RAPHAEL ODURO BOAFO

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Portfolio: https://raphaeloduroboafo-cs.github.io/portfolio/

EDUCATION

Kwame Nkrumah University of Science & Technology (KNUST) - Kumasi, Ghana

Bachelor of Science Mathematics, First Class | November, 2022

CWA: 89.07/100

Relevant Coursework: Numerical Methods & Computations, Probability & Statistics, Differential Equations, Partial Differential Equations, Time Series Analysis, Machine Learning Applications, Optimization Methods

RESEARCH INTEREST

Mathematical Modelling, Control Theory, Machine Learning, Stochastic Processes, Nonsmooth Optimization, Geometric Analysis, High-Performance Computation

My research bridges theoretical mathematics with applied problem-solving in urban mobility, wireless networks, geometric modelling, and probabilistic network analysis. I focus on integrating stabilization phenomena, optimization methods, and machine learning for real-world systems in engineering, data science, and applied statistics.

RESEARCH EXPERIENCE

Undergraduate Research Project – KNUST | 2022

Application of Mathematical Models in Economics

- Developed dynamic systems models using differential equations for economic forecasting.
- Applied regression analysis, time series, and machine learning techniques to model macroeconomic trends (evaluation score: 88%).

Research Assistant - University of Cape Coast, Ghana | 2023

- Contributed to statistical and machine learning modeling for economic predictions.

- Applied R and SPSS to large datasets, implementing regression and time series models to identify behavioral patterns in economic data.

Diploma Research Project - Kumasi Technical University, Kumasi - Ghana | 2018

Adoption and Impact of Accounting Software in SMEs

- Conducted statistical surveys and hypothesis testing to assess technology adoption patterns.

PROFESSIONAL EXPERIENCE

Quantitative Analyst - Apex Financial Solutions, Kumasi - Ghana | June 2022 – Present

- Develops predictive models for financial risk management using machine learning and stochastic methods, improving portfolio performance by 20%.
- Applies Monte Carlo simulations and control-based modeling to increase model accuracy by 25%.
- Collaborate with data scientists and financial analysts to optimize investment strategies based on data-driven insights.

Mathematical Consultant - TechSolve Innovations, Kumasi - Ghana | Feb. 2021 – May 2022

- Designed numerical and optimization models for engineering projects, including nonsmooth optimization for resource allocation.
- Implemented MATLAB and Python high-performance algorithms, improving computation efficiency by 25%.

Research Intern - Ghana Statistical Service - Accra, Ghana | June 2020 – Dec. 2020

- Modeled national demographic trends using probabilistic and statistical approaches.

Teaching Assistant - Department of Mathematics, KNUST | Feb. 2019 – March 2020

- Led tutorials in Probability, Statistics, and Differential Equations, integrating real-world applications such as stochastic mobility modeling and optimization.

PROJECTS

Predictive Stock Price Modeling: Developed Python-based machine learning and control-theoretic model for traffic congestion prediction.

Geometric Surface Modelling with CAS: Used Mathematica and symbolic computation to analyze curvature in evolving surfaces.

Random Walk Simulation for Network Optimization: Modelled pedestrian movement in irregular city layouts using stochastic processes.

Energy-Efficient Wireless Optimization: Created nonsmooth optimization algorithms to improve IoT network energy consumption

TECHNICAL SKILLS

Programming: Python, Java, C++, SQL

Mathematical and Statistical Tools: MATLAB, Mathematica, R, SPSS

Specialized: Numerical Analysis, Nonsmooth Optimization, Control Theory, Stochastic Processes, Geometric Modeling

Web Development: HTML, CSS, JavaScript

Research Tools: LaTeX, MATLAB, Computer Algebra Systems