

Machine Learning for Acoustic Data



BAE SYSTEMS

We are Techmodal

A collaborative data consultancy, bringing the capability and creativity you need to unlock the strategic potential in your data.

As Defence and Government experts, we understand the unique complexity of your constraints. Adaptive, imaginative and iterative, we meet you where you are – and start with what you have.

We focus on making more of your existing tools and technology. Applying smart thinking and continuous improvement to uncover the insight in your data – and help you move past your stickiest problems. Optimising your investments, operations and outcomes. Maximising the impact of your resources towards a better future.

Our clients operate in high-stakes, highly technical and highly secure environments. The pace is fast; the demands are complex and the cost of getting decisions wrong is high. They need partners who bring clarity, precision and practical expertise – not complexity for its own sake.

Our value comes from combining deep analytical strength, applied technology expertise and hands-on consulting experience. We turn ambiguity into clarity and insight into action.

What we offer

We operate at the cutting edge of digital innovation and at the heart of organisations that keep vital infrastructure running, national security protected, and armed forces prepared. Our teams provide:

Decision advantage

We give organisations the insight to act with clarity and pace, ensuring choices made today hold up under tomorrow's pressure.

Our strength comes from being data-led, operationally aware and grounded in real-world context. We explore options, test scenarios and highlight trade-offs before action is taken, building confidence in complex and high-consequence environments.

Technology that works

We help organisations unlock the full value of their technology and existing investments. Our solutions are shaped to our clients' environments – secure, scalable and designed for reuse – delivering faster outcomes and greater value for money.

We stay user-driven, not technology-driven, ensuring what we build is usable, dependable and impactful.

Delivery impact

We work shoulder-to-shoulder with clients to turn ambition into results. Our approach is collaborative, adaptive and focused on rapid progress.

We build momentum early, provide clear answers before the conversation moves on and ensure delivery stays aligned to purpose. Whether defining strategy or supporting implementation, we bring clarity, structure and practical leadership.

Strength in secure and complex environments

All our work is delivered by security-cleared teams who understand the realities of Defence, national security and critical infrastructure.

We design and assure solutions that are resilient, secure and governed — engineered to work in environments where constraints are real and reliability matters.

Powered by BAE Systems Digital Intelligence

We combine the pace, creativity and agility of a specialist consultancy with the depth, reach and security of BAE Systems.

Clients benefit from a unique blend of niche expertise and enterprise-scale capability, with seamless access to Digital Intelligence, engineering, cyber and equipment programmes when required.

Service Overview

Techmodal has 20 years' experience of applying data science methods to address our clients' business challenges. We help our customers to digitise workflows and enhance those workflows with Artificial Intelligence (AI).

We employ the latest tools and thinking in the field of data science to enable our customers to process and derive maximum value from acoustic and audio data. We have proven experience of working with acoustic data to reduce manual effort and produce sustainable insights and decision-making tools, regularly combining multiple AI techniques (Machine Learning, Computer Vision, Natural Language Processing, Large Language Models) to achieve the required outcome.

Techmodal specialises in developing solutions iteratively and responsively, addressing initial requirements and flexibly accommodating changes during the development process. We work collaboratively with our clients to deliver projects at the full range of maturity and Technical Readiness Level (TRL), from data discovery and strategy to capability demonstrators and hosted production applications.

We have a demonstrable track record of employing the latest vendor tools and open-source technologies, along with proven solution deployment credentials, utilising both cloud and on-premises infrastructure and working in secure, constrained environments.

Service Capabilities

- Our service brings together our extensive technical expertise with a sharp focus on business need. We have experience of integrating data science techniques and tools into our customers' existing processes and existing solutions and of deploying AI in secure environments.
- We have experience of working in environments where labelled training data is unavailable and have developed innovative workarounds, including:
 - Use of an autoencoder-based deep clustering method.
 - Generating synthetic audio data which can be used for model training.
- Our solutions can incorporate a web-based User Interface (UI) to enable users to easily interact with the models and outputs.
- We have helped our customers to solve challenges including:
 - Processing and analysis of post-mission underwater platform data for AUKUS Pillar 2, including audio data of the underwater environment captured by SONAR sensors. We streamlined the analysis of mission data and provided decision support to the user by quickly identifying events of interest (e.g., contacts with other platforms).
 - Developing, demonstrating, and assessing AI capabilities that improve the detection range and classification capabilities of in-service P-8 SONAR systems.

SoniScope

- SoniScope is our end-to-end data and ML pipeline for ingestion and classification of unstructured data streams, such as acoustics, RF, and imagery. Built using our lived experience on AUKUS Pillar 2, SoniScope enables a modular, rapid approach to data streaming, model training and classification. Soniscope:
 - Is designed for deployment on low-power edge compute or secure cloud hosting allowing real-time processing.
 - Is designed against Secure by Design (sbD) principles for assurance on Defence infrastructure.
 - Avoids vendor lock-in by using techniques built on hardware agnostic, Free Open Source Software (FOSS).
 - Accelerates delivery timescales for deploying AI/ML classification models.

Flexible Deployment and Hosting

- We work with our customers' existing technology stacks wherever possible to maximise the pace of delivery, align with wider digital and data strategies and derive maximum value from existing investments. To support this, we are experts in using a range of Commercial Off The Shelf (COTS) and open-source tools and platforms, ensuring we can bring the most effective solution to our customer's challenges.

Techmodal has repeated experience of developing and deploying data science and analytics solutions on customer platforms, including on-premises infrastructure and cloud environments such as Amazon Web Service (AWS), Microsoft Azure, Oracle Cloud Infrastructure (OCI) and Google Cloud Platform (GCP). Our work spans different classification levels, and we have experience of MODCloud (AWS, Azure and Palantir Foundry), Army Hosting Environment (AHE) and Navy Digital environments.

Service Features

- Repeatable data processing and Extract Transform & Load (ETL) pipelines
- Pre-existing solution and components to accelerate delivery
- Acoustic signature analysis
- Optimised Machine Learning predictive models and classification algorithms
- Synthetic audio data generation
- Parallelised data processing
- Develop-low, deploy-high
- Model deployment via DevOps/DevSecOps pipelines
- Research and experiment with model types and architectures
- Friendly user interface for seamless interaction between human & AI
- Clear, ethical development practices and outputs that empower end users

Service Benefits

- Proven approaches and model architectures
- Strong track record of deploying acoustic analysis solutions in secure environments
- Latest in Machine Learning and AI technologies
- Scalable solutions, either on-premises or cloud
- Flexible infrastructure and hosting options
- Vendor agnostic and experienced in open source software
- Greater utility from existing data
- Enhanced business decisions
- Improved process efficiency
- Enabling delivery of strategic objectives
- Managing compliance to contractual, legal and policy requirements

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