SAMUKELO MKHIZE

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SUMMARY

Computer Science Honours graduate from the University of KwaZulu-Natal with applied expertise in artificial intelligence, machine learning, IoT systems, and full-stack software engineering. Experienced in developing data-driven and intelligent applications, conducting empirical research, and supporting academic instruction. Skilled in designing scalable system architectures, implementing optimization-driven models, and integrating intelligent components into real-world environments.

EDUCATION

Bachelor of Science Honours in Computer Science   **Feb 2025 - Dec 2025**

University of KwaZulu-Natal, Durban, South Africa
- Research: Water Pipeline Leak Prediction Using Deep Learning
- Advanced Coursework: Quantum Computing, IoT, ML, AI, Ontologies, Image Processing

Bachelor of Science in Computer Science & Information Technology   **Mar 2021 - Dec 2024**

University of KwaZulu-Natal, Durban, South Africa
- Relevant coursework in Comp Sci and Information Systems

EXPERIENCE

Undergraduate Tutor | *University of KwaZulu-Natal*   **Jul 2023 - Oct 2025**

- Assisted undergraduate students in programming, data structures, and artificial intelligence, improving understanding and pass rates.
- Explained complex concepts such as finite automata, Turing machines, & algorithm efficiency in simplified terms.
- Designed structured lesson plans and provided one-on-one mentorship to guide students through assignments and exam preparation.

Virtual Intern | *Quantify Your Future*   **Jan 2024 - Feb 2024**

- Participated in team-based, industry-aligned projects facilitated by Absa, FNB, FirstRand, and Nedbank, simulating real-world business and data problems.
- Performed data framing, exploration, analysis, modeling, and visualization using R, translating raw data into interpretable insights.
- Strengthened analytical thinking, collaboration, and communication skills through structured problem-solving and peer-reviewed deliverable.

Full Stack Software Developer | Freelance   **Dec 2025 - Present**

Bego E-Commerce Platform
- Engineered a full-stack B2C e-commerce platform using .NET 8, Blazor, and Azure SQL Database, delivering end-to-end functionality from cloud-hosted data storage to a responsive frontend built with Tailwind CSS.
- Implemented secure identity and access management using ASP.NET Core Identity, including email verification, password reset flows, and role-based authorization.
- Designed a scalable data access layer with Entity Framework Core, optimizing queries and indexes to support efficient product catalog filtering and real-time inventory updates.
- Configured and managed Azure SQL Database connectivity, including environment-based connection strings, database migrations, firewall access rules, and performance considerations (indexing and resource utilization).
- Developed an admin CMS dashboard enabling non-technical users to manage products, categories, and stock levels efficiently, reducing operational overhead.

SKILLS

Programming Languages: C#, Python, Java, C++, SQL
Web & Application Development: Blazor (Server & WebAssembly), ASP.NET Core 8, React.js, Tailwind CSS, HTML5, JavaScript
Backend & Databases: Entity Framework Core, ASP.NET Core Identity, Microsoft SQL Server, PostgreSQL (Azure), MySQL
Cloud & DevOps: Microsoft Azure (Fundamentals), AWS (Data Engineering), Docker, Linux, Git
Machine Learning & Data: TensorFlow, PyTorch, Scikit-Learn, Pandas, NumPy, OpenCV, Power BI, Matplotlib
Software Engineering Concepts: Object-Oriented Programming (OOP), Data Structures & Algorithms, Systems Analysis & Design, RESTful API Design
Professional Skills: Communication, Critical Thinking, Problem Solving, Team Collaboration, Project Management

PROJECTS

Water Pipeline Leak Prediction Using Deep Learning (Honours Project)
Developed and evaluated a comparative and multimodal learning framework for pipeline leak prediction using historical Umgeni Water data. Established a Logistic Regression baseline, then implemented Tabular MLP and Text-based BiLSTM models. Designed a Fusion BiLSTM combining tabular and textual features to improve predictive performance. Implemented the full machine learning pipeline, including data preprocessing, hyperparameter optimisation, and model evaluation.

Quanvolutional Neural Network – Quantum Machine Learning
Implemented a hybrid quantum–classical neural network using PennyLane for image classification. Extended baseline models by experimenting with circuit depth and variational parameters, and documented results in a literate Jupyter Notebook.

Student Rent Reconciliation Bot (Python Automation)
Built a Python automation tool to process rental payments, reconcile records, detect discrepancies, and generate summary reports, significantly reducing manual financial verification.

Appointment Management System (.NET / ASP.NET, Power BI)
Developed a full-stack medical practice management system supporting patient scheduling, appointment tracking, and reporting. Integrated a SQL Server backend and Power BI dashboards for analytics and decision support.

Retrieval-Augmented Personal Chatbot (Python, LangChain, Streamlit)
Designed a RAG-based chatbot capable of answering interview-style questions using personal documents and CV data. Integrated LangChain for retrieval and deployed an interactive web interface using Streamlit.

Cloud Computing Ontology (OWL 2 DL, Protégé)
Designed a semantic ontology modelling cloud resources, service models, and relationships using OWL 2 DL. Enabled automated reasoning, consistency checking, and improved interoperability through Protégé.

Find out more from the links provided at the beginning

CERTIFICATIONS
- Data Engineering on AWS – Foundations │ AWS Training & Certification (Dec 2025)
- Microsoft Azure Data Fundamentals │ Microsoft / Mecer Inter-Ed (Jun 2025)
- Quantify Your Future Virtual Internship │ Absa, FirstRand, FNB & Nedbank (Apr 2024)

REFERENCES
- Prof Okuthe Paul Kogeda │ KogedaO@ukzn.ac.za │ 0312601176
- Sue Price │ Pricec@ukzn.ac.za │ 0312603162