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WorldQuant Perspectives

DISCOVERING THE HIDDEN WORLD OF ALTERNATIVE DATA

The increasing availability of data from satellite imagery, social media and other emerging sources is giving investors the opportunity to make better-informed decisions.

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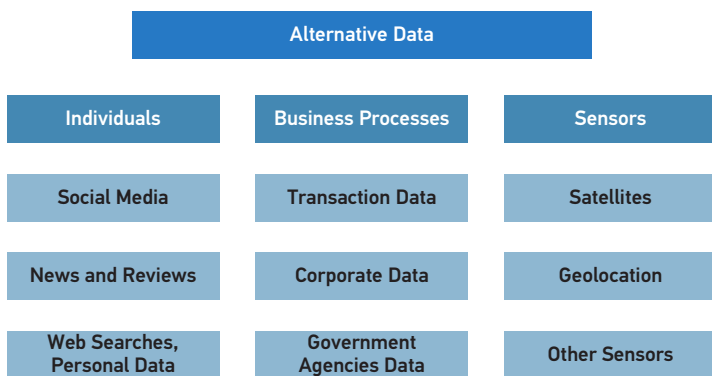
IMAGINE A WORLD IN WHICH YOU COULD SIMULTANEOUSLY KEEP track of every ship on its way to port, every truck that missed its route, every factory under construction. That’s the world envisioned by Planet Labs, a San Francisco–based company that builds satellites and launches them into space.

Founded by three ex-NASA scientists, Planet Labs sends up flocks of Dove satellites — each the size of a 12-inch cube and costing as little as \$300,000 — to form constellations that circle the earth at low orbit. In February, the company set the world record for the most satellites ever launched on a single rocket — 88 — creating the largest private satellite array in history. Planet Labs’ 149 Dove satellites have the capacity to capture images of 150 million square kilometers of the earth on a daily basis. Employing machine learning techniques, the company’s algorithms analyze these images to find patterns in the pixels or identify specific objects. For instance, they keep track of the number of factories under construction in rural China, a possible indicator of the strength of that country’s industrial production.

Planet Labs is just one of many companies helping to create and make use of the growing amount of alternative data stored and managed in the digital universe. Framingham, Massachusetts–based research firm IDC expects the volume of globally created data to grow to 44 zettabytes (44 trillion gigabytes) by 2020 and to 180 zettabytes by 2025. Alternative data will represent more than two thirds of that total. J.P. Morgan breaks alternative data into three categories based upon its source: data generated by individuals, data created by business processes and data produced by sensors (see figure below).

TRIPARTITE VIEW OF THE WORLD

Alternative data generally falls into one of three main categories.



Source: J.P. Morgan Macro QDS.

The growing availability of alternative data has helped investors expand their knowledge of companies’ business prospects beyond information culled from traditional sources. In the past, investors relied on quarterly earnings calls, analyst reports and financial news for insight on company performance; today they have cost-effective opportunities to discover myriad sources of alternative data and create digital records of this information at scale. Although we are still in the early stages of defining how to consume alternative data — actionable data is projected to grow 9.6 times from 2020 to 2025, according to IDC — innovative work in artificial intelligence and machine learning should help investors and companies use these untapped sources to make better-informed decisions.

Data generated from business processes — that is, obtained from commercial transactions, corporations or government agencies — can be especially valuable. Investors can purchase transaction data sold by firms that gather credit card and debit card purchase information and anonymously aggregate it to help predict company sales in near real time. Email receipt data from online retailers also can be useful. In November 2016 shares of onetime market darling GoPro plummeted 17 percent over three days because the company’s third-quarter earnings came in well below Wall Street forecasts. Quandl, a Toronto-based data platform provider, had successfully predicted GoPro’s larger-than-expected loss by analyzing the camera maker’s product receipts from more than 3 million email inboxes. Quandl observed low sales volume from third-party retailers including Amazon.com, Target Corp. and Wal-Mart Stores. Amazon, which accounts for about 50 percent of GoPro’s revenue, experienced a 5 percent decline in GoPro sales that quarter. By basing its predictions on alternative data, Quandl estimated that GoPro’s third-quarter revenue would rise by 15 percent, significantly below Wall Street analysts’ consensus of 42 percent growth. (The company’s revenue actually increased less than 9 percent.)

THE POWER OF SENTIMENT

Individuals are major producers of alternative data through their social media activity, online reviews and web searches. Social media have been a particularly rich source for analysis by investors who are trying to understand market sentiment and predict business performance. Facebook has 1.28 billion daily active users, on average, generating enormous amounts of data through user posts and comments. Twitter has a strong following as well, with 328 million monthly active users.

“ SENTIMENT ANALYSIS IS CONDUCTED BY DEVELOPING ALGORITHMS TO IDENTIFY POSITIVE OR NEGATIVE KEYWORDS IN STATEMENTS WHILE TAKING INTO ACCOUNT USER DEMOGRAPHICS AND THE POSTS’ CONTEXT. THE ANALYSIS IS USEFUL IN DETERMINING NEW-PRODUCT PERCEPTION AND BRAND REPUTATION. ”

Facebook and Twitter provide a window into the public’s thoughts and impressions, which often are not represented in daily news coverage. Although Facebook has a much larger user base than Twitter, the latter has been more popular among investors, in part because the 140-character limit for tweets lends itself well to analysis by third-party data providers like Miami Beach-based PsychSignal and New York’s Dataminr.

Sentiment analysis, as it is called, is not restricted to social media. Boston-based Lexalytics offers text and sentiment analytics to commercial companies, providing insight on branding, reputation and competitors. The technology vendor’s products include an analysis engine capable of extracting sentiment scores from a company’s data, a search engine that tracks the emotional intensity of any document online (social media post, news article) and a social media platform that analyzes data and identifies users who are influential on topics of interest. Typically, sentiment analysis is conducted by developing algorithms to identify positive or negative keywords in statements while taking into account user demographics and the posts’ context. The analysis is useful in determining new-product perception and brand reputation, assisting investors in forming predictions about the growth of a company or industry. When accessible data is diversified to include alternative data from social media sites, investors may be able to make better decisions.

TRACKING MOVEMENTS

Sensors account for the third major source of alternative data, collecting images from satellites and monitoring movements using apps on mobile phones and other devices. Investors can turn to companies like Planet Labs to gather trade and production information by counting and categorizing ships at ports or along trade routes. This is done by differentiating the ships’ pixel colors from the seawater’s darker pixels. Additionally, real-time access to data on ship movements can prove useful in building a comprehensive picture of global shipping and an accurate understanding of competitor and market trends. Genscape, for example, acquires this information by receiving signals from the Automatic Identification System (AIS), a global positioning system used by most international ships to avoid collisions. The Louisville, Kentucky-based company has the largest privately owned AIS receiver network and AIS satellite constellation, tracking more than 144,000 vessels daily. Acquiring diverse shipping data can be used to better understand the costs and health of companies’ supply chains.

AirSage and StreetLight Data are companies that use technology to provide mobile device location data for modeling and evaluating the movement of people and assets. Foursquare, a New York-based enterprise, designs mobile apps that employ geolocation intelligence for consumers and businesses. CEO Jeff Glueck wrote a blog post for Medium last year describing how Foursquare correctly predicted that Chipotle Mexican Grill’s first-quarter sales would drop 30 percent. Though it was clear that the restaurant chain’s sales would suffer following an E. coli bacterial outbreak at some locations, investors were surprised by the magnitude of

“ IOT TECHNOLOGY INCLUDES EVERYTHING FROM IRRIGATION DEVICES THAT AUTOMATICALLY MAINTAIN CROPS BY MONITORING PUBLIC WEATHER INFORMATION AND SOIL CONDITIONS TO WEARABLE TECHNOLOGY THAT TRACKS IN-STORE TRAFFIC. ”

“ FACEBOOK AND TWITTER PROVIDE A WINDOW INTO THE PUBLIC’S THOUGHTS AND IMPRESSIONS, WHICH OFTEN ARE NOT REPRESENTED IN DAILY NEWS COVERAGE. ”

the sales decline, which sent Chipotle’s shares down by more than 11 percent in April 2016. By keeping track of 50 million monthly users actively or passively sharing their locations, Foursquare was able to determine the foot traffic patterns of Chipotle restaurant-goers and build models that predicted the chain’s drop in sales.

A GLIMPSE INTO THE FUTURE

There are no bounds on the type of data that can be generated. And whether it comes from a company’s supply chain, activity on an online platform or a sensor in a device, the data creates new types of intelligence. As the world becomes increasingly digitized, we are starting to see an interconnection of these data pools through the network of computing devices embedded in everyday objects, known as the Internet of Things. IoT technology has the ability to collect and exchange data, and includes everything

from irrigation devices that automatically maintain crops by monitoring public weather information and soil conditions to wearable technology that tracks in-store traffic. While information is created and shared through networking technology, data is generated through the coupling of businesses, individuals and devices. This gives rise to new signals and trends for analysis, allowing investors to gather intelligence about a company’s performance or product that was previously considered opaque to the outside world. In near real time these devices have the ability to provide valuable feedback and inspire responses across many industries.

Improvements in technology have allowed IoT to progress rapidly despite concerns about privacy and accessibility. Research firm Gartner forecasts there will be 20.4 billion connected devices in use worldwide by 2020, compared with 8.4 billion expected at the end of this year. Additionally, traffic from wireless and mobile devices will account for nearly two thirds of total Internet traffic by 2021, according to a report by Cisco Systems. However, IoT is still relatively unknown: Just 9 percent of the 996 respondents in a 2016 Penton corporate survey felt they were familiar with the technology, while the majority felt there was confusion surrounding IoT. Companies that can determine how best to comprehend this vast amount of data could have an edge in finding new opportunities and creating greater business efficiencies. For investors, especially those who play in the world of quantitative finance, increasing access to alternative data from emerging sources like IoT could give rise to a variety of new investment ideas and trading strategies. ◀

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