

Machine Learning for **Data Classification** with Proof-of-Concept Delivery



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We helped a large defence organisation analyse complex datasets, accelerate model development, and deliver a proof-of-concept machine learning solution in just four weeks.

Challenge

A large defence organisation wanted to explore how machine learning could improve the classification and analysis of complex datasets within their operations. They required a proof-of-concept (POC) model capable of accurate classification under demanding performance conditions. It needed to be reliable, resilient to variable or unexpected inputs, and able to operate within strict performance requirements.

The engagement had two phases. The first focused on refining the model-development workflow and evaluation process in a controlled environment, while the second concentrated on delivering the full proof-of-concept within a four-week timeframe.

Solution

Over the four-week period, the team developed and evaluated multiple machine-learning approaches:

- Approach 1: captured key patterns within the dataset using engineered features and descriptors. Pre-processing included data cleaning and filtering to reduce variation and focus on relevant information.
- Approach 2: a pre-trained model was adapted for feature extraction and enhanced with a custom output layer to suit the task. Data variation control techniques were applied to improve generalisation.
- Approach 3: transformations were applied to capture patterns across different dimensions, and a tailored model was trained to recognise meaningful structures within the processed data.

Throughout the project, models were evaluated in a secure test environment, with iterative improvements made to meet accuracy and operational requirements.

Impact

The delivered proof-of-concept achieved promising results despite being trained on a limited dataset, demonstrating that high-accuracy classification under constrained conditions is achievable with an optimised workflow.

In addition to technical outcomes, the first phase provided feedback that improved the organisation's broader approach to data-driven evaluation and project delivery.

The success of the proof-of-concept established a foundation for future research and potential operational deployment.



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