

# Marvin Jagen

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## Education

2018 – 2022      **B.Sc. in Electrical Engineering**, CEDAT, Makerere University, Kampala, Uganda.  
Final Year Project: *An Internet of Things-based Smart Water Meter with Machine Learning-aided Water Quality Assessment.*

## Employment History

2023 – Date      **Backend Software Engineer.** Makerere Centre for Artificial Intelligence, College of Computing and Information Sciences (COCIS), Makerere University, Kampala, Uganda.

### Key Responsibilities

- Lead design, development, and deployment of core back-end infrastructure for research platforms.
- Maintain and secure cloud-hosted servers, including performing regular security hardening.

### Key Research Projects

- *Open Source Health Information Exchange for Cervical Cancer Screening* — Led backend architecture, implementation, and deployment of a machine learning-enabled system tailored for low-resource environments.
- *Google Amplify Initiative: Localized Data Platform for Globalized AI* - Responsible for the development and implementation of the back-end of a scalable data collection and annotation platform.
- *NLP for Mental Health in Uganda and Tanzania* - Design and deployed a back-end system that integrates with IVR and machine learning models to support the delivery of mental health services.

2022 – 2024      **Backend Software Engineer.** Marconi Research and Innovation Laboratory, College of Engineering, Design, Art, and Technology (CEDAT), Makerere University, Kampala, Uganda.

### Key Responsibilities

- Designed and deployed an end-to-end ETL pipeline for large-scale chest radiograph image upload and annotation.

### Key Research Projects

- *Lacuna TB Chest X-ray Project* — Developed an AI-ready dataset to support tuberculosis screening in low-resource settings. Led the design and development of the image annotation protocol and the data ingestion pipeline.

## Employment History (continued)

2022 – 2023      **Frontend Software Engineer** EmergentAI, Janani Luwum Church House, Kampala, Uganda.

### Key Responsibilities

- Designed, developed and deployed the official EmergentAI website using Django.

2021 – 2022      **Research Intern** Netlabs!UG, College of Engineering, Design, Art, and Technology (CEDAT), Makerere University, Kampala, Uganda.

### Key Responsibilities

- Supported field research and data collection for applied technology and digital inclusion projects.
- Assisted in the development, training, and testing of digital solutions for underserved communities.

### Key Research Projects

- *Machine Learning for COVID-19 Screening in Uganda* — Supported data collection of biometric and air quality indicators (heart rate, temperature, and breath-based VOCs).
- *Audience Research for Community Radio in Uganda* - Helped design and implement data collection tools in KoboToolbox to track radio listening patterns.
- *IEEE Digital Literacy Initiative for Rural Schools* — Participated in training primary school students in basic computer literacy and programming using Scratch.
- *IEEE IoT Integration in Rural Schools* — Contributed to the design of a sensor-based system to monitor the use of wells, tested in the Apac district.

## Research Publications

### Journal Articles

- 1 Q. M. Rashid, E. van Liemt, T. Shih, *et al.*, “Amplify initiative: Building a localized data platform for globalized ai,” *arXiv preprint arXiv:2504.14105*, 2025.

### Conference Proceedings

- 1 **M. Jagen**, J. Ariiho, E. Mugume, and D. K. Okello, “An internet of things-based smart water meter with machine learning-aided water quality assessment,” in *2023 IEEE AFRICON*, IEEE, 2023, pp. 1–6.

## Participation in Conferences and Workshops

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|----------------|---|
| June 2024      | <b>Data Science Africa</b> , Nyeri, Kenya.<br>Attended the Summer School and Workshop, gaining hands-on training in Machine Learning techniques for both Computer Vision and Natural Language Processing applications.  |
| September 2023 | <b>IEEE AFRICON</b> , Nairobi, Kenya.<br>Presented a paper and poster titled <i>An Internet of Things-based Smart Water Meter with Machine Learning-aided Water Quality Assessment</i> .  |
| November 2022  | <b>Makerere Engineering Society Incubation in association with StartHub, Africa</b> , Kampala, Uganda.<br>Pitched a digital platform designed to support farmers by providing access to agricultural information, including weather forecasts, recommended pesticides, and other relevant products and made it to the Semifinals. |

## Training and Certification

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|------|---|
| 2024 | <b>Good Clinical Practice Certificate of completion.</b> NDAT CTN Clinical Coordinating Center  |
| 2023 | <b>IEEE Certificate of appreciation.</b> Presentation of an IoT-based Smart Water with Machine Learning-aided Water Quality Assessment, IEEE AFRICON 2023.  |
| 2020 | <b>Coursera: Certificate of completion of Python Programming: A concise Introduction.</b> Taught by Bill Boyd , Wesleyan University.<br><b>Coursera: Certificate of completion of Writing skills for Engineering leaders.</b> Taught by Gayle Moran, and Beata Krupa, Rice University.<br><b>Coursera: Certificate of completion of Communication strategies for a Virtual Age.</b> Taught by Ivan Waris Ruiz, University of Toronto.<br><b>Certificate of student membership in Uganda Institute of Professional Engineers (UIPE).</b> |

## Skills

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|-----------------|--|
| Languages       | English, Japanese, Luganda.  |
| Programming     | Python, C, C++   |
| Databases       | PostgreSQL, MySQL.   |
| Web Development | HTML, CSS, JavaScript, FastAPI, Vue, Django.   |
| Cloud computing | Google Cloud Platform, Hostinger, DigitalOcean.  |
| Version Control | Git, GitHub, GitLab  |
| Misc.           | Academic research, teaching, training, L <sup>A</sup> T <sub>E</sub> X typesetting and publishing. |

## Miscellaneous

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### Ongoing Work

- 2024 – date      **Development of an Open-Source Private Health Information Exchange System Enhanced with Machine Learning for Cervical Cancer Screening in Low-Resource Settings.** Ongoing development of a secure health data exchange platform integrating ML-assisted cervical cancer screening support in low-resource healthcare environments.
- 2023 – date      **Lacuna TB Chest X-ray Project — Development of an AI-ready Dataset to Support Tuberculosis Screening in Low-Resource Settings.** Contributing to the design and annotation of a digital chest X-ray dataset for AI-driven TB screening in low-resource settings. A research paper on the methodology and findings is currently in preparation.

## References

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| <b>Dr. Andrew Katumba</b><br>Senior Lecturer, Department of Electrical and<br>Computer Engineering,<br>CEDAT, Makerere University,<br>Email: <a href="mailto:andrew.katumba@mak.ac.ug">andrew.katumba@mak.ac.ug</a><br>Phone: +256 784343505 | <b>Dr. Joyce Nabende</b><br>Senior Lecturer, Department of Computer Sci-<br>ence,<br>COCIS, Makerere University,<br>Email: <a href="mailto:joyce.nabende@mak.ac.ug">joyce.nabende@mak.ac.ug</a><br>Phone: +256 776555992          |
| <b>Dr. Edwin Mugume</b><br>Senior Lecturer, Department of Electrical and<br>Computer Engineering,<br>CEDAT, Makerere University,<br>Email: <a href="mailto:edwin.mugume@mak.ac.ug">edwin.mugume@mak.ac.ug</a><br>Phone: +256 784031622       | <b>Eng. Dr. Dorothy Okello</b><br>Associate Professor, Dean, School of Engineer-<br>ing,<br>CEDAT, Makerere University,<br>Email: <a href="mailto:dorothy.okello@mak.ac.ug">dorothy.okello@mak.ac.ug</a><br>Phone: +256 772957550 |

### Declaration

I hereby declare that the information provided above is true and correct to the best of my knowledge and belief.

**Signed:**      Marvin Jagen

**Date:**      August 3, 2025