Godfred Somua – Gyimah, PhD

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Legal Status: US Permanent Resident

Work Experience

MONSANTO COMPANY (acquired by BAYER AG) Saint Louis, MO

Data Scientist (Monsanto Emerging Leaders in Science Program), *January 2018 to present (1 year)*

- Translating business problems into research questions for exploratory, descriptive, predictive and prescriptive analytics. Developed deep learning models for seed vigor prediction with ~99.6% sensitivity and ~90.1% specificity using Python, Keras and CNN. Developed imaging models for seed radicle emergence testing and corn tassel spikelet counting using Tensorflow, CNN and image processing. Developed a dryer setting recommender model for optimizing seed quality using DataRobot, R and the Random Forest algorithm. Provided technical support for pilot phase model deployments. Collaborated with business leaders constantly to update / agree on project goals and expectations. Created visualizations to communicate model results to both technical and non-technical audiences. Documented projects on Github and prepared technical reports.

- As an ELS scholar, I have been involved in formal leadership training, mentorship and coaching. My major leadership task for the first 18 months is to co-ordinate the company's cross-functional Data Science teams integration initiative, which aims at achieving cross-team collaboration and similar common best practices across all Data Science teams in the R&D organization.

INSIGHT DATA SCIENCE Manhattan, NY

Artificial Intelligence Fellow (Computer Vision / Deep Learning), *July 2017 – October 2017 (4 months)*

- Implemented the 3D CNN action recognition model by Schindler et al. (2008) using Python, Keras and the KTH video dataset; Modified and improved the model to accommodate more complex actions for real-time video surveillance, while achieving state-of-the-art performance (88% accuracy and 100% recall on the target class for tested videos).

MISSOURI S & T Rolla, MO

PhD Research Assistant (Geomechanics, Numerical Modeling & Machine Learning)*, August 2014 – December 2018 (4 years)*

- Developed and validated a novel method for calibrating the geomechanical parameters of Discrete Element Models using R and the XGBoost machine learning algorithm. The method combines numerical simulation of tri-axial rock testing with XGBoost to achieve prediction accuracies of up to 95.54%.
- Developed and validated a 3D numerical model for studying the failure patterns of geomaterials during rock excavations.

HUAWEI TECHNOLOGIES Accra, Ghana

Engineering Data Analyst, *July 2010 – September 2013 (3 years)*

- Provided formal mentoring and leadership to a team of 5 analysts. Performed and led costumer analytics studies to discover insights and opportunities. Produced exploratory, descriptive and predictive analyses for revenue forecasting, customer segmentation, customer churn and sentiment analyses. Conducted end-to-end analytic projects including wrangling data, validating data, data analysis, interpreting results of analysis, identifying variances / trends / root cause and providing solutions.

Education

MISSOURI UNIVERSITY OF SCIENCE & TECHNOLOGY Rolla, MO

- ***PhD Mining Engineering*** *(GPA: 4.0 / 4.0)* Aug. 2014 – Dec. 2018
- ***Graduate Certificate, Business Analytics & Data Science*** *(GPA: 4.0 / 4.0)* Aug. 2016 - May 2017
  (Courses: Data Mining & Machine Learning, Data Visualization, Text Mining, Business Analytics & Data Science)
- ***MS Mining Engineering*** *(GPA: 4.0 / 4.0)* Aug. 2014 - July 2016

UNIVERSITY OF LEEDS Leeds, England

- ***MS Engineering Geology*** Sep. 2013 – Aug. 2014

KWAME NKRUMAH UNIVERSITY OF SCIENCE & TECHNOLOGY Kumasi, Ghana

- ***BS Civil Engineering*** Aug. 2006 - June 2010

Technical Skills

- ***Languages*:** Python, R, SQL, Matlab
- ***Statistics, Machine Learning & Deep Learning*:** Tensorflow, Keras, Scikit-Learn, Caret, Weka, Azure ML, Amazon ML, DataRobot, NLTK, NumPy, SciPy, SAS Text Miner, RStudio
- ***Data Wrangling & Storage*:** MySQL, Pandas, R Dataframe, Trifacta
- ***Data Visualization*:** Tableau, Power BI, ggplot2, matplotlib
- ***Cloud Computing:*** AWS, MS Azure, Domino, Paperspace
- ***Other skills:*** Jupyter Notebook, Git, Flask, Docker

Profile Summary (based on advertised role requirements – Director of Data Science)

- Formal management experience with 5+ years of experience applying machine learning methodologies in quantitative research and business environments. Able to work closely with business leaders, expert domain scientists, and data engineers to identify and execute customized, problem-driven machine learning and AI solutions to advance research efforts.
- Prior experience identifying, developing, and advancing new products and businesses in an R&D environment.
- Able to use appropriate sampling, data preparation, analytic and statistical methodology to develop predictive models; combine this with business strategy skills to develop solutions that leverage datasets of any quantity, shape or size.
- Demonstrated experience solving problems using Machine Learning, Predictive Analytics, and statistical analysis involving: Regression, Classification, Clustering, Matrix Factorization, Predictive Analytics, Decision trees, Support Vector Machines (SVM), Neural Networks / Deep Learning, k - NN, Naive Bayes, Decision Trees, Random Forests, etc.
- Strong business acumen and communication skills. Solid analytical and problem-solving skills (critical thinker).
- Self-motivated and organized individual with a strong interest in AI / machine learning innovation in the healthcare industry.

Publications

Journal Articles

- **Somua-Gyimah, G**., et al., A machine learning approach to Distinct Element Model calibration for earth material. International Journal of Constructive Research in Civil Engineering. 2019. In Press.
- **Somua-Gyimah, G**., et al., Formation fragmentation modeling and impact on dragline excavation performance in surface mining operations. International Journal of Mining Science, 2019. Volume 5, Issue 1: p. 11-21. [PDF]
- **Somua-Gyimah, G**., et al., A Material Flow Model for Dragline Bucket-Formation Failure Analyses Using the Distinct Element Method. International Journal of Mining Engineering and Technology, 2018. 1(1): p. 1-15. [PDF]

Theses & Dissertations

- **Somua-Gyimah, G.** Dragline Excavation Simulation, Real-Time Terrain Recognition and Object Detection. PhD Dissertation. Missouri University of Science & Technology. 2018. [PDF]
- **Somua-Gyimah, G.** Finite Element Modeling of The Proposed Tunnel for the York Potash Mineral Transport System. MSc Thesis. University of Leeds. 2014. [PDF]

Peer-reviewed conference papers

- **Somua-Gyimah, G**., et al., A computer vision system for terrain recognition and object detection tasks in mining and construction environments. Proceedings of the 2019 Annual Conference of the Society for Mining, Metallurgy & Exploration (SME). 2019. In Press. [Preprint - PDF]
- Nyaaba W, Frimpong S, **Somua-Gyimah G**, Galecki G. Finite Element Analyses Prediction of Off-Road Tire Temperature Distribution. Science in the Age of Experience. 2016. [PDF]