Ammar Khairi

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Education

The University Of Edinburgh — Edinburgh, UK
M.Sc. in Artificial Intelligence; **GPA: 7.5/10** — *Sep 2022 – Sep 2023*

- Master's Thesis: Efficient Fine-Tuning of Large Language Models for Code Generation.
- Developed method to efficiently fine-tune LLMs on limited compute for code generation across 4 programming languages.
- Reduced training costs by 70% while maintaining performance through LoRA fine-tuning and smaller model architectures.
- Published and presented work at NeurIPS Black in AI Workshop; Code and models open-sourced on HuggingFace

University of Khartoum — Khartoum, Sudan
B.Sc. in Electrical and Electronics Engineering; **GPA: 8.64/10** — *Sep 2014 – Jun 2020*

- BSc Thesis: SemGAN - Text to Image Synthesis from Text Semantics using Attentional Generative Adversarial Networks
- Proposed incorporating sentence-level semantics to enhance attention mechanism in text-to-image synthesis
- Improved Inception Score by +4.13% and Fréchet Inception Distance by +13.93% on CUB birds dataset
- Published and presented work at International Conference on Computer, Control, Electrical, and Electronics Engineering (ICCCEEE)

Work Experience

Clingendael - the Netherlands Institute of International Relations — Remote
NLP Consultant — *Oct 2023 – Nov 2023*

- Working as an NLP consultant on a research project analyzing polarization in Twitter discussions related to the conflict in Sudan.
- Manually annotated part of the Arabic dataset for stance detection, sentiment analysis and bot identification.
- Collaborated with senior researchers to design a pipeline for stance classification and bot detection using BERT models fine-tuned on our annotated dataset.
- Applying state-of-the-art NLP techniques like transformers and transfer learning to enhance ML models for low-resource Arabic text.

School of Informatics, The University of Edinburgh — Edinburgh, UK
Teaching Assistant — *Jan 2023 – June 2023*

- Served as a TA for the Computer Graphics course, instructing over 100 students.
- Designed and implemented 3 programming assignments on core graphics algorithms including raytracing, meshes and optimization.
- Hosted lab sessions to mentor students in C++ and OpenGL.
- Achieved an overall student satisfaction rating of 4.8/5.0 in course evaluations.

AmunData, Data-Driven Research, and Advisory — Khartoum, Sudan
Data Scientist — *July 2021 – September 2022*

- Led the development of an open-source precision agriculture web application using Python, Streamlit, and Azure to provide crop monitoring and insights to clients. The application leveraged Sentinel-2 satellite imagery and vegetation indices to enable low-cost, customized field monitoring.
- Created automated workflows to process and store raw Sentinel-2 data. Implemented custom JavaScript scripts to extract vegetation insights like NDVI, LAI, and land cover. Stored and updated processed imagery in Azure Blob storage.
- Designed and implemented a crop classification pipeline using Random Forest and Sentinel-2 multispectral bands. Achieved 89.22% accuracy in categorizing key crops in the state of El Gezira. Analysis provided area estimates for strategic planning on food security.
- Developed predictive yield models by combining satellite data with ground truth data from surveys. Models were used by clients like FGM International to monitor crop health and compare seed performance.

- Led migration of the company's crop monitoring platform from a licensed solution to open source. Reduced costs and enabled greater customization.
- Managed interns, provided technical guidance, wrote project proposals, and maintained existing data solutions. Contributed to various agricultural projects using remote sensing and ML.

CODE Software <div align="right">Sudan, Khartoum</div>

Full Stack Developer <div align="right">*Dec 2020 − Jun 2021*</div>

- Worked as Full stack developer to provide specialized solutions in web development, systems integrations, process management systems, mobile development
- Migrated Sudatel's Direct Carrier Billing -a type of online payment that allows consumers to charge the cost of a purchase to their phone bill,- from Java to GoLang. This enabled more flexibility in implementing concurrent modules of the system, which resulted in a 10% increase in revenue for Sudatel's Anghami subscription service.
- Improved the company's internal Code Management System (CMS) web application. By using a micro-service structure (rather than the monolithic), the CMS became easier to reuse in many sites and blogs. I also add a central dashboard to monitor all of the companies applications statuses and send alerts in case of failures. The CMS is implemented in GoLang and NodeJs

Research Experience

University College Dublin <div align="right">Remote</div>

Research Assistant <div align="right">*Mar 2021 − Aug 2021*</div>

- Evaluated and compared performance of neural networks with conventional output layer against neural networks utilizing the Kasami Orthogonal Classification Layer (KOCL) in the task of multi-label image classification.
- Our work extended neural networks trained on single class data to provide classification output for multi-label data without further training. The results were presented in the NLDL2022 conference

Baylasan Innovation Production <div align="right">Khartoum, Sudan</div>

Research Intern <div align="right">*Jan 2020 − May 2020*</div>

- Identified, analyzed and reported on potential directions for the data science and machine learning department.
- Acted as a second author in the paper presented by the department based on the Global Innovation Index at ICLR2020, handling the models comparison on the Innovation Output Sub-index.

Publications

- **Training with Single Class Images and Generalizing for Multi-Class Images using Kasami Orthogonal Classification Layer.**
  Mohamed Saadeldin, Ammar Nasr, Amel AbdElraheem, Arjun Pakrashi, Brian MacNamee.
  Northern Lights Deep Learning Conference (NLDL) 2022.

- **SemGAN: Text to Image Synthesis from Text Semantics using Attentional GANs**
  Ammar Nasr, Ruba Mutasim, and Hiba Imam.
  International Conference on Computer, Control, Electrical, and Electronics Engineering (ICCCEEE), 2021.

- **Modeling, Visualization, and Analysis of African Innovation Performance.**
  Muhammad Omer, Moayad El-Amin, Ammar Nasr, Rami Ahmed.
  International Conference on Learning Representation (ICLR), 2020.

Awards & Achievements

National University Admission Exam: Ranked 16th in Mathematics and Science among 600,000 candidates.

Sudan Outstanding Success Scholarship: Granted Full Scholarship for Bachelor Degree For Excellence in the Nationwide University Admission Exam by the Ministry of Higher Education

Skills

Programming: C, C++, Java, Python, GoLang, JavaScript, MySQL

Technologies: Git, AWS, PyTorch, HuggingFace, Streamlit, GCP, Blender

Languages: Arabic (Native), English (Professional), German (Elementary)