

# MOHAMED A ABDELSALAM

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## OBJECTIVE

Passionate and innovative Machine Learning Research Engineer with extensive experience in multimodal deep learning, seeking to leverage my skills in a challenging and creative environment. Proven track record in research and development, aiming to contribute to cutting-edge projects in machine learning and artificial intelligence.

## EXPERIENCE

### Machine Learning Research Engineer, Samsung AI Center

Toronto, Canada • July 2021 - Present

- Specialized in multimodal learning at the intersection of vision and language, with extensive application of foundation models and Large Language Models (LLMs) across the various projects.
- Served as the lead author in two team-based research projects:
  - Developing a generative deep learning model for procedural video step anticipation. (ICCV 2023)
  - Developing a new method for visual scene understanding using Abstract Meaning Representations, emphasizing higher-level semantic concepts. (CoNLL 2022)
- Implemented and managed a versatile internal repository for easy evaluation of different text-image retrieval models in a modular fashion, as part of our work in enhancing image search capabilities in smartphone galleries using natural language processing.
- Working on personalizing image search experience by augmenting embedding based VLMs with image metadata and gallery context.
- Contributed to creating a stories/memories generation module for the user gallery in an unsupervised manner, as opposed to the existing template based modules.

### Research Assistant, Mila/University of Montreal

Montreal, Canada • Sep 2019 - Jun 2021

- Engaged in research in Incremental and lifelong deep Learning, culminating in a CVPR publication and thesis.
- Co-authored a SIGDial paper, focusing on applying a semantic loss to enhance small generative dialogue models.
- Contributed to a comprehensive primer on Lifelong Learning, describing key methodologies in the field.

### Machine Learning Intern, National Bank of Canada

Montreal, Canada • May 2019 - Sep 2019

- Worked on security and anomaly detection using ML techniques.

### ML Teaching Assistant, Zewail University of Science and Technology

Cairo, Egypt • Sep 2018 - Dec 2018

### Undergraduate Research Intern, Computer Vision Lab, ETH Zurich

Switzerland • June 2016 - Sep 2016

- Worked on Learning based Super-Resolution using Sparse Representations.

## SKILLS

**Programming Languages:** Python (Expert); C/C++, MATLAB, SQL (Familiar); C#, Java (Beginner)

**Frameworks:** Pytorch (Expert); Tensorflow, Keras (Familiar)

**Tools:** Numpy, Pandas, scikit-learn, NLTK, Git, Slurm

**Languages:** Arabic (Native), English (Fluent), French (Intermediate)

## EDUCATION

### Mila/University of Montreal

Montreal, Canada • 2019 - 2021

MSc in Machine Learning

Thesis: [IIRC - Incremental Implicitly-Refined Classification](#) Adviser: Sarath Chandar

### Zewail University of Science and Technology

Cairo, Egypt • 2013 - 2018

BSc Aerospace Engineering

Graduation Project: [Attribute-based Face Generation Using Progressive GANs](#) Adviser: Elsayed Hemayed

## PUBLICATIONS

### [GePSAn: Generative Procedure Step Anticipation in Cooking Videos](#)

ICCV 2023

*Mohamed Abdelsalam, Samrudhdi Rangrej, Isma Hadji, Nikita Dvornik, Konstantinos Derpanis, Afsaneh Fazly*

Developed a generative deep learning model for next-step prediction in procedural videos, achieving top results on YouCookII and enabling zero-shot text-to-video domain transfer.

### [Visual Semantic Parsing: From Images to Abstract Meaning Representation](#)

CoNLL, 2022

*Mohamed Abdelsalam, Zhan Shi, Federico Fancellu, Kalliopi Basioti, Dhaivat Bhatt, Vladimir Pavlovic, Afsaneh Fazly*

A new method for visual scene understanding by using Abstract Meaning Representation (AMR) to create linguistically informed visual AMR graphs that focus on higher-level semantic concepts.

## **IIRC: Incremental Implicitly-Refined Classification**

**CVPR, 2021**

*Mohamed Abdelsalam, Mojtaba Faramarzi, Shagun Sodhani, Sarath Chandar*

A setup and benchmark to evaluate lifelong learning models in more dynamic and real-life aligned scenarios.

## **A Brief Study on the Effects of Training Generative Dialogue Models with a Semantic loss SIGDial, 2021**

*Prasanna Parthasarathi\*, Mohamed Abdelsalam\*, Joelle Pineau, Sarath Chandar*

A study on the use of an auxiliary semantic loss as a way of encouraging generative dialogue models diversify their responses.

## **BOOKS**

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### **An Introduction to Lifelong Supervised Learning**

**2022**

*Shagun Sodhani, Mojtaba Faramarzi, Sanket Vaibhav Mehta, Pranshu Malviya, Mohamed Abdelsalam, Janarthanan Janarthanan, Sarath Chandar*

This primer is an attempt to provide a detailed summary of the different facets of lifelong learning.

## **OTHER PROJECTS**

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### **TT-Transformer**, Matrix and Tensor Factorization for ML IFT6760A

Winter 2019

- Compressed the Transformer architecture using Tensor Train Decomposition.
- Achieved a compression rate of 2.58 with a minimal loss in accuracy on the task of Machine Translation.

### **Attribute-based Face Generation Using Progressive GANs**, Bachelor Project

Spring 2018

- Used conditional GANs to create realistic faces given a set of face attributes.
- The network was built upon Progressively Growing GANs.

### **RollX**, Dynamics Course SPC 218 (Simulation video [here](#), Trial video [here](#))

Spring 2015

- Designed and manufactured a Cubli inspired jumping machine based on the conservation of angular momentum.

References available upon request.