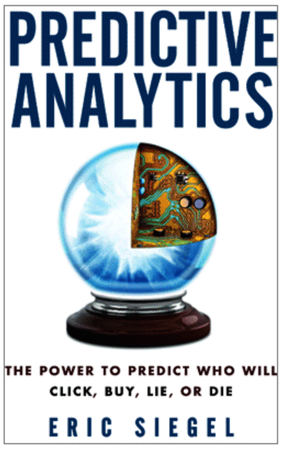
Predictive Analytics' New Wave

Demand for solutions grows as fast as Big Data accumulates; powerful technology platforms step into the breach

Thursday, January 30, 2014 , By Katherine Heires

Fascination with the future is part of human nature. In a commercial or financial context, accurate predictions have major business implications; in finance, many quantitative processes and innovations are designed to deliver such insights for competitive advantage.

One doesn't need a crystal ball -- or sophisticated software, for that matter -- to measure the demand for the latest in predictive-analytics tools or to understand how and why it is accelerating. Predictive analytics can be seen everywhere from the micro level, as in credit scoring on loan applications, a technique banks have been employing since the 1940s; to the macro analyses that regulatory bodies are developing to assess systemic risks. Financial and nonfinancial enterprises alike aspire to mine Big Data for patterns and insights that can foretell, and create opportunities out of, market trends or customer behaviors, while also taking emerging risks into account.



Eric Siegel's "Predictive Analytics" is one of a number of titles indicating a growing level of popular and business interest in the field.

Amazon, Google, Netflix and other retail marketers have used predictive analytics to anticipate customer likes and dislikes and offer highly individualized services and recommendations. An ever-widening array of entities -- in advertising, health care, insurance, energy, and even government agencies like the Securities and Exchange Commission -- have embraced predictive analytics in some form, many working with data and technology-platform providers that include, to name a few, IBM Corp., Microsoft Corp., Oracle Corp., SAP, SAS Institute and Tibco.

Elder Research, a Charlottesville, Virginia-headquartered data-mining and predictive-analytics consulting firm, has expanded since its start in 1995 from working exclusively with hedge funds to applying its expertise to oil-and-gas-drilling outcomes, drug discovery, preventing bank and contract fraud and working on national security issues, says founder John Elder. The firm offers proprietary predictive technology and lists among present and past clients Capital One Bank, HSBC, Hewlett-Packard and the U.S. government.

"Predictive analytics allows you to consider many things simultaneously, in complex ways, so you can see and analyze many more combinations of factors" before arriving at a prediction or identifying the potential for fraud, Elder explains.

Experts in the field say that taking full advantage of the latest innovations in predictive analytics -- which for any firm involves making savvy use of its collected data, gleaning insights about the future from historical and/or real-time data and ultimately advancing business and risk management decision-making -- requires thinking about new technology or new combinations of capabilities.

The ability to analyze extremely large quantities of data can advance the accuracy of models or other predictive efforts. This might entail enhanced visual displays in predictive platforms that can scale up for Big Data; or enhancing predictive analytics with machine learning and artificial intelligence technology. What's more, making predictive analytics easier to use would spread its benefits beyond just data scientists.

'New Wave' Providers

"Our mission is to bring high-powered predictive analytics and machine learning to the masses," says Martin Hack, president, CEO and co-founder of Skytree. The two-year-old startup in San Jose, California views itself as part of a new wave of predictive analytics firms, declaring on its website that "advanced analytics and machine learning is the best way to exploit the opportunity presented by Big Data."

Likewise, David Marra, founder and CEO of Arialytics, a Westchester County, New York-based company bringing high-level analytics capabilities to hedge funds and asset managers, asserts: "The old way of analyzing data for predictive analytics has broken down. We are part of the new wave" that can work with massive amounts of computing power.

Some practitioners caution that ever larger volumes of data do not necessarily correlate with better analytics. In many instances, anomalies can be identified more easily, and predictive models assembled more quickly, using selective data sets.

"It's puzzling to me why Big Data is a buzzword," says John Elder. He is not alone in warning that too much data can be counterproductive -- information overload has hindered effective intelligence analysis by the U.S. National Security Agency, according to some critics of the NSA's recently exposed blanket communications surveillance approach.

Still, Gartner predicts that within three years, 70% of the most profitable companies will manage their business processes using either real-time predictive analytics or extreme collaboration, the latter involving virtual collaboration and real-time communication across divisions and regions. The firm says organizations that actively use predictive business-performance metrics will increase profitability by 20% by 2017.

In 2012, a Gartner survey found that only 13% of companies had a predictive analytics system in place.

Widening Circle of Interest

A former Columbia University professor of computer science, Eric Siegel is a consultant and author of "Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie or Die," one of a number of titles indicating a growing level of popular and business interest in the field. Founder of the Predictive Analytics World conferences, he notes that in 2009 he hosted two conferences, and 10 are on the calendar for 2014. "The two new predictive analytics verticals we will focus on this year will be manufacturing and health care," he says.

Among those tapping into the demand for specialized predictive solutions is Verdande Technology, a company with roots in Trondheim, Norway and in the energy industry -- it has offices in Abu Dhabi, Houston and New York -- that is crossing over into finance.

According to David Lauer, a Verdande technology architecture consultant, Wall Street's bout with technology glitches, including the 2010 flash crash and the 2012 Knight Capital Group software failure that forced that firm into a merger, is a sign of the need in highly complex markets for far better surveillance and proactive alerts like Verdande's VTEdge platform can provide.

"We focus on normality modeling and anomaly detection," Lauer explains. The "dynamic and adaptive" system takes note, for example, "of traders acting differently from their normal behavior," and may recommend that action be taken. Similarly, order rates and risk exposures potentially spiraling out of control would set off alarms. IEX Group, a New York-based alternative trading system operator led by former RBC Capital Markets executives, signed up for the VTEdge platform late last year.

Access to Supercomputing

Marra of Arialytics notes that in finance and investments "there is a constant need for predicting things. All active investment is about predicting the direction of some security." What has changed dramatically is the amount of data from which investors can draw their predictions and assess risk -- and the automation enabling that.

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A Boston Consulting Group veteran who had worked on the pharmaceutical industry's data challenges, Marra started thinking about a better platform for investment research about eight years ago. He formed Arialytics, the firm, four years ago and launched its Aria analytics platform in summer 2013. It was programmed with Linux and brings supercomputing power to bear on machine learning and structured analytics.

Martin Hack is president, CEO and co-founder of two-year-old startup Skytree.

"We are the only Big Data, predictive analytics platform purpose-built for financial markets that I am aware of," Marra says. "All other examples are cross-industry platforms."

"Clients come to us with their own data and want to extract as much predictive power out of that information as possible and that's what we allow them to do," he adds. Whereas a typical institutional client might bring 2,000 securities with 40,000 variables per security for analysis, the Aria platform brings 2,000 additional econometric predictors to the exercise. Therefore, says Marra, terabyte-scale problems are the norm for Aria, which can be deployed on-site or accessed as a cloud service.

Taking advantage of what the firm calls adaptive prediction, which continually adjusts to market conditions and provides objective analysis of complex time series data sets, a hedge fund manager with ideas about alpha can test a greater quantity of investment ideas and predict which ones might work far faster than in the past. Risk managers can use the platform to better estimate expected returns and, in turn, lower risk. Even typically unprofitable activities like currency hedging can be transformed into profit centers using predictive insights, Marra states.

He goes on, "We've moved to a world where you can go from investing ideas to investable solutions in a matter of hours or days, rather than months. ... Ultimately, I think every investment firm will embrace predictive analytics as it makes so much sense."

Choose Your Strategy

Skytree offers the Skytree Server platform; its advanced algorithms can be applied to a range of analytics strategies including predictive, value, what-if and outlier. The company's more than 30 clients are primarily in financial services, but also in real estate, advertising, logistics and telecommunications. The dating site eHarmony is a user.

In the financial services market, "the two major drivers are loss prevention and making money, and advanced machine learning allows you to do both," says CEO Martin Hack. His Skytree co-founder, computer scientist and chief technology officer Alexander Gray, "began working with massive scientific datasets in 1993 (long before the current fashionable talk of Big Data) at NASA's Jet Propulsion Laboratory in its Machine Learning Systems Group," according to Gray's biographical note.

Hack says there are currently 3,500 different machine learning methods extant, and 800 new ones are introduced each year. "Just combing through those in existence is an overwhelming task" -- and that is what Skytree Server helps clients to do. Skytree Server is compatible with Hadoop open source technology for Big Data management. The company has also introduced SkyTree Adviser, aiming to bring the platform within reach of everyday business users.

The massive quantities of collected data -- from sensors, social media, genomics or financial activity -- are not a problem for machine intelligence company Wise.io, whose CEO, Joshua Bloom, has an astrophysics Ph.D. and is an associate professor at the University of California, Berkeley. The "io" in the Berkeley-basedcompany's name stands for "infinite output."

The one-and-a-half-year-old, cash-flow-positive firm aims to build accurate prediction models using highly scalable implementation of the Random Forest algorithm and publish results at "blindingly fast speeds" for any enterprise environment. "We are focused on answering real-time questions" that companies routinely ask all the time about internal or incoming data, Bloom says.

Proving the Value

Wise.io claims it can apply its predictive services for clients and produce results in two weeks or less. To demonstrate the value of Wise.io, its Proof of Value program invites potential customers to present a single business question related to their data. "We can show you the true predictive value of your own data and how to use it in a more efficient and cost-effective manner," Bloom states.

Cary, North Carolina-based SAS, which has 23 U.S. offices, has in-memory analytics and machine learning techniques at the ready for financial organizations' risk and scenario analysis, stress-test, fraud prevention and other requirements that benefit from predictability. In November 2013, SAS introduced an update to its three-year-old High Performance Risk platform, addressing new Basel III liquidity and credit risk rules and facilitating the testing of complex shocks to banking systems, what-if scenarios, ad hoc recovery scenarios and extensive changes in risk-factor values.

Also last year, SAS introduced Decision Manager, a predictive analytics and decision-support platform for Big Data in such areas as credit, fraud risk, next-best offers, pricing and claims approval. It shortens processes involving humans and automation from months to hours, the company says.

SAS global financial services marketing manager David Wallace noted: "With the proliferation of ever larger data sizes, our job at SAS is to constantly make sure that our analytics provide the predictive insights our customers need, whether in the form of risk forecasts, new-business projections or the right mathematically formulated action to take."

Caveats

Paul Rowady, senior analyst at research firm Tabb Group, says that with predictive analytics coming to the fore as a strategic tool, prospective buyers s assessing their options need to be alert to the difference between truly predictive systems and those that are simply reactive. He advises three lines of inquiry:

1. What is the scope, depth and diversity of data sources that can be utilized with a given platform? Are you able to access and work with different types of clean data that has significant history relevant to the issues at hand? If a given set of patterns cannot be informed by diverse data, predictability will be diminished.

2. What is the nature of the algorithms employed by the platform and the mechanism by which it converts historical data into something predictive? Is it based on some underlying method whose workings can be understood? Some providers will not want to reveal this information, and a client must decide if it can live without it. Also, can the algorithm be customized to meet specific needs? And is it a third-party, contributed algorithm, or proprietary to the platform provider?

3. Does the platform and its provider demonstrate ongoing creativity in the user interface and data visualization to enable users to configure the outputs to suit their needs?

Rowady believes that in the capital markets space in particular, there could be greater use of information currently in place for predictive purposes, and that this might be a worthy subject for discussion with platform providers.

"One of the greatest opportunities is for these mechanisms to use data about the future, including information about upcoming meetings, dividends, earnings, anything that we know about the future" -- or the impact of future events, Rowady says, adding, "Nobody has taken this step yet" in a major, scientific way.

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