

AI SOLUTION DEVELOPMENT

Through the Independent Research & Development (IR&D) organization within Technica Labs; Technica has pioneered next-generation applications of Artificial Intelligence (AI)/Machine Learning (ML). We work with defense, intelligence, and federal organizations to safely harness the power of AI for diverse use cases. Some example use cases are anomaly detection, battlefield communications prioritization, cave mapping, and autonomous resiliency for satellites in space.

Technica's AI services include:

CUSTOM AI SOFTWARE & MODEL DEVELOPMENT

Full-cycle development of custom AI models based on Deep Learning (DL)/ML algorithms, including Data Science research, training, validation, testing

AI Ops

Comprehensive infrastructure management for ML workloads via Microservices Architecture (MSA) and containerization

AI FOR THE EDGE

Machine Learning model customization for edge devices incorporating Size, Weight, and Power (SWaP) constraints and Denied-Disrupted, Intermittent, and Limited (D-DIL) communications environments

AI SOLUTIONS LIFECYCLE MANAGEMENT

Implementation of AI application lifecycle management and Continuous Integration (CI)/Continuous Delivery (CD), including working with Kubernetes

AI-DRIVEN BIG DATA SOLUTIONS

Architecture design and implementation for Enterprise Big Data solutions like Apache Spark and Apache Kafka

INTEGRATION

Establish integration with AI-ready cloud platforms and third-party APIs



TECHNICA AI AREAS OF EXPERTISE

ML & DL

- Anomaly Detection for signals data, like network traffic data
- Ensuring autonomous resiliency and high-availability of microservices
- Blind Modulation Classification
- Image detection/processing

Natural Language Processing (NLP)

- Work with state-of-the-art NLP Transformer networks; specially Bidirectional Encoder Representations from Transformers (BERT) models
- Cognitive discovery - Using graph analytics and NLP to reveal synonyms, topics, keywords, and relationships
- Cognitive search - NLP with ML/DL to rank and return semantically similar documents
- Speech recognition/Speech AI

Fog/Edge Processing

- Vast expertise with utilizing AI in D-DIL environments
- Autonomously prioritize D-DIL communications with most important information shared first
- Expertise with Internet of Things (IoT) protocols and mesh-networking
- Lightweight ML models for the Fog/Edge

Data Lakes & Cloud-Based AI

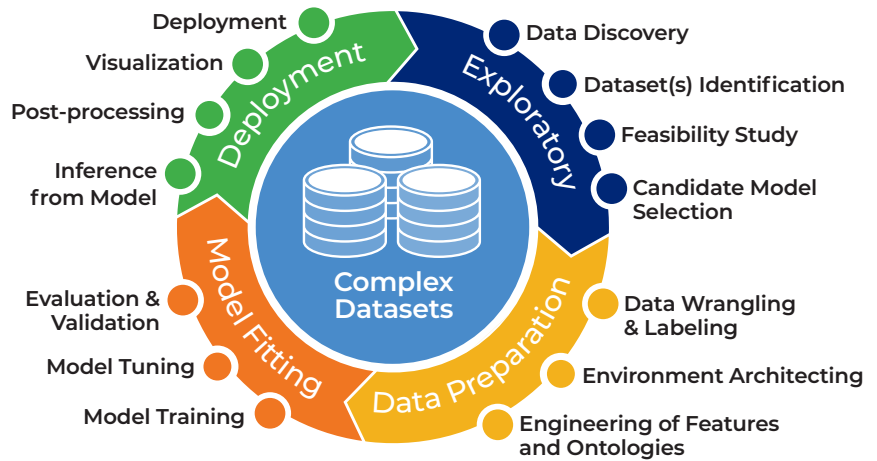
- Big data, business intelligence analytics, predictive tools, planning, generative models, and optimization tasks in one place
- Data ecosystem architecture development
- Distributed storage
- Scale-ready read and write processing
- Data cleaning processes
- Pre-built high-level features for ML
- Integration with popular cloud platforms including AWS, Azure, and Google

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TECHNICA'S METHODOLOGY

Technica has developed an agile AI Methodology. The process allows us to move from ideation to prototyping in weeks – not years. Technica's AI Methodology enables us to conduct sprints within each element of the loop to demonstrate success, early and often. Beginning with your complex datasets, we iteratively move through each phase: Exploratory, Data Preparation, Model Fitting, and Deployment. As more data is collected, the process repeats.



AI SOFTWARE DEVELOPMENT STACK

Technica has real-world experience with the following:

DL Frameworks

- Tensorflow
- Theano
- PyTorch
- MXNet
- Nvidia Caffe
- Caffe2

Modules/Toolkits

- Microsoft Cognitive Toolkit
- Natural Language Toolkit (NLTK)
- spaCy

Libraries

- Numpy/Scipy
- Scikit Learn
- Sonnet
- Tensorflow Probability
- Tensor2Tensor
- tf-slim

Concepts

- Supervised/Unsupervised Learning
- Federated Learning
- Time Series Analysis
- Reinforcement Learning
- Representation Learning
- Genetic Algorithms to Hyper-tune Parameters
- Clustering (Density-Based, Hierarchical, Partitioning)

Neural Networks

- Transformer Attention, e.g., BERT
- Generative Adversarial Networks (GANs)
- Autoencoders
- Convolutional Neural Networks (CNNs)
- Recurrent Neural Networks (RNNs) including Long Short Term Memory (LSTM)
- Bayesian Networks

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Technica Corporation, founded in 1991, provides high-end system engineering services to Defense, Intelligence, Law Enforcement, and Federal civilian agencies. The company specializes in systems engineering; integration and testing; cybersecurity; and product development, deployment, and support. Technica invests heavily in R&D and is leveraging big data, machine learning, artificial intelligence, blockchain technology and high-performance computing to support its customers. For more information, please visit www.technicacorp.com

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