

# Ammar Khairi

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## EDUCATION

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### The University Of Edinburgh

*M.Sc. in Artificial Intelligence; GPA: -/10*

Edinburgh, UK

*Sep 2022 – Sep 2023 (Expected)*

### University of Khartoum

*B.Sc. in Electrical and Electronics Engineering; GPA: 8.64/10*

Khartoum, Sudan

*Sep 2014 – Jun 2020*

### S.M.A Model High School

*High School Diploma; GPA: 95.40/100*

Khartoum, Sudan

*Sep 2011 – Jun 2014*

## WORK EXPERIENCE

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### School of Informatics, The University of Edinburgh

*Teaching Assistant*

Edinburgh, UK

*Jan 2023 – Present*

- Worked as TA with Dr. Amir Vaxman for the Computer Graphics Course which introduces classic and state-of-the-art methodology in computer graphics.
- I was responsible for the coursework in which we designed three programming exercises -a skeleton code and an automatic self-checker- each covering a single major algorithm learned in class.

### AmunData, Data-Driven Research, and Advisory

*Data Scientist*

Khartoum, Sudan

*Jan 2022 – September 2022*

- Designed and implemented services primarily focused on precision agriculture using remote sensing data.
- Developed a web application that analyzes time-series satellite data as well as field measurements to provide our clients with real-time crop monitoring.
- Used Sentinel-2 satellite imagery to estimate yield of seven cash crops in different states of Sudan. Total area covered was calculated through image classification, verified and crossed checked through primary data (surveys). The Final report was used by some of the major companies and The Food and Agriculture Organization of the United Nations in Sudan FAO.
- Created a tool to estimate a field's expected production and fertilizer through satellite imagery and on-site data.

### KooshLyncs For Software Solutions

*Backend Developer*

Sudan, Khartoum

*Jul 2021 – Dec 2021*

- Worked in the fin-tech sector to develop an online marketplace for Sudan.
- Designed the company's back-end microservices for data storage, authentication and third-party integration. The services were implemented in GoLang and hosted on AWS Elastic Beans to ensure performance and scalability

### CODE Software

*Full Stack Developer*

Sudan, Khartoum

*Dec 2020 – Jun 2021*

- 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

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### University College Dublin

*Research Assistant*

Dublin, Ireland

*Mar 2022 – Aug 2022*

- Worked with DR Mohamed Saadeldin -Assistant Professor in School of Computer Science, UCD- on a project about multi-label image classification.
- 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

Research Intern

Khartoum, Sudan

Jan 2020 – May 2020

- 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.

## AWARDS & ACHIEVEMENTS

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**National University Admission Exam:** Ranked 16<sup>th</sup> in Mathematics and Science among 600,000 candidates with a test score of 95.04/500.

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

## PROJECTS

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### Fine-tuning LLM for Multilingual Code Generation | [GitHub](#)

- My MSc thesis project to optimally extend Small code LLMs to new programming language.
- Used LoRa adaptors to increase the Efficiency of the fine-tuning process.

### SemGAN Project | [GitHub](#)

- My BSc thesis Project to train text-to-image Model From scratch
- I use Attn-GAN architecture, and I added to it text encode an semantic embedding module that gives the model ability to handle longer inputs better.
- My Work got a distinction and was published ICCCEEE2021 Conference

### Crop Health Monitoring | [GitHub](#)

- An Open Source Project that anyone can use to monitor their fields health and growth stage development
- The project is a part of commercial tool used by companies like DAL Group in a professional manner.
- I used Sentinel-2 imagery, python, Streamlit, GeoPandas and JavaScript to create a web-app as a demo for the product

### Multilingual Image Captioner | [GitHub](#)

- The first multilingual captioning system on English, Arabic, and German, we used CLIP as an encoder for the images and trained GPT2 with four adapters each on a specific language.
- The Project achieved SOTA results in under-represented languages and got distinction in my master's Machine Learning Practical course

### Knowledge-Based QA system upgrade | [GitHub](#)

- Our proposal was awarded \$20,000 to update Enigma knowledge-based question answering service to be more cost-effective in training and deployment
- We used LoRa in our Similarity models to make the service scalable and more affordable to small businesses.
- I was responsible for the research and development of the new training and evaluation methods

## SKILLS

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

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

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

## RELEVANT COURSEWORK

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**Major coursework:** Calculus I-II, Matrix Theory, Differential Equations, Materials Science, Electrical Circuits I-II, Digital System Design, Numerical Methods, Probability Theory, Electronics I-II, Signals and Systems, Electromagnetic Field Theory, Energy Conversion, System Dynamics and Control, Communication Engineering

**Minor coursework:** Discrete Computational Structures, Introduction to Object-Oriented Programming, Data Structures and Algorithms