CURRICULUM VITAE
Relebohile Motaung

OBJECTIVE

Dynamic Mechanical Engineering graduate with expertise in Artificial Intelligence, Machine Learning, Generative AI, and Computer Vision. Proficient in developing innovative solutions using LLMs, Vision Transformers, and advanced machine learning techniques. Hands-on experience in AI applications for image processing, predictive modelling, recommendation systems, and multi-agent systems. Certified in Generative AI and Computer Vision, with a strong passion for combining technical and analytical skills to solve real-world challenges.

PERSONAL DETAILS

Surname:	Motaung
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EDUCATION

High school

Institution:	New Horizon College
Period:	2010-2014
Qualification:	Grade 12(Matric)
Subjects:	Life sciences, Sesotho, CAT, mathematics, physical science, life orientation and english.

Tertiary Education

Institution:	Itemoheleng TVET College
Period:	2015
Qualification:	N1
Completed subjects:	Engineering science 1
	Fitting 1
	Mathematics 1
	Drawing 1

Institution:	Central University of Technology
Period:	2015-2023
Qualification:	National diploma mechanical engineering
Completed subjects:	Communication skills
	Computer skills 1 (Microsoft Word, Excel and PowerPoint)
	Engineering design 2 and 3 (group project design)
	Mechanics 1

Strength of materials 2 and 3
Mechanics of machines 2 and 3
Electrotechnology 1 and 2(components, biasing, rectification, regulation...)
Thermodynamics 2 and 3 (telecommunication technologies
Fluid Mechanics 2 and 3 (microcontroller programming)
Hydraulics 3
Steam plant 3
Mathematics 1, 2 and 3
Materials 1

Certifications:

- **Machine learning –** Simplilearn
- **Deep learning –** Simplilearn
- **Computer Vision with Roboflow -** Euron
- **Generative AI Series –** Euron
- **OpenCV Bootcamp –** OpenCV University
- **Mathematics for Machine Learning –** Great Leaning Academy
- **Artificial Intelligence Projects** – Great Learning Academy
- **AI in Digital Marketing** – Great Learning Academy
- **Digital Marketing Strategy** – Great Learning Academy
- **Project Management** – Great Learning Academy
- **ChatGPT for Marketing** – Great Learning Academy
- **Generative AI for Beginners** – Great Learning Academy
- **Prompt Engineering for ChatGPT** – Great Learning Academy
- **UI/UX for Beginners** – Great Learning Academy

Achievements:

2009-RCL New Horizon College(primary)
2011- Best Orator Junior
2012-Gold Eskom Expo for young scientists(regional)
2012- Best project in the category(regional)
2013-Silver Eskom Expo for young scientists(regional)
2013-Bronze Eskom Expo for young scientists(International)
2013- RCL New Horizon College(Senior)
2014- Silver Eskom Expo for young scientists
2014-RCL New Horizon College(High school)

Positions of leadership

2004-2008 Sunday school leader(Gospel Fire Church)
2009- RCL New Horizon College(primary)
2009-2011 youth treasurer(Gospel Fire Church)
2012-2014 youth leader(New Vision Ministries)
2013- RCL New Horizon College(High school)
2014- RCL New Horizon College(High school)

Skills:

TECHNICAL SKILLS

- **Programming Languages**: Python, JavaScript, HTML, CSS,C++
- **Machine Learning**: Linear Regression, Classification, Lasso Regression, Outlier Detection, Predictive Modeling, Clustering, Recommendation Systems
- **Deep Learning & Generative AI**: Neural Networks, Text-to-Speech, Text-to-Image Generation, Multi-Agent Systems, LLMs
- **Libraries/Tools**: Scikit-learn, TensorFlow, Keras, OpenCV, Flask, FastAPI, ngrok, LangGraph, Hugging Face, Pandas, Matplotlib, Seaborn
- **Other**: NLP, Web Scraping, Data Analysis, Digital Marketing, Project Management, SEO, email marketing, SQL, soft-skills, teamwork, Vertex AI(GCP), RAG.

Machine Learning & AI Projects

ResearchBot using LLMs and RAGs

- Designed and implemented a ResearchBot leveraging Large Language Models (LLMs) and Retrieval-Augmented Generation (RAGs) to assist in conducting in-depth research, demonstrating advanced natural language processing capabilities.
- https://colab.research.google.com/drive/1I9AOysXHSqPagmSuv-qPSTH-HaVa4n3p

LangGraph Multi-Agent Systems

- Built a multi-agent system for retrieval-augmented generation (**RAG**) using LangGraph and ASTADB to handle complex data interactions across multiple AI agents.
- Developed a chatbot with LangGraph for engaging and context-aware conversations, with adaptive responses based on user input.
- **Tools**: LangGraph, ASTADB
- [Copy of Multi AI Agents RAG with LangGraph.ipynb - Colab](#)

Movie Recommendation System

- Designed a comprehensive movie recommendation engine with content-based, popularity-based, and collaborative filtering methods, using **cosine similarity** for personalized recommendations.
- **Tools**: Python, Scikit-learn,gradio,matplotlib,
- [Movie Recommendation.ipynb - Colab](#)

House Price Prediction Model

- Created a machine learning model using **lasso regression** for house price predictions, integrating outlier detection to improve accuracy. Deployed the model with **Flask** for user-friendly access.
- **Tools**: Scikit-learn, Flask, Pandas, Matplotlib
- [Real Estate Price Prediction .ipynb - Colab](#)

Diabetes Prediction Model

- Built a model to predict diabetes likelihood using FastAPI for fast, accessible deployment, with **ngrok** for secure public access.
- **Tools**: Scikit-learn, FastAPI, ngrok
- [Diabetes.ipynb - Colab](#)

- **LLM Agent (Google Colab)**
  Developed an LLM agent capable of interacting with CSV files for data extraction and querying.
  Tools: Python, Google Colab, CSV Handling
- [Langraph With Astradb.ipynb - Colab](#)

Medical Chatbot Using LLMs

- Developed an intelligent chatbot using LLMs and deployed it on Google Vertex AI to assist with health-related queries.

Loan Prediction Model

- Implemented a predictive model to assess loan approval likelihood based on customer profiles and financial history.
- Created a predictive model for loan approvals using FastAPI. Tested five machine learning models and finalized the RandomForest classifier for its superior accuracy and performance, providing a robust solution for financial institutions.
- https://colab.research.google.com/drive/1jGVhAhmpcp77_NaOj36BXIsrbHXFxM_7

Customer Segmentation Using K-Means Clustering

- **Objective:** Implemented customer segmentation for a retail company to improve targeted marketing strategies.
- **Skills:** K-Means Clustering, Data Preprocessing, Scikit-learn, Matplotlib.
- **Impact:** Identified distinct customer groups based on purchasing behavior, improving marketing efforts and customer retention.

https://colab.research.google.com/drive/1L8cqRRlTcQIVryWMnL8eXp4PEAnNdrP5

Sentiment Analysis

- Built an application to analyze and classify movie reviews into positive or negative sentiments using Gradio for deployment, ensuring user-friendly access to sentiment predictions.
- Sentiment Analysis - Colab

Computer Vision Projects

Traffic sign detection using Yolov8

- Designed and trained a YOLOv8 model to accurately detect and classify traffic signs in various environmental conditions.
- **Tools**: Python, OpenCV, numpy, matplotlib seaborn.
- Traffic.ipynb - Colab

Face Mask Detection Using Deep Learning(CNN)

- Developed a binary classification model using TensorFlow/Keras to identify individuals wearing face masks.
- Achieved an accuracy of **92%** through hyperparameter tuning and data augmentation.
- Built a computer vision application to detect faces in real-time using OpenCV's Haar cascades and classify them using the trained model.
- **Tools**: OpenCV, tensorflow, matplotlib
- [Face Mask Classification.ipynb - Colab](#)

Data Annotation for Image Segmentation

- Created a data annotation system for video-based **image segmentation** using **Ultralytics** and **Segment Anything Model (SAM).**
- Successfully detected and segmented cars in video streams, achieving accurate object segmentation in dynamic environments.
- Leveraged SAM for pixel-accurate segmentation and Ultralytics for object detection, combining these tools for high-quality results
- **Tools**: Ultralytics, SAM, Python, cv2, matplotlib
- [Auto Data Annotation for image segmentation.ipynb - Colab](#)

Metal Defect Inspection Using Softmax Classifier

- Designed a multi-class classification model with TensorFlow/Keras to identify defects in metal surfaces.
- Preprocessed a dataset of metal images, including resizing, normalization, and augmentation for robust training.
- Achieved a classification accuracy of **100%**, distinguishing between 6 number of classes(defects).
- **Tools**: OpenCV, Python, tensorflow, matplotlib, CNN.
- [Metal Surface Detects.ipynb - Colab](#)

Brain Tumor Detection Using CNN

- Built a CNN model to classify brain tumor types from MRI images with high precision.
- Employed advanced techniques like data augmentation and transfer learning to enhance model accuracy.

- Created a user-friendly **Gradio** interface for medical professionals to use the model seamlessly.

References

1. Nthabiseng Motaung (Pastor) - 072 818 6963
2. Carissa Pieters(Cell Leader) - 061 295 9470