



Intel Partner Similarity Delivers AI Software for Asset Monitoring

Similarity provides cost-effective, real-time AI software for asset monitoring, combining disparate sources of data—ranging from sensors to satellites



Do more with your data

In manufacturing, oil and gas, and energy sectors, proactively monitoring and optimizing the efficiency of assets like machines and other infrastructure to maximize uptimes is the key to profitability. This requires analyzing large sets of data to build predictive models that can detect problems before they occur. Similarity's self-configuring AI combines data from a wide variety of sources to overcome the organizational, technological, and financial challenges typical of this type of optimization.

The traditional method of enabling machine-learning analytics is to hire data scientists who can pick out the right parts of the data to harness, and then train the algorithms on the data to create a static model to help detect problems. This process is expensive, and can be slow to roll out. What's more, these static models will always be working with stale data. Even worse, this paradigm is ineffective when massive amounts of multisource image and sensor data are required to be analyzed.

To address these issues and help companies achieve the benefits of reduced cost, increased uptime, and advanced warning of impending problems, Intel partner Similarity offers software that acts as a virtual data scientist: ingesting and combining structured or semistructured data in any format, from anywhere; devising the most accurate predictive algorithms; and retraining models dynamically to keep them current and accurate. It's flexibility with the data it can ingest, the rules and algorithms that can be applied, and the hardware and software it can run on makes it easy for businesses to reap benefits quickly without major up-front investments of time and money.

Capitalizing on data is a key advantage

In almost every vertical, data tells a story that can mean the difference between success and failure. The trick is in finding the predictive signals in the data to give advanced warnings of impending problems.

The proliferation of IoT solutions, and the introduction of smart sensors in many different verticals, has expanded the available data, and thereby increased the opportunities to derive benefit from predictive maintenance and asset monitoring. Real-time patterns in a collection of sensor output can predict the failure of a critical system or device. Automatically analyzing other sources of data, such as satellite imagery, can make for a secure and effective infrastructure, such as an oil pipeline.

Once a company in an industry implements these benefits, they gain an advantage over their competition. The other companies are left with the option to catch up, or to lose ground.

Data analytics with a difference

Similarity's AI software detects anomalies and predicts incidents in realtime, to enable predictive maintenance and remote asset monitoring. Similarity's AI learns on its own, in real time, making it easy to automatically develop hundreds of accurate models for different individual assets, as opposed to the traditional approach which involves only one generalized model that is less accurate.

Similarity can ingest and combine data in any format from anywhere. Moreover, it can run on any device—from tiny edge devices, to stand-alone desktops and laptops, to large clusters of commodity servers, and on both public and private clouds. It offers a software as a service (SaaS) solution in partnership with hosting providers such as Amazon Web Services* (AWS*).

When you incorporate Similarity's AI into your analytics layer, you get advanced predictive analytics results in milliseconds. By combining transactional and sensor data analysis with Similarity's imagery analytics, Similarity can further amplify the benefits by adding a visual and geographical dimension to the data, as appropriate.

Some of the capabilities enabled by Similarity

- **Correlation and similarity calculations:** Sees patterns across multiple sources of data
- **Automatic predictive model creation:** Saves cost and time without sacrificing accuracy
- **Event prediction via automated multivariate temporal reasoning:** Allows for timely action to be taken
- **Anomaly detection in massive amounts of data:** Solves the "finding needles in a haystack" problem
- **Event classification:** Predicts events before they happen



Smart Asset Monitoring (SAM)

Monitor assets (like machines), detect anomalies, and predict incidents

- Predictive maintenance
- Throughput improvement
- Anomaly detection
- Utilization optimization
- Process optimization



Manufacturing



Energy



Oil and gas



Automated Image Anomaly Detection System (AI-ADS)

Analyze images from satellites and cameras to identify anomalies based on historic images

- Security surveillance
- Visually monitor vast assets
- Illegal construction and encroachment
- Manufacturing quality control
- Construction project monitoring



Defense



Smart cities



Oil and gas



Combine Sensor and Image Data AI

- Remote asset monitoring
- Pipeline monitoring
- Border security
- Oil well monitoring

Asset Monitoring and Imagery Analytics—Know what you need to know, when you need to know it, with a complete view of your remote assets that incorporates data from sensors that see, feel and hear.

Simple deployment. Powerful insights.

Self-configuring deep learning

Similarity uses a proprietary, scalable combination of neuroevolution of augmenting topologies (NEAT), genetic algorithms, forward and backward chaining reasoning, self-organizing maps, random forests, clustering algorithms, piecewise aggregate approximation (PAA) and symbolic aggregate approximation (SAX), statistical correlation and

similarity measurements, and symbolic representation. These technologies allow Similarity to perform real-time analytics that actively look for patterns. A Similarity deployment can even communicate with other Similarity deployments around the globe to teach them what it has learned, creating a network effect for maximum intelligence.

Scalability and a small footprint

Similarity is able to handle very large data sets, but the software itself is extremely light. Its efficiency allows you to perform high-speed analytics, but with 90 percent less hardware. This lightness means fewer expenses for hosting and transmission. Similarity's software can run close to the data, in a distributed learning cluster. It can be run on any Linux* server, including stand-alone on a desktop or laptop. It doesn't require specialized hardware, nor does it require connection to the Internet. What's more, the Similarity AI can easily scale to hundreds of billions of multicore computers.

Data and software agnosticism

Similarity puts few restrictions on the type of data you can work with or the software platform. While there are standard loaders available, you can write your own loaders in any language. With Similarity's API, or over a socket, you can add or remove data sources at any time.



Case study: Similarity helps predict the failure of an oil well

Challenge

An oil and gas enterprise experienced an unexpected part failure in one of their wells that cost thousands of dollars a day in lost production—not to mention the expenses for the repair. Fortunately, the customer had equipped the well with a gauge system that had captured a number of measurements over the previous year. The customer wanted to know what caused the failure, and whether there's a way to predict another.

Solution

Similarity makes it possible to analyze large volumes of time-series data in real time at the edge of the network. Examining six months of data produced by the oil well's sensors, the Similarity software agent was able to quickly define normal operating parameters, and to detect complex correlations between the sensor variables.

Results

Within the sensor data, Similarity found a complex pattern that would have predicted the failure more than one month in advance. This pattern detection would have given the customer time to take corrective action that would have avoided the failure completely, had the customer been using Similarity's analytics in real time. With Similarity's software in place, performing real-time learning analytics, the customer was able to establish a predictive model to help see failures coming, saving them money and significantly reducing unplanned downtime.

Experts not required

Some solutions require highly paid data scientists in order to set up, deploy, and manage an analytics program with learning capability. Similarity's self-configuring AI software, however, can be deployed and managed without experts. This makes it economical and fast to roll out and maintain, and offers greater flexibility as your asset monitoring and predictive maintenance needs and objectives change.

Edge analytics that reduce bandwidth requirement

Similarity's solutions can live in the cloud of your choice, but they can also be deployed in a stand-alone fashion at the edge on tiny devices such as oil and gas infrastructure sensors, or wearable monitors. This allows for learning edge analytics on-premises that deliver results and alerts faster and more reliably. By learning from the data, close to the data source, the raw data does not need to be transmitted to the cloud, reducing bandwidth requirements. Additionally, Similarity's analytics output can be monitored on virtually any device.



Case study: Similarity helps detect remote activity

Challenge

A study of illegal smuggling activity along the Oman-Yemen border was required to demonstrate Similarity's Automated Image Anomaly Detection System (AI-ADS), which uses satellite imagery to detect abnormal changes on the ground.

Solution

Harnessing the power of Similarity AI-ADS, over 10,000 sq. km of 50cm resolution time series satellite imagery was analyzed and anomalies were sorted according to severity.

Results

Several unusual constructions were detected within four miles of the border, which were not there previously. These anomalies were uncovered in just a few hours, using a single, inexpensive server.

Extending this example to combine AI-ADS with Similarity's advanced predictive analytics using data from ground sensors, such as those on and near an oil pipeline, an oil and gas customer would have a powerful system to monitor their remote assets and the region around them—gaining significant security capability, predictive maintenance, and other types of asset value protection.

Benefits such as detecting illegal land use, encroachment, vandalism, and pipeline tapping, can be realized using Similarity AI-ADS.

What you need to know, when you need to know it

In this age of business, no one can afford to ignore their data. Regardless of what equipment your organization counts on, being able to fix something before it breaks while increasing security in the region of the equipment can save any business a great deal of money.

Together with Intel—a world leader in providing flexible, scalable compute solutions from edge to cloud—Similarity is offering businesses the chance to see both opportunities and challenges coming. And they're doing it while offering efficiencies that save businesses money and reduce the complexity of their solutions.

Learn More

To learn more about Similarity, please visit similarity.com.

To explore Intel® solutions for IoT, please visit intel.com/iot.



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