Mohamed Yousuf

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Summary:

Ph.D. candidate with expertise in developing deep learning and machine learning models for real time applications, for example, medical imaging, large language models (LLMs), and data science applications. Proven ability to design and deploy AI solutions using multiple tools like Python, PyTorch, and Hugging Face. Published author with over 8 papers and 2 book chapters. Seeking to leverage advanced analytics, generative AI, and LLM skills in a machine learning or data science role.

Education:

- **Ph.D. in Electrical and Computer Engineering from J.B. Speed Engineering**
  University of Louisville
  August 2021 – April 2025
  Thesis: "An automatic colorectal polyps detection approach for CT colonography"
- **Master's Degree in Mechatronics Engineering**
  Ain Shams University
  2016 – 2019
  Thesis: "Toward a real-time vehicle detection system"
- **Bachelor of Mechanical Mechatronics Engineering**
  Ain Shams University
  2010 – 2015

Experience:

Research Assistant
CVIP lab, *J.B. Speed Engineering, University of Louisville*
August 2021 – present

- Developed and deployed deep learning models for 2D/3D medical imaging, focusing on CT scan abnormality detection, which improved the current framework by 15%.
- Improved image classification accuracy for polyp detection by 15% using PyTorch and Keras.
- Created synthetic images with CycleGAN and handled 3D segmentation for medical imaging data.
- Built a GUI for colon polyp detection using PySide, improving diagnosis workflow by 30%.
- Collaborated with multidisciplinary teams under Prof. Aly Farag and Dr. Asem Ali.

R&D Engineer Intern
Digimarc Company
October 2023 – April 2024

- Conducted research on digital watermarking using deep learning algorithms.
- Enhanced existing watermarking algorithms and developed new solutions using Pytorch.
- Published a paper titled "Affine Transform Recovery via Convolutional Neural Networks for Watermark Synchronization" at Electronic Imaging 2024.
- Collaborated with cross-functional teams to advance watermarking technologies.

Teaching Assistant
J.B. Speed Engineering, University of Louisville
August 2021 – December 2022

- Conducted labs and tutorials for courses in Electronic Networking, Signal Processing, Logic Design, and Computer Vision.
- Held office hours, graded assignments, and provided support to undergraduate students.
- Awarded Student Champion Award for outstanding performance.

Teaching Assistant
Faculty of Engineering, Ain Shams University
October 2016 – August 2021

- Conducted labs and tutorials for courses including Image Processing, C++ Programming, Electronics, Computer Vision, and Mechatronics.
- Prepared and delivered introductory courses on MATLAB and SIMULINK.
- Supervised graduation projects related to computer vision and deep learning.

Skills

Machine Learning & AI:

- **Techniques:** Supervised & unsupervised learning, regression models, clustering, dimensionality reduction (PCA, t-SNE), neural networks, CNNs, Transformers, LLMs, prompt engineering, and generative modeling, Machine Learning Algorithms (SVMs, Random Forests), and Optimization Techniques (Gradient Descent, Hyperparameter Tuning).
- **Statistical Methods:** Hypothesis testing, probability distributions, Bayesian inference, A/B testing, statistical modeling, and confidence intervals.
- **Tools:** Python (Pandas, NumPy, Scikit-learn), Keras, PyTorch, Hugging Face.

Generative AI & LLMs:

- Familiar with LLM development lifecycle: pre-training, fine-tuning, and evaluation, for tasks such as summarization, question answering, and dialogue generation.
- Practical application of generative AI in text, image, and video generation using Hugging Face, LangChain, and AWS SageMaker.
- Familiar with parameter-efficient fine-tuning (PEFT), and retrieval-augmented generation (RAG).

- **Tools**: Python (Transformers, Tokenizers), Hugging Face, AWS SageMaker, LangChain.

Data Analytics & Processing:

- **Skills:** Data wrangling, feature engineering, exploratory data analysis (EDA), data visualization, and business intelligence.
- **Tools:** Python (Pandas, NumPy), SQL, Power BI, tableau, Matplotlib, Seaborn.

Image and Video Processing:

- **Libraries:** OpenCV, PIL, scikit-image, pytorch, keras.
- **Techniques:** 2D/3D image detection, classification, segmentation, and synthetic image generation, video analysis.

Development, GUI Applications, and deployment:

- building machine learning and data science user interfaces using PySide, Gradio and PyQt.
- Proficient with Git for version control and GitHub for collaborative development.
- Familiar with deployment using FastAPI, Docker, and EC2 from AWS

Research and Technical Writing:

- **Skills:** Performing literature reviews, Writing research publications, funding grant proposals, and technical documentation.

Publications:

- Multi-view network for colorectal polyps detection in CT colonography "ICIP24"
- Accurate colon segmentation using 2D convolutional neural networks with 3D contextual information "ICIP 2024"
- Colon Segmentation Using Guided Sequential Episodic Training and Contrastive Learning "ICPR 2024"
- Colorectal Polyps Detection in Virtual Colonoscopy using 3D Geometric Features and Deep Learning "ISBI 2024"
- Affine Transform Recovery via Convolutional Neural Networks for Watermark Synchronization "Electronic Imaging 2024"
- An Automatic Colorectal Polyps Detection Approach For CT Colonography "ICIP 2023"
- A Deep Learning Approach for Vehicle Detection "ICCES 2018"
- A Novel Vehicle Detection System "ICCES 2018"

Certifications:

- Generative AI with Large Language Models – DeepLearning.AI & AWS (2024)
- Google Advanced Data Analytics Specialization – Google (2024)
- Hugging Face Bootcamp – Udemy (2024)