The Challenge of Self-Service Big Data

Big data – data sets so large, moving so rapidly that traditional tools are woefully inadequate – continue to explode across enterprises today. Such real-time firehoses of data promise to swamp users across the enterprise spectrum, from remote field workers to office staff to the depths of the IT organization.

Just making some sense out of all this information is challenging enough. Putting it to actual use is even tougher for data scientists and subject-matter experts, who deal with such information daily. And yet, bringing the value of big data to all employees, so they can access useful analyses and deep insights in their day-to-day work has been the big data pot of gold, with no rainbow in sight.

Until now. Introducing Maana, the next-generation big data analytics platform. Maana operationalizes big data insights – bringing the full value of big data intelligence and real-time recommendations to employees’ day-to-day work.

From massive, streaming data sources all the way to the people in the field, Maana enables self-service for data discovery and insight, translates those insights into recommendations, and then embeds those recommendations into line-of-business applications.

Maana’s Secret Sauce

Maana positions its product as an “analytics platform that operationalizes big data insights into line-of-business applications.” The operationalization part of this story means that the platform is able to turn the results of its big data analyses into recommendations for users. Line-of-business applications, from call center to petroleum well management apps, can then display such insights within the application.
Maana’s secret sauce, however, is its newly patented semantic search technology – although ‘search’ undersells the power of what Maana has been able to accomplish. In fact, Maana takes a fundamentally new approach to big data analytics, making it easy for enterprises to turn disparate data from multiple silos into continuous insights quickly.

At the core of this platform is a unique invention in knowledge representation, the *Emergent Semantic Graph*. This graph automatically inputs and delineates the enterprise’s entire knowledge structure. The result: a holistic view of anything the enterprise wishes to optimize, the product of simultaneously analyzing all the data in the context of that asset.

Most companies aren’t able to analyze data from all sources simultaneously. To solve this problem, Maana combines its Emergent Semantic Graph with its unified index strategy to process and collate all data silos and data types more deeply than traditional data analysis technology has ever been able to accomplish.

Next, advanced machine learning algorithms automatically extract features in multistructured data, for example, temporal clustering and co-occurrence of events. Incremental, as well as continuously updated data sources, also update Maana’s dynamic insights in real-time.

Furthermore, an important differentiator that contrasts Maana with other semantically-enabled data mining products is how Maana’s underlying technology is not only neutral with respect to business domain, but also neutral with respect to ontologies as well.

*Ontologies* are essentially structured vocabularies – the raw material for most semantic technologies. For Maana, however, ontologies are optional, because it takes a ‘statistically semantic’ approach, essentially deriving relevant terminology via statistical analyses of the raw data.

The Maana platform also offers a patented approach for separating the structure of data from their content. This separation provides a ‘fluidity of modeling’ within a graph and is the underlying enabler to Maana’s conceptual framework.

The combination of the Emergent Semantic Graph, unified index strategy, and advanced machine learning enables the Maana platform to create a continuous knowledge structure of core business assets for iterative insight discovery, which in turn accelerates data understanding and integration.
Operationalizing Big Data Insights

While most big data analytics platforms – including modern, semantically rich ones – are essentially tools for experts, Maana brings the power of big data to everyone in the organization. This fundamentally new approach to big data analytics operationalizes the power of data insights to end-users within the applications they are already using.

Operationalization includes integration with a wide variety of line-of-business applications, which is especially important when users don’t want a whole new app in order to get the benefits of data insights, as well as orchestration of several data processing capabilities, as shown in the diagram below.

Maana delivers an end-to-end analytics platform that crawls, indexes, mines, enriches, joins, classifies, analyzes, clusters, connects, and correlates data from various data silos — simultaneously — to create a dynamic knowledge structure of a business asset or business process.

Maana adds a layer of intelligence to otherwise static business applications, which are often form-based applications with simple query-based back ends. Furthermore, Maana provides continuous insights by updating information with incremental data sources and updated data, all in real-time. In this way, Maana operationalizes recommendations for appropriate actions directly into line-of-business applications.
A User-Guided/Machine-Assisted Paradigm

Maana does more than simply process and operationalize data. The platform actually enriches and ‘uplevels’ the data to provide continuous, adaptable insights.

This notion of upleveling is core to the Maana value proposition. Traditional data mining tools are generally for data scientists to work with. In contrast, Maana refocuses data mining on end-user self-service within line of business applications people already use. As a result, Maana enables better human interaction with data than other tools can accomplish.

In fact, Maana’s user-guided, machine-assisted approach is simple and intuitive for subject-matter experts as they find and draw correlations among data from disparate sources. This approach accelerates the time it takes to get from raw data to usable, real-world insights, often by an order of magnitude.

Under the covers, Maana leverages its advanced machine learning technologies to work symbiotically with the user. Maana learns from the actions of subject-matter experts and others and adapts to the way they work with the information at hand.

User curation is an essential part of this iterative process. Maana’s operationalization of data analytics includes gathering data from interactions with the end-user interface and feeding that information back to the platform as an additional source of data.

The machine-assisted part of this story includes statistical analyses that automatically identify candidate keys – data elements common to different data sources that facilitate the joining of disparate data. Maana also provides machine-assisted renormalization, properly identifying and processing insights into patterns in the data, thus discerning important trends.

By combining such user-guided and machine-assisted approaches, Maana enables users to find answers not only via search and filtering but also through drilldowns and interactive visualizations. Furthermore, Maana’s ongoing operational recommendations provide executive-level analytics, including measurements of improvement of an organization’s key performance indicators.

Maana’s Diverse Applications

The applications of Maana’s platform are surprisingly diverse. General Electric and Chevron are both investors as well as early customers, and early applications include predictive maintenance for oil and gas and industrial manufacturing, accounts receivable collections, and field service optimization.
Optimizing the equipment lifecycle in industrial environments is an important example of how Maana works. Companies often sell equipment at a loss in hopes they will make a profit on service contracts. Therefore, optimizing the service schedule is imperative for both the vendor as well as the customer.

Maana optimizes such field service schedules via a contextual analysis of relevant data, leading to field service optimization as well as failure prediction. Such data may come from the device itself, as much of today’s industrial equipment generates streams of telemetry that include sensor data indicating normal function as well as error codes and symptoms of underlying problems.

Modern turbines, for example, have over three hundred sensors. They churn out terabytes of data per day, both continuous and discrete. The problem with continuous data, however, is that people understand discrete data points, while continuous data are opaque to a casual observer.

Maana boils down such continuous data streams by identifying commonalities that are leading indicators of a failure event. In other words, Maana doesn’t just pull out any discrete data from continuous data streams, it uncovers the most useful data.

However, Maana doesn’t stop with such streaming telemetry. The platform also processes the entire repair history for all equipment as well as their component parts. The result of this processing will be a ranked set of parts the maintenance staff should most likely have on hand to facilitate the successful repair of each device.

In many situations, important information comes from the staff in the field. For example, Maana correlates time series data like telemetry data with structured data and text, including comments from engineers.

If an engineer labels an event as a ‘broken shaft’ for example, Maana can identify the patterns in the streaming data that correlate with that label and recognize that pattern should it occur again. The goal is to both predict when failures are more likely to occur as well as have the right parts available, either to deal with a failure or ideally to provide properly timed maintenance necessary to avoid such a failure.

Maana also optimizes maintenance schedules by inputting maintenance and repair histories, weather data, job reports, travel logs, and any other relevant source of information, especially if the data have timestamps. Maana then iteratively renders its analysis to enable pattern searches so maintenance personnel can optimize the entire maintenance process and determine if equipment is operating within the approved envelope, or whether it’s being pushed past its normal limits.

Maana’s end-to-end, operationalized approach also supports field service management. For example, managers are now able to dispatch engineers following a statistically-driven ‘Moneyball’ approach: who are the most effective engineers at solving particular problems? Are they prepared to deal with
equipment failure? How can we match the best field engineers to the right jobs? Maana can answer all of these questions.

Predicting equipment failure is an especially important part of maintenance optimization. Maana’s equipment failure prediction queries ‘window of time’ sensor data based upon historical sensor data and failure information. The platform then automatically generates a ranked set of likely failures.

Optimizing maintenance processes and predicting – thus preventing – equipment failures, in turn, impacts the service organization. Call centers, for example, receive calls and open tickets, while on the field engineering side, workers access Salesforce, ServiceMax, Oracle, or other business applications.

An unusual event, for example, a product upgrade, might trigger new alarms, which would lead to the generation of more tickets. Maana can answer the questions: why do people call the call center? What tickets are they opening? Maana uses its natural language processing capability to process the textual data in support tickets in order to turn them into discrete, categorized information.

**Conclusion: Adding Intelligent Insights to Static Business Apps**

Many of Maana’s competitors offer sophisticated ‘black box’ solutions that require an army of data scientists, while others tout such cutting-edge capabilities as semantic search and machine learning. However, Maana is no complex black box nor a simple tool chest of low-level algorithms, and it doesn’t promise magic through ‘cognitive computing’ nonsense, either.

Fundamentally, Maana enables companies to leverage all data relevant to a business asset and provides a holistic view of that asset for optimization. Maana helps domain experts find the right data relevant to a particular asset or process – thus enabling employees to make day-to-day decisions without having to call IT to help them crunch the numbers.

The platform also enables enterprises to analyze data in multiple silos simultaneously, allowing companies to accelerate the time it takes to get from raw data to continuous insights, often by an order of magnitude. This is the power of Maana’s end-to-end operationalization of data insights.

This extra intelligence serves people in three key roles within the enterprise: the data scientist, the data analyst, and the domain expert. The addition of self-service data mining for domain experts to the list of data professionals is one of Maana’s big wins for customers.

The combination of speed, end-to-end capabilities that connect raw data to line-of-business applications, and semantic technology so versatile it empowers self-service data mining, positions Maana for success in enterprises with even the most intractable big data analysis challenges.

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