

# Sipho Alex Mahlangu

Motivated Computer Systems Engineering graduate with expertise in programming, software development, system analysis, and embedded systems design. Proficient in debugging, optimizing applications, and working across the Software Development Lifecycle (SDLC). Skilled in multiple programming languages and delivering efficient technical solutions. Strong problem-solving and critical-thinking abilities, with a passion for innovation. Eager to contribute to software engineering, development, or systems analysis roles in the tech industry.

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## Education

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02/2020 – 08/2024 Pretoria, South Africa	<b>Diploma: Computer Systems Engineering</b> <i>Tshwane University of Technology</i> <ul style="list-style-type: none"><li>Focus: Software Engineering, Data Structures, AI, Networking, Operating Systems</li><li>Key projects included full-stack systems with real-time data and AI integration</li><li>Final year project aligned with scalable systems and automation</li></ul>
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02/2012 – 11/2014 Soshanguve, South Africa	<b>Matric Certificate</b> <i>Hlanganani Secondary School</i>
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## Professional Experience

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02/2024 – present Pretoria, South Africa	<b>Software Engineer (AI)</b> <i>4IR-TUT</i> <ul style="list-style-type: none"><li>Developed and deployed full-stack systems across healthcare and agriculture using C#, Python, and React.</li><li>Built RESTful APIs and integrated systems using Flask and Express with SQL/MySQL backend.</li><li>Created AI tools for medical diagnostics and agriculture, applying deep learning models (YOLOv8-YOLOv12, CNNs).</li><li>Deployed cloud-native applications using AWS EC2, ECS, Lambda, S3, and API Gateway.</li><li>Integrated OpenAI and external APIs (Google Maps) into business-facing applications.</li><li>Followed Agile methodology for sprint-based development and collaborated with cross-functional teams.</li><li>Applied version control and conducted peer code reviews using Git and GitHub.</li></ul>
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## Skills

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### Web & App Development

- React, Node.js, Flask, HTML/CSS, Firebase

### Databases:

MySQL, SQLite

### Programming (Academic):

Python, Java, C++, JavaScript, SQL, C#

### Tools & Platforms

Git, Docker, Postman, Linux, VS Code

### AWS Deployment Services

AWS (ECS, EC2, Lambda, S3, Elastic Beanstalk, CodeDeploy, CloudFront, API Gateway), Firebase (basic). Deployed scalable web and mobile apps using containerization and serverless architectures. Used S3 and CloudFront for static file and asset hosting. Managed CI/CD pipelines with CodeDeploy and CodePipeline. Integrated REST APIs via API Gateway and secured deployments using IAM best practices.

### Core Competencies

- Analytical & Problem Solving Skills
- Communication & Collaboration
- Agile Project Delivery
- Clean Code & Scalable Architecture
- Continuous Integration & Deployment

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## Awards

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01/09/2024

### IBM Datathon Participation

IBM

AI in Mental Health Project Developed an AT system that analyzes text, speech, and behavioral data to detect early signs of mental health issues like depression and anxiety. Utilized machine learning and NLP for sentiment analysis and real-time feedback. Provides personalized recommendations to support mental well-being. Aims to improve accessibility to mental health resources. Focused on proactive intervention for early diagnosis and support.

01/10/2024

### BRICS Skills Development and Technology Innovation

Competition (South Africa),

BRICS Bronze Prize (AT-Powered Pneumonia Detection with Heatmaps) Developed a deep learning model using CNNs to detect pneumonia from chest X-ray images with high accuracy. Integrated GradCAM for heatmap visualization, providing interpretable insights by highlighting affected areas. Designed for efficient, real-time diagnosis to assist healthcare providers. Features a user-friendly interface for seamless image uploads and predictions. Demonstrates the power of AI in improving medical diagnostics and early intervention.

## Projects

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### Smart Agriculture Dashboard

Technologies: YOLOv8, Flask, React, Google Maps API

- Created a cross-platform application to detect plant diseases and visualize field data in real time.
- Integrated geolocation features with Google Maps API, reflecting skills in external API integration.
- Delivered a responsive, interactive UI aligned with end-user needs, improving operational decision-making.

### AI Health Diagnostic Tool

Technologies: Flask, TensorFlow, OpenAI, React, AWS

- Developed a mobile-first health diagnostic app from start to finish, showcasing full-stack development skills.
- Used convolutional neural networks (CNNs) to analyze medical images (e.g., pneumonia, skin cancer).
- Integrated OpenAI to generate preventive care recommendations, demonstrating ability to use modern AI tools.
- Deployed using AWS ECS, highlighting experience with scalable, cloud-based deployment strategies.

## Alda – Accessibility Assistant App

*Technologies: Python, React, Text-to-Speech APIs*

- Built an accessibility-focused desktop and mobile tool for users with disabilities, addressing inclusive design needs.
- Implemented speech recognition and text-to-speech features to enhance usability.
- Added practical tools (calculator, calendar, French PDF reader) to support day-to-day tasks, showcasing versatility and user-centered development.

## Certificates

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### Full StackWeb developer Fundamentals

- Gained expertise in front-end technologies, including HTML, CSS, and JavaScript.
- Developed back-end skills using Python and the Django framework.
- Built dynamic, data driven web applications with secure user authentication.
- Learned to manage and query databases using Django's ORM.
- Acquired knowledge in designing and integrating RESTful APIs.
- Practiced software design principles and best practices for scalable applications.
- Gained hands-on experience with deployment strategies for web applications.

### CXI-Africa Cloud computing(AWS)

- Learned how to use AWS services such as EC2, S3, Lambda, and VPC for deploying and scaling cloud applications.
- Worked on projects to build, secure, and manage cloud-based infrastructure, with emphasis on network configuration and access control.
- Collaborated with classmates on real-world cloud and networking tasks, including virtual networking, routing, and subnetting.
- Gained skills in cloud architecture, automation, and network troubleshooting, focusing on availability, latency, and connectivity.
- Developed scripts to automate routine tasks using AWS CLI and SDKs, including configuring security groups, VPC peering, and routing tables.
- Monitored and optimized cloud and network resources for cost efficiency, performance, and security using tools like CloudWatch and Wireshark.
- Assisted in setting up and managing VPNs, NAT gateways, and elastic load balancers within AWS environments.
- Learned about disaster recovery, high availability, and network fault tolerance strategies in cloud deployments.
- Created detailed documentation and user guides for cloud-based and network-integrated solutions.

## References

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**Prof Pius,** Assistant Dean, Tshwane University of Technology

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