BLAKE DOWNWARD

DATA SCIENCE | ANALYTICS

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MOTIVATION

For me, Data Science is more than just running models - it's about navigating problems and providing solutions that deliver tangible value. Whether it's streamlining operations, reducing costs, or uncovering insights for decision makers - I bring a broad mix of technical expertise and business acumen to produce valuable, data-driven solutions.

SKILLS & TOOLS

Programming: SQL, Bash/Linux, JS, HTML, CSS, Python (Pandas, Numpy, Flask, Selenium)

Tools: Excel, Tableau, Power BI, Github, GCP (CloudRun, VertexAI, Cloud Storage), AWS (S3, Lambda, IAM, EC2, SageMaker, RDS, DynamoDB, Glue)

Statistics: Hypothesis Testing, AB Testing, Distributions, Central Limit Theorem

Machine Learning: Linear and Logistic Regression, Decision Trees, Random Forest, KNN, k-means, PCA, Association Rule Learning, Causal Impact Analysis, Neural Networks

ML Tools: PyTorch, Tensorflow, Keras, Weights & Biases, Scikit-Learn, Librosa, MatplotLib

EXPERIENCE

Machine Learning Engineer - PALETTEYES.com
DECEMBER 2024 - PRESENT

- Leverage K-means clustering as a functional tool for users to extract colour palettes from images, which doubled as a dataset creation tool for training a "colour palette generator".
- Developed a zero-shot capable transformer - which can take any arbitrary semantic input and generate a colour palette to match the input prompt.
- As a highly subjective task, standard loss functions were not optimal. Implemented a custom loss function with six "perceptual" scoring metrics. Immediately resulted in subjectively better colour palettes with less time spent training.
- Deployed as a serverless Cloud Run instance to maximise scalability and cost efficiency.
- Published the core functionality as an open-source, pip installable Python package.

Managing Director - Fox Limbry
NOVEMBER 2016 - PRESENT

- Created Python scripts to parse and synthesize monthly reports from online marketplaces (Amazon, eBay and Shopify) into a standardised format for monitoring Key Performance Indicators and inform strategic decision making.
- To speed up our fortnightly cash-flow management procedure, I developed a front-end application to parse, extract and perform relevant calculations with just a few clicks. A job that once took over an hour to complete manually, now takes less than 10 minutes - whilst still giving the user full control to make procedural decisions.
- To streamline bookkeeping, I combined a Python script with a Google Sheets macro for categorising and formatting transactions. Now, the only manual task is verifying expense receipts. Like the cash-flow system, this reduced processing time to minutes.

PROJECTS

AeroSonicDB: Audio Dataset for Detection and Classification of Aircraft

- Created a standalone device to autonomously record and label aircraft sounds in the field. A truly "smart" device with an awareness of its location, as well as nearby aircraft.
- Developed a Python web-app to vastly reduce (over 10x) the time required for human validation and annotation of samples.
- Extensively documented the dataset collection procedure and presented benchmark detection models and training pipelines. https://arxiv.org/abs/arXiv:2311.06368

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PROJECTS (CON'T)

Fruit Classification from Images with a Convolutional Neural Network

- Applied transfer learning and hyperparameter tuning techniques to assess the viability of using deep learning to classify fruits in images. Demonstrating that lightweight, locally trained models can be trained to rival the performance of pre-trained models (eg, vgg16).

SA Ambulance Callout Analysis: Power BI Dashboard

- Used Python and SQL to fetch (daily) and store pager messages from a live-feed.
- Extract, clean and transform unstructured messages ready for modelling and analysis.
- Source and model demographic data to segment messages by local government area.
- Created advanced visualisations to provide users with insights at a glance, including; statewide and local government level shape maps to show geographic "hot spots", temporal heatmaps to quickly highlight "day of week" and "hour of day" relationships, and a time-series plot including a forecast for the following seven days.

EDUCATION

Master of Economics (International Trade)
August, 2012 - June, 2014 - Shandong University, China
Dissertation: *Vector Autoregressive Analysis of Exchange Rate Pass-Through in Australia*

Bachelor of Commerce
February, 2009 - July, 2012 - University of Adelaide, Australia

COURSES & CERTS

Data Science Professional Certification (Data Science Infinity)

Actionable Learnings: Extracting & manipulating data using SQL. Application of statistical concepts such as hypothesis tests for measuring the effect of AB Tests. Utilising Github for version control, and collaboration. Using Python for data analysis, manipulation and visualisation. Applying data preparation steps for ML including missing values, categorical variable encoding, outliers, feature scaling, feature selection & model validation. Applying Machine Learning algorithms for regression, classification, clustering, association rule learning, and causal impact analysis for measuring the impact of an event over time. Machine Learning pipelines to streamline the ML pre-processing & modelling phase. Deployment of a ML pipeline onto a live website using Streamlit. Using Tableau to create powerful Data Visualisations. Turning business problems into Data Science solutions.

Microsoft Power BI Data Analyst (Coursera)

Actionable Learnings: Modelling data from various sources to optimise database size and computational efficiency. Grouping, binning and creating measures where relevant to better convey insights from the data. Creating visually appealing and accessible dashboards that tell a "data story" to the intended audience.

IBM: Databases and SQL for Data Science with Python (Coursera)

Actionable Learnings: Create, manipulate and maintain relational databases with SQL. Gained proficiency in designing and querying relational databases, optimising data retrieval, and handling large-scale tabular datasets efficiently.