Abdalla Abdalla

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Education

University of Cambridge October 2020 – June 2023
Bachelor's in Physical Natural Sciences – Courses including: *Cambridge, United Kingdom*

- Computational Physics (Neural Networks), Statistics, Mathematics, Quantum Mechanics, Materials Science

Skills

Languages: Python, SQL, R, LaTeX, Markdown, MATLAB
Developer and Visualisation Tools: Power BI, Tableau, Git, VS Code, Visual Studio, PyCharm, Jupyter Notebook, Streamlit
Libraries:NumPy, pandas, Matplotlib, SciPy, scikit-learn, TensorFlow, Keras, XGBoost, OpenCV, Streamlit
Machine Learning Skills: Neural Networks, Natural Language Processing (NLP), Supervised and Unsupervised Learning, Model Evaluation and Validation, Data Preprocessing and Augmentation, Monte Carlo Simulations, Sentiment Analysis, Generative AI

Experience

Data Scientist July 2023 – September 2023
Thornton Tomasetti *Warrington, United Kingdom*

- Pioneered a probabilistic assessment framework using Monte Carlo simulations and uncertainty quantification techniques with Python and MATLAB, enhancing the precision of risk assessments in engineering applications.
- Utilized scikit-learn for regression analysis, achieving a 22% improvement in the predictive accuracy of structural failure probabilities, highlighting the effective use of machine learning libraries to bolster decision-making frameworks in engineering.
- Initiated and spearheaded the adoption of a data-driven culture focused on uncertainty quantification within the organization, adeptly conveying complex data analyses to management and clients.

Environmental Data Analyst June 2019 – November 2019
Nuffield Foundation *Manchester, United Kingdom*

- Led a project to capture and analyze satellite signals for advanced atmospheric and oceanic studies. This initiative demonstrated superior data management skills and resulted in a 15% improvement in image resolution, enhancing the quality of meteorological analysis.
- Conducted in-depth analysis of complex datasets for meteorological predictions and climate change studies, underscoring a strong commitment to leveraging analytical insights for societal benefits and environmental stewardship.
- Delivered compelling presentations on satellite signal analysis research to a non-technical audience.

Projects

Tumor Track | *Python: NumPy, Matplotlib, pandas, seaborn, TensorFlow, OpenCV, scikit-learn* | *github.com*

- Developed and implemented a Convolutional Neural Network (CNN) using TensorFlow for brain tumor detection, achieving an accuracy of 91% with a precision of 85% and recall of 91%, demonstrating strong performance in distinguishing between tumorous and non-tumorous MRI images.
- Utilized advanced data preprocessing techniques with OpenCV, including image resizing, normalization, and augmentation, to enhance the model's robustness and improve generalization across diverse datasets.
- Conducted comprehensive model evaluation using scikit-learn, plotting learning curves, confusion matrices, and ROC curves, and calculating metrics such as accuracy, precision, recall, F1 score, and ROC-AUC to ensure model reliability and identify areas for further improvement.

Amazon Product Recommendation App | *Python: NumPy, pandas, scikit-learn, Streamlit, TextBlob, transformers* | *github.com*

- Developed an Amazon product recommendation system using NLP techniques and a TF-IDF Vectorizer to suggest products based on user input prompts.
- Implemented sentiment analysis with TextBlob and used generative AI with BART for generating concise summaries of product reviews to enhance user experience and decision-making.

Now You See Me, Now You Don't | *Python: NumPy, Matplotlib, pandas, TensorFlow, OpenCV, scikit-learn* | *github.com*

- Designed and implemented a real-time face detection and tracking system, leveraging advanced machine learning techniques to demonstrate proficiency in AI applications.
- Built a deep learning model using TensorFlow's Functional API and VGG16 architecture, incorporating dual heads for classification and regression tasks, highlighting expertise in model architecture and multi-task learning.

Ising Model | *Python: NumPy, Matplotlib, pandas, SciPy, Numba* | *github.com*

- Conducted a comprehensive study on Monte Carlo techniques to explore the behavior of the two-dimensional Ising model and compare the performance of Metropolis-Hastings and Wolff Cluster algorithms.
- Optimized simulation efficiency by identifying the Wolff Cluster algorithm as significantly reducing critical slowing-down, demonstrated by dynamic exponent reduction of 88%, thereby vastly improving the simulation's approach to critical phenomena.

Certifications

Machine Learning Specialization | *Python: NumPy, Matplotlib, pandas, TensorFlow, XGBoost* | *Stanford University*

- Proficient in developing and implementing machine learning models using various techniques, including supervised and unsupervised learning, neural networks, and ensemble methods.