Kwabena Kwayisi KISSIEDU

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EDUCATION

Bachelor Of Science in Civil Engineering (First Class Honors), GPA:3.74

September 2019 – August 2023

Kwame Nkrumah University of Science and Technology (KNUST)

Kumasi, Ghana

Relevant Coursework: Reinforced Concrete Design, Steel and Timber Design, Structural Dynamics, Structural Engineering, Computer Programming (Python), Systems Engineering II (Intro to Finite Element Analysis)

RESEARCH INTERESTS

- Physics-Informed and Generative Models for Damage Simulation and Synthetic Data Generation
- AI-Driven Geometric Digital Twins and Robotics
- Computer Vision for Structural Assessment
- Al for Sustainable Materials and Additive Manufacturing

RESEARCH / PROJECT EXPERIENCE

Personal Research Projects

March 2024 - Present

Concrete Crack Segmentation model GitHub

- Achieved a high-performance Dice Score of 0.93 on the test set by developing a U-Net based semantic segmentation model in PyTorch, enhanced with attention mechanisms for precise pixel-level damage localization.
- Implemented calculated class weighting to effectively handle inherent class imbalance in the crack dataset.

Construction Site Safety Detection model GitHub

- Developed a real-time safety detection model using YOLOv8 to automatically detect the presence or absence of Personal Protective Equipment (PPE) such as helmets and safety vests.
- This model serves as a foundation for a more advanced system incorporating dense captioning to provide contextual risk assessment, moving from simple detection to intelligent scene understanding.

Traffic Car Counter model: GitHub

- Developed an end-to-end, real-time vehicle monitoring system using YOLOv8 for multi-class object detection (cars, trucks, buses) and the SORT algorithm for robust object tracking.
- The system accurately counts vehicles crossing a user-defined virtual line, achieving 99% vehicle counting accuracy on test footage, demonstrating core competencies in video stream processing.

Concrete Strength Prediction Model: GitHub

- Applied machine learning to a practical problem by developing a Random Forest Regression model to predict concrete compressive strength.
- The model was successfully used to identify and implement a concrete mix with a 10% higher predicted strength for a live construction project (The Ark Phase 2 project, Oak Plaza Suites).

Research Assistant December 2024 – Present

Fatigue Life Prediction of Locally Manufactured Steel Reinforcement Bars from Scrap Metals Using Artificial Neural Networks and Numerical Simulation

Structural Engineering Lab, Department of Civil Engineering, K.N.U.S.T. | Supervisor: Dr. Evans Amponsah

- Developing an Artificial Neural Network-based Fatigue Life prediction model using experimental fatigue test data.
- Optimizing the model for accurate Fatigue Life prediction.
- Comparing model predictions with experimental fatigue test results and numerical simulations to assess model accuracy.
- Performing sensitivity analysis to determine the influence of selected factors on Fatigue Life.

Research Assistant January 2024 – Present

Assessment of Fatigue Life of Locally Manufactured Steel Reinforcement Bars for Sustainable Construction in Ghana.

Structural Engineering Lab, Department of Civil Engineering, K.N.U.S.T. | **Supervisor:** Dr. Evans Amponsah

- Developed a numerical model to predict the fatigue life of locally manufactured rebars from scrap metals.
- Evaluating the fatigue life of locally manufactured steel reinforcement bars from scrap metals.
- Investigating the factors influencing fatigue resistance in the local manufacturing process.
- Assessing the potential for integrating locally produced bars into sustainable construction practices.

Final Year Thesis July 2023 – August 2023

Increasing Block Tariffs for water and their effect on households with shared metered connections

Kwame Nkrumah University of Science and Technology | Supervisor: Prof. Emmanuel Amponsah Donkor

• Compiled data on the tariff structures of ten countries from IB-Net.

- Developed models to estimate the water bills for a dataset of household types and water consumption.
- Created visualizations of analysis results.
- Compared tariff structures of countries under study and suggested restructuring where necessary.

PUBLICATIONS

(Upcoming 2025) - Assessment of Fatigue Life of Locally Manufactured Steel Reinforcement Bars for Sustainable Construction in Ghana.

(Upcoming 2025) - Fatigue Life Prediction of Locally Manufactured Steel Reinforcement Bars from Scrap Metals Using Artificial Neural Networks and Numerical Simulation.

TECHNICAL SKILLS

Machine Learning and Data Science

- Languages & Version Control: Python, Git
- Core Frameworks: Pytorch, Tensorflow, with a specialization in PyTorch
- Specialized Libraries: Ultralytics (YOLO), OpenCV, Keras, Scikit-learn, CVZone, Skorch, PIL, Albumentations
- Data Science and Visualization: Pandas, Seaborn, Matplotlib
- ML Operations: Data Annotation (Label Studio), Data Augmentation (Torch Transforms, Albumentations)

Structural Analysis and Simulation

View Structural Engineering Portfolio

Numerical Simulation: ABAQUS

Structural Analysis: ProtaStructure, Midas

Building Design and BIM

View Structural Engineering Portfolio

Building Information Modeling (BIM): Autodesk Revit

3D Design and Synthetic Environments

- 3D Modeling: Blender 3D
- 3D Sculpting: ZBrush
- 3D Texturing and Rendering: Substance Painter, Blender3D, Marmoset Toolbag 5
- Character Creation: Character Creator
- 3D Environment Building: Unreal Engine, Unity
- 3D Animation and Photo Editing: Adobe After Effects, Adobe Photoshop, Adobe Illustrator

Professional skills

Project supervision, Project Management

WORK EXPERIENCE

Co - Founder
The Anthracite Limited

July 2024 – Present

 Researching sustainable construction methods and providing innovative BIM solutions for structural and architectural design needs.

Driving the company's mission to pioneer construction of Ghana's first 3D printed Green Building estate.

Consultant Engineer

Consulting Steel, Roads and Concrete (SRC) Engineers

November 2023 - September 2024

- Performed structural design and detailing for a diverse portfolio of large-scale projects, including industrial, residential and medical facilities.
- Served as the representative consultant for "The Ark Phase 2" project, advising on optimum structural solutions and utilizing my ML model to resolve on-site concrete strength issues.
- Spearheaded the adoption of Autodesk Revit for structural detailing, boosting work efficiency and output presentation by about 20%.

Freelance 3D Designer

September 2023 - Present

June 2024 - Present

Dobiison Ghana Limited

 Creating high-quality 3D characters, assets and immersive VR/AR experiences for a diverse range of clients including Unilever Ghana, MTN and SuCasa Properties.

Freelance Structural Engineer

Ekodek Engineering and Construction

Collaborated on the structural design and detailing of numerous residential, commercial and public works projects using Autodesk Revit. Projects include Pineapple Hill Residential Building and Onyx Properties Warehouse.

Engineering Intern

Production Department, Contracta Construction UK

September 2021 – December 2022

- Supervised construction of retaining walls, pile foundations and composite slabs.
- Performed site surveys to map out road network for road expansion project.
- Performed checks and took stock of vehicles and construction materials.
- Diligently managed skilled and unskilled labour.
- Revised detail drawings for construction of the New Kejetia Market.
- Assisted in management of the company's project database.

TEACHING EXPERIENCE

CE 452 - Computer Applications in Civil Engineering - KNUST

June 2025 - July 2025

- Invited by Dr. Evans Amponsah to teach BIM using Revit to the final year Civil Engineering class of 300 students.
- Class lasted for a period of 3 weeks, with two sessions per week.
- Prepared a detailed course outline with tasks for each week.
- Tutored students on optimized building modeling techniques for coordination with other engineering disciplines.

Revit Tutor - SRC Engineers

May 2024

 Organized in-house training at Consulting Steel, Roads and Concrete Engineers in the use of Autodesk Revit for 3D structural design and detailing.

Revit Tutor - KSTU February 2024

- Tutored a group of industry professionals in Revit for 3D building modeling.
- Tutorials span over the course of two weeks.

CE 263 - COMPUTER AIDED DESIGN - KNUST

February 2023

Tutored a group of 50 students in the use of Autodesk AutoCAD for structural detailing.

Class Teacher - Victory Bible Church International, Shalom Sanctuary

January 2024 - present

Instructor of the Joshua Class.

AWARDS

Best Student in Civil Engineering Design (CED) Project [Structural Engineering] - 2023:

- Final year capstone project that subjects students to a real-life Civil Engineering Design (CED) project.
- Competed with 300 students across KNUST's two campuses for the spot of best student in CED.
- Won the Associated Consultancy award for second- best student in CED (Structures).

COURSERA COURSES

Supervised Machine Learning - Regression and Classification

Stanford Online & DeepLearning.ai

Advanced Learning Algorithms

Stanford Online & DeepLearning.ai

PyTorch Ultimate 2024: From Basics to Cutting-Edge

Packt

MEMBERSHIPS AND ORGANIZATIONS

National Society of Black Engineers (NSBE)

Engineers Without Borders (EWB)

Men's President - VISA KNUST (2022-2023)

Ghana Engineering Students' Association (GESA)

Men's Vice-President – VISA KNUST (2021-2022)

Civil Engineering Students' Association (CESA)

REFEREES

Available upon request.