

# Capabilities Overview

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This document provides an overview of the technical capabilities, domains, and service areas offered for consulting engagements. It is intended for engineering teams and organizations requiring specialized machine learning and computational infrastructure expertise for any machine learning applications.

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## Core Competency Areas

### 1. Machine Learning Systems Engineering

- End-to-end ML pipeline design and implementation
- Leakage-resistant validation and research frameworks
- Ensemble integration and model orchestration
- Feature engineering systems and data preprocessing workflows
- GPU-accelerated training and inference pipelines
- Reproducible research environments and controlled experimentation infrastructure

### 2. Cross-Sectional ML Research Architecture

- Cross-sectional modeling workflows
- Multi-entity model design and evaluation
- Research tooling for signal generation and model comparison
- Custom metric evaluation utilities
- Frameworks for rapid prototyping and systematic testing

### 3. High-Performance Computing (HPC)

- Multi-GPU training pipelines
- Distributed workload design
- Optimization for large-scale batch jobs
- Low-latency inference workflows
- C++ integration for performance-critical components

### 4. Infrastructure Engineering

- Modular codebase design
- Internal tooling development

- Integration with secure data sources and APIs
  - CI/CD support for ML and research workflows
  - Structured configuration management
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## **Engineering Strengths**

### **Architectural Design**

Designs modular, maintainable systems with attention to clarity, reproducibility, and long-term extensibility.

### **Research-Oriented Engineering**

Bridges the gap between academic ML practices and production-quality research tooling.

### **Rapid Problem Identification**

Efficient at diagnosing issues in existing systems, including stability, leakage, performance bottlenecks, and code design flaws.

### **High Adaptability**

Capable of building or improving internal pipelines regardless of existing stack maturity.

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## **Typical Engagement Areas**

- Enhancement or extension of existing ML pipelines
  - Custom development of proprietary model research infrastructure
  - Evaluation and redesign of validation methodologies
  - Internal tooling for machine learning applications
  - Integration of HPC workloads into ML workflows
  - Advisory services for system design, architecture, and research direction
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## **Contact**

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