



## ARTIFICIAL INTELLIGENCE OVERVIEW

Market and competitive dynamics are changing faster than human insights can respond, making now the time to leverage Artificial Intelligence (AI). Not only is the data volume for AI models increasingly available, but AI tools have matured and are now more affordable. Empower your organization and significantly impact business outcomes with the help of our AI experts.



AI tools have matured and are more affordable than ever. Empower your organization and significantly impact business outcomes with a tailor-made solution designed by Trace3 AI experts.

### LET US AI WITH YOU, NOT TO YOU

Together with your business leaders and data experts, we work holistically to identify and prioritize use cases and integrate solutions into operational workflows that best support your business. Our AI services and support encompass Data Architecture, Data Operations, Data-Driven Outcomes, Machine Learning, and Analytics and Intelligence. Trace3's hands-on business consultants, data scientists, data architects, and engineers develop capabilities, design, and build AI models Trace3 can provide your team with AI 101 and Deep Learning training. With our end-to-end solutions, you decide how much or how little you want to advance your AI business environment, and we take care of the rest.



#### PROOF OF AI BUSINESS VALUE

If you're not convinced of AI's value or don't know how to start, we can help. First, we'll explain AI's role and methods to achieve business outcomes. Next, we'll build a model for you to demonstrate that value using your organization's data. In three weeks or less you will have a predictive model with its ability to answer the use case, performance metrics, and potential model enhancements.



#### DEVELOPMENT & OPERATIONALIZATION

Executing AI at scale requires two capabilities: developing many AI models simultaneously and operationalizing the solutions to quickly monetize the AI. For the former, we architect model building and model serving environments for data science reproducibility, reusability, and collaboration. For the latter, we integrate AI solutions into operational workflows and enable continuous AI model retraining to enhance predictive accuracy.



#### EXPERT DATA SCIENCE

Our data scientists can develop both machine learning and deep learning models. They are experts at understanding the business problem, identifying best-fit algorithms and model architectures, and building high performing models. In addition, they conduct hands-on Deep Learning courses, including computer vision, NLP, and CNN and RNN combined neural networks.

Our mission is to directly impact your business's profit and loss by simplifying the complex, solving barriers, and operationalizing and monetizing solutions so that you can be confident in all your business decisions.

## CUSTOMER SUCCESS STORY: DEEP LEARNING MODEL

### INDUSTRY

- Petroleum (fuel, oil, gasoline)

### THE BUSINESS OPPORTUNITY

- Every 1% improvement in a specific component's performance yields half-million additional barrels of oil per day globally; this equates to \$19.3B per year at \$100/bbl.

### THE CHALLENGE

- The client was struggling to develop well-performing deep learning model to predict failure of the component.
- Drivers of complexity included low volumes of data, incomplete data labeling which prevented full operational workflow understanding, balancing false positives and false negatives (higher maintenance costs vs. lower downtime), and long model training time.

### THE CHALLENGE

- Trace3 systematically created a series of models using machine learning (for baselining) and deep learning. For each model, we performed data pre-processing feature engineering, hyper-parameter tuning, and network development.
- Specific to deep learning, we researched and adapted cutting-edge approaches, including variations of LSTM, Weibull Time to Event RNN, dynamic time warping, attention mechanism, and multi-channel CNN.
- The result was a deep learning model with high predictive accuracy (ROC AUC and average precision of 0.8) and with extensibility to accommodate additional sensor data and variable length failure prediction window.
- We also reduced the model training time by implementing model and data parallelism and code modularization to efficiently use the multi-GPU environment.

## AI MILESTONES AND TRACE3 SOLUTION OFFERINGS

