-Time Analysis **Rank**: 1/13	Beirut, Lebanon
From 2012 to 2015	**Lebanese University** Bachelor in Computer Science	Beirut, Lebanon

Experience

From 2023 to Present	**Al Maaref University** Lecturer • Data Structures Using Java	Beirut, Lebanon
From 2023 to Present	**Al Mustapha Institute** Founder and Manager • Managed the institute's operations • Developed Learning Materials	Beirut, Lebanon
From 2022 to 2023	**Career Break** Traveled • Studied Persian • Introduced myself to the Persian culture	Iran, Mashhad
From 2021 to 2022	**Java Developer** Murex • Maintained a business module • Agile Methodology • Java, Groovy, Python, Spring, Spring Boot, Open API, REST, …	Beirut, Lebanon

2021 (8 months)	**Machine Learning Engineer** Veer	Beirut, Lebanon

- Managed a Machine Learning project from A to Z
- The project was related to Traffic Management
- Data Cleaning, Data Munging, Data Visualization
- Learning Prediction. Python, RNNs, LSTMs, Regression, Pandas, Numpy, Plotly, Dash.

From 2018 to 2020	**Research Assistance** American University of Lebanon (AUB)	Beirut, Lebanon

- Implementing/Improving Bleeding Edge Unsupervised Deep Learning Models
- Neural Networks Adversarial Samples
- Unsupervised Deep Learning
- Software Engineering Interaction with Machine Learning

From 2018 to 2020	**Multidisciplinary Engineer** Self-Employed – Different Clients

- Computer vision models to detect vehicles in a tropical reserve in Africa.
- Computer vision models to detect illness through lung X-ray images
- Python Script to scrape and sort by price selected goods from different online providers
- Several Data Science and Machine Learning projects

Spring 2018-2019 **Fall 2019-2020**	**Teaching Assistance (277 hours total)** American University of Lebanon (AUB)	Beirut, Lebanon

- Teaching Introduction to Programming C++ / Matlab
- Teaching Computer Organization VHDL/PIC
- Software Tools (QT/Doxygen/Make Files/Unit Tests)

From 2017 to 2018	**Research Intern** University of Versailles (UVSQ)	Versaille, France

- Handling Multidimensional Data from Moving Air Pollution Sensors
- Use **R** libraries to transform data into functions
- Implement a **Spark/Scala-based** framework to read sensory values, interpolate them into functions, apply analysis on them, …

From 2015 to 2016	**Occasional Private Tutor**	Beirut, Lebanon

- Introduction to programming (C/C++)
- Introduction to Web Development

Publications

- Mustapha A., Zeitouni K. and Taher Y. (2018). Towards Rich Sensor Data Representation Functional Data Analysis Framework for Opportunistic Mobile Monitoring.GISTAM
- Mustapha A., Khreich W., Masri W. (2021) A Deep Dive into Deep Cluster
- Mustapha A., Khreich W., Masri W. (2021) Inter-model Interpretability: Self-Supervised Models as a Case Study

Conferences

- 4th International Conference on Geographical Information Systems Theory, Applications and Management, GISTAM 2018, Funchal, Madeira, Portugal. Presented the paper Towards Rich Sensor Data Representation - Functional Data Analysis Framework for Opportunistic Mobile Monitoring.
- 34th IEEE International Conference on Data Engineering ICDE20 18. Paris. Guest.
- Junior Conference on Data Science and Engineering JDSE2018. Paris Saclay. Guest.

Notable Projects

- **Research**
  As a Research Assistant at the American University of Beirut, I worked on three different but related topics.
  - **Adversarial samples for deep learning models**. I studied the literature and focused on how the Software Testing community tackles this problem.
  - **Unsupervised Deep Representation Learning**. I implemented a state-of-the-art approach called Deep Cluster proposed by the Facebook AI team and did thorough experimentations and proposed enhancements.
  - **Self-Supervised Deep Learning**. I applied a state-of-the-art interpretability approach to different self-supervised models to understand their actual learning capacities.
  - **Interaction between Machine Learning and Software Engineering.** Studied the literature.
  For all experiments, I used **Pytorch** for building and training models. **Tensor board** for tracking experiment results. **SLURM** to submit jobs to the university computation cluster.

- **Point in Polyhedron Algorithm Implementation on GPU**
  Implemented the computationally extensive problem of "locating whether a point belongs to a triangulated polyhedron" over a Graphics Processing Unit (GPU). The two-stage parallelized algorithm was borrowed from two state-of-the-art papers. One is to index the polyhedron faces using a 3D grid. The other was to compute whether a point belonged to a polyhedron or not utilizing the indexed triangles. Used C++, **CUDA**, Three.js. Course Project.

- **Machine Learning Based Text Segmentation**
  Islamic Hadith are narrations of Prophet Mohammad's (PBUH) words by consecutive scholars. Each hadith contains a narrator list and then followed by the actual hadith. The team developed a machine learning (n-grams in particular) based algorithm to segment Islamic hadith into corresponding narrators and body segments using Python, NLTK, and Information Gain. We implemented and enhanced an approach proposed in a research paper.

- **Object Detection in aerial videos**
  This was a freelancing project. The client overseeing a natural reserve in Africa asked to develop a computer vision program that takes drone footage as input and fires an alarm if a vehicle is detected. The task was not straightforward as the available data was relatively small and of special natural flora. Moreover, off-the-shelf object detection models were not trained to detect vehicles from a birds-eye point of view. I had to fine-tune models using manually annotated data. Used **CVAT**, Python, **Pytorch**, and **YOLO** object detection deep learning model.

- **Software Development**
  I have a solid foundation in software engineering. Throughout the years, I managed to work on a multitude of applications. Desktop Applications using C++, Java, JavaFX, and Visual Basics. Mobile Applications using Android. Web applications using Vanilla JavaScript, Ajax, and PHP.

- **Profiling Lebanese Real Estate Properties Rentals**
  A side project to study the Lebanese Real State Rentals the team scraped the OLX Lebanon website to collect data related to property rentals to predict prices followed by exploratory data analysis, data preparation, data preprocessing, and feature selection. Followed by the modeling phase which uses **SVM**, **KNN**, **decision trees**, and **neural networks**. The modeling phase included hyper-parameters grid search and cross-validation. Finally applied statistical significance tests to figure out whether model improvements were a matter of chance or not. While also incorporating state-of-the-art research **Deep Learning Uncertainty Quantification** using ensembles, Monte Carlo dropout, and **mixture density networks**. Moreover, we applied state-of-the-art ML model interpretation using **SHAP**. Used Python, Pytorch, **Keras**, Skorch, **R**, and **Scikit-learn**.

SKILLS

Languages: Fluent in English and Arabic.
Soft Skills: Communication, Teamwork, Setting Goals, Planning
Technical Skills: Java, spring, Python, Scikit-Learn, R, Pytorch, Tensorflow, MatplotLib, Plotly, Dash

Last Updated: October 23