Prince Mensah

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Education

African Institute for Mathematical Sciences — Mbour-Senegal
Master of Science in Machine Intelligence — *Feb 2024 – Present*

- **Relevant coursework:** Fundamentals of Machine Learning, yet to take: Computer Vision, Natural Language Processing, Reinforcement Learning.

African Institute for Mathematical Sciences — Accra, Ghana
Master of Science in Mathematical sciences — *Nov 2022 – Aug 2023*

- **Relevant coursework:** Machine Learning, Data Science, Complex Networks, Information Theory, Python Programming, Differential Equations, Quantum Field Theory, Quantum Mechanics, Dynamical Systems, Entropy Decay in Markov Chains and General Relativity.

Kwame Nkrumah University of Science and Technology — Kumasi, Ghana
Bachelor of Science in Mathematics — *Oct 2017 – Nov 2021*

- **Relevant coursework:** Scientific Computing, Mathematical Programming, Calculus I-II, Differential Equations, Numerical Methods, Probability & Statistics, Optimization, Scientific Research & Communication, Linear Algebra, Stochastic & Financial Models and Theoretical Mechanics.

Work Experience

Industry Immersion Africa — Accra, Ghana
Course Tutor — *Sep 2023 – Present*

- Facilitating a hands-on supplementary curriculum for students who seek a career in industry or in business. Courses I am tutoring includes Introduction to Power Bi, Advanced Microsoft Excel for Data Analytics, Introduction to General Management, Data & Decisions, and Agile Leadership.

Galois Analytics Limited — Accra, Ghana
Data Science Instructor — *Feb 2023 – Aug 2023*

- Delivered lectures, conducted workshops, and guided hands-on practical sessions to help our students understand and apply various data science concepts and techniques. Topics I teach include predictive analytics, machine learning, data visualization, and programming in languages like Python and R.
- Engaged in collaborative meetings with other instructors and program coordinators to ensure the smooth running of the program. Basically, it entailed curriculum design, addressing student concerns, and contributing to broader strategic planning for the program.

Developers Bureau — Accra, Ghana
Junior Machine Learning Engineer — *Jan 2021 – Sep 2021*

- Collaborated with teams in designing and implementing effective machine learning models. Basically, it entailed understanding the requirements of the project, conducting exploratory data analysis, pre-processing and cleaning the data, and selecting appropriate features.
- Implemented, train, and optimize machine learning algorithms, and then validate them using suitable performance metrics. Maintained a clear and effective communication about our machine learning models and their performance.

Kwame Nkrumah University of Science and Technology — Kumasi, Ghana
Research & Teaching Assistant – Department of Mathematics — *Oct 2021 – Nov 2022*

- Tutored undergraduate students in courses including; Differential equations, Numerical methods, and Linear algebra. This involved conducting tutorial sessions, grading assignments, and offering office hours to address student queries. I also collaborated closely with professors to design course materials and exams, ensuring that the content was appropriately challenging and aligned with the learning objectives of the courses.
- Collaborated with faculty members on their research projects. The research topics spanned the application of numerical methods to solve complex mathematical problems, the study of differential equations in modeling real-world phenomena, and the exploration of advanced concepts in linear algebra.

Academic Research Experience

Graduate Research

Dark-soliton quantum bits from the coherent dynamics of Bose-Einstein condensates with self-defocusing nonlinearity. May 2023

- We investigated the coherent dynamics of Bose-Einstein condensates (BECs) with self-defocusing nonlinearity by considering the use of the corresponding dark-soliton solution for the generation of quantum bits in a dilute Bose gas system.
- We developed a mathematical framework incorporating finite-length BECs and study the quantum states induced in the dilute Bose gas by the nonlinear BEC.
- The findings pave the way for exploring novel mechanisms for encoding and manipulating quantum information in the context of BECs with self-defocusing nonlinearity.

Undergraduate Research

Predicting the Severity of Road Traffic Accidents in Ghana using Machine Learning Algorithms *May 2021*

- Developed machine learning (ML) models including; Random Forest (RF), Logistic Regression (LG), and Artificial Neural Network to predict crash injury severity using several crash-related parameters.
- The performance of the various algorithms was measured and compared based on accident severity prediction accuracy, precision, recall, F1-scores, and the Receiver Operating Characteristics (ROC) scores, while the relevance of the feature attributes was determined using feature selection technique.
- The findings were useful in the improvement of an effective traffic safety system within a sustainable transportation system by assisting government managers in developing timely proactive traffic accident prevention strategies and effectively improving road traffic safety in Ghana.

Updates on Meningitis Surveillance in the Upper West region of Ghana (2012-2020) *July 2021*

- Analyzed Meningitis surveillance data from the Upper West region, one of the hottest zones of Meningitis transmission in Ghana. This study is a sequel to Domo Nuoh's report which spanned 2009 to 2013. By analyzing long-term surveillance data (2012 to 2020)
- Utilised the QGIS software to study the spatial distribution of cases and deaths throughout the 11 districts in the Upper West region.

2021 SPE Drillbotics - Directional Well Model Design *Sept 2021*

- Developed a computer model in C++ that represent a full-scale system and corresponding control scheme to virtually drill a directional well to a given trajectory as efficiently as possible within constraints of safety and economics.

Awards & Achievements

Master's in Mathematical Sciences Scholarship: Awarded by the African Institute for Mathematical Science in collaboration with the Ghana Government to talented postgraduate students from the African continent. This award was extremely useful throughout my graduate education at AIMS-Ghana.

Ghana National Petroleum Corporation (GNPC) Scholarship Award: Awarded to Bachelors and Masters students with excellent academic performance. This award was useful throughout my undergraduate education.

Amazon Web Services (AWS) Certification: Awarded for successful completion of Python for Machine Learning and Deep Learning Program. Gained adequate proficiency in building ML and DL algorithms.

Projects

Quesion-Answering System | *Flask, Streamlit, Docker and SenteceTransformers. GitHub*

- Developed a Question-Answering (QA) system capable of processing user queries and returning relevant passages from a given corpus as answers. The system leverages advanced machine-learning techniques and efficient data retrieval mechanisms to provide accurate and timely responses.
- Implemented Generative AI (GPT 2) model to additionally provide direct, concise, and accurate answers to each question based on the relevant passages retrieved, and utilized Streamlit to create a UI to interact with the ML system.

Connection Between American Corporate Elite | *Social Network Analysis with Networkx and igraph*

- Utilised Networkx package to critically analyze the connections that exist between the American Corporate Elite in the US during the 1980s and 1990s.

- Employed the various in-built functions and methods to calculate for the important metrics; Eigenvector centrality, betweenness centrality, degree centrality, average shortest path length, nodes, edges, etc. And used the igraph tool for further analysis and identified the number of subgraphs and communities in the network.

Credit Card Fraud Detection | *Python, Logistic Regression, Jupyter Notebook GitHub*

- Developed a Logistic Regression classification algorithm for potential credit card fraud detection.
- Implemented Synthetic Minority Oversampling Technique (SMOTE) to balance the distribution and help overcome overfitting problems. And finally, the classification report from sklearn was used to showcase the performance of the algorithm.

Diabetes Analysis and Prediction | *Python, Random Forest, Jupyter Notebook. GitHub*

- Performed a thorough exploratory data analysis of the diabetes data to investigate and to identify important risk factors associated with persons with type 2 diabetes (T2D).
- Built the Random Forest classification model for early prediction of diabetes patients with a higher accuracy and compared the results with Decision Tree and Logistic Regression Algorithm.

Stock Price Prediction | *Python, Arima Model, Jupyter Notebook. GitHub*

- Performed an exploratory data analysis of Tullow Oil for an intended data-driven decision-making.
- Built the Autoregressive Integrated Moving Average (ARIMA) model for forecasting the trend in the data.
- Implementedthe Long Short-Term Memory (LSTM) algorithm for prediction.

Computing Skills

Programming: C/C++, Python, Mathematica, MATLAB, R, SQL.

Technologies: Git, Unix Shell, LaTeX, Tableau, Power Bi.

Libraries: TensorFlow, Scikit-Learn, Pytorch, Numpy, Scipy.

Other Skills: Software configuration management, strong verbal and written communication skills, excellent troubleshooting and debugging skills, exceptional problem-solving skills, good teams skills.

Membership and Volunteering

2023 Deep Learning Indaba Volunteer: Colaborated with other volunteers to ensure the smooth operation and success of the Conference.

2022 ALX Software Engineering Program: Engaged in challenging software engineering projects to enhance adequate proficiency and technical expertise.