Analytics Goes on Location with New Approaches

Lee Garber

Businesses are increasingly using location analytics—which integrates organizational and geographic data—to help identify trends, develop more accurate predictions, and make better decisions.

Companies have long used analytics to make sense of the huge amount of data they collect from customers, marketing campaigns, suppliers, and other sources.

Businesses are always looking for ways to improve this process and are now beginning to do so by adding a new component: location-based data.

Location analytics adds geographic, demographic, economic, and similar types of information to the financial and other data that companies already collect. This lets analysts better understand trends by combining geographic relationships with the ones they have been studying using technologies such as business intelligence (BI). They can then view the results via maps and other easy-to-comprehend approaches.

As the “Using Location Analytics” sidebar describes, they could use these findings to improve business insights and processes, upgrade customer relations, and make decisions such as where to locate branch offices or introduce new products.

However, before location analytics can become widely popular, it must overcome several key challenges.

**DRIVING FORCES**

Companies are always looking for ways to outperform their competition and otherwise thrive in the marketplace. One way to do this is to better leverage the data they gather about customers, suppliers, rivals, and other important entities.

With this in mind, an increasing number of organizations have adopted BI, noted Chris Ovens, director of location analytics for vendor Esri. Frequently, businesses add a BI layer to data-collecting applications they already run, such as those for customer-relationship management.

To improve corporate decision making, BI typically focuses on information such as sales figures and supplier transactions. However, BI doesn’t have location-related capabilities and thus doesn’t consider geographic and demographic factors that are critical to many aspects of business such as consumer analysis, where to locate stores, warehouses, and manufacturing facilities; and marketing campaigns’ effectiveness.

In the past, combining separate BI and location-related approaches, such as geographic information systems (GISs), was limited to large enterprises such as oil- and gas-exploration companies, big transportation firms, and major government agencies.

The two types of technologies were expensive to run across a lot of data and required workers with specialized skills. In addition, integration required complex, costly, time-consuming custom coding for each type of functionality, noted James Buckley, senior vice president and general manager for location analytics vendor Pitney Bowes Software’s Customer Data and Location Intelligence Division.

**Increasing demand**

A recent survey by Esri and IT media firm TechTarget of about 180 business and IT managers and staff at companies of differing sizes and from various industries found that an increasing number think it’s important...
to use maps to view business data in a geographical context. “All aspects of businesses are inherently geographic,” said Ovens. “Things are bought and sold somewhere. Things are shipped to and from somewhere.”

Today, the customer experience demands greater personalization and customer knowledge, explained Matthew Gentile, a principal with Deloitte Financial Advisory Services. Knowing customers, he said, is in large part defined by where they live, work, and are likely to be. Many companies need this information about their geographically diverse customer base to constantly develop appealing new products and services, he added.

Plenty of location-related data is readily available today from social media and the increasing use of mobile technology, noted Pitney Bowes Software president of the Americas Greg Van den Heuvel.

Meanwhile, location-analytics adopters’ early success has encouraged other companies to try the technology, observed Alfonso Pedraza Martinez, assistant professor of operations and decision technologies in Indiana University’s Kelley School of Business.

**Technological advances**

According to Gentile, advances in systems architecture, processing power, and inexpensive storage, as well as growth in the number and types of sources of geographic data—such as phones and GPS systems—make location analytics accessible.

Also, said Pedraza, hardware and software have become less expensive and more user friendly, making location analytics attractive to many businesses.

Today’s availability of more computing bandwidth has made the complex processing that location analytics requires available to smaller organizations, said George Demmy, chief technology officer for analytics vendor TerraGo.

Applications like Google Maps and Microsoft’s Bing Maps Platform provide free or low-cost, easily accessible mapping capabilities, and simple APIs let people with basic programming skills put data on maps, said Gentile.

**ADDING LOCATION TO ANALYTICS**

Turnkey location-analytics applications are now available from vendors such as Alteryx, Azavea, BroadMap, CoreLogic, Esri, Gartrell Group, Omnisdata, Pitney Bowes Software, SpatialKey, and TerraGo.

These applications integrate analytical and geospatial capabilities. This eliminates the need for analysts to do the integration themselves, making it easier for even small companies to use location analytics, explained Pitney Bowes Software’s Buckley.

At its most basic, location analytics automatically combines location and demographic data—which is multidimensional—with nongeographic information—which is typically tabular and two-dimensional—for subsequent analysis, noted Indiana University’s Pedraza.

According to Esri’s Ovens, location analytics lets organizations

- enrich sales and other internal data with layers of other types of information such as geolocation, demographic, or weather-related data;
- spatially analyze data; and
- present analysis results on a map or in some other form that’s easy to visualize and interact with in geographic terms.

**Location analytics employs techniques such as natural-language processing to understand text.**

**Analytics**

The technology employs the same types of techniques as other forms of business analysis. These include data mining, business-process intelligence, and online analytical processing.

OLAP works with multidimensional databases. These databases can handle each of many information attributes as a separate dimension and analyze them in terms of combinations of dimensions. For example, companies could analyze sales data based on location, demographics, competitors, and weather. Relational databases are typically just two-dimensional.

Location analytics employs techniques such as natural-language processing to understand text. It also utilizes entity extraction to recognize and identify useful information, said TerraGo’s Demmy. For example, the techniques let a location-analytics application recognize what an address format looks like and then find addresses for use in geographic analysis.

Location analytics also utilizes predictive analytics to study information from datasets, identify patterns, and forecast outcomes and trends with an acceptable level of reliability. The technique can update its findings as new data becomes available.

Companies often use this approach to predict customer behavior, such as whether people in specific areas are likely to buy a new product or respond positively to a marketing campaign.

**Storing and managing data**

There are various approaches to storing and managing data. For
organizations make the most of data available from social-networking sites and mobile devices, said Deloitte’s Gentile. They could get information such as who and where their best customers are, as well as location-based patterns related to purchases.

In addition, companies could find out where to look for new customers similar to existing ones, based on demographic similarities, as well as where and why marketing efforts have or haven’t been successful.

A key advantage is that many workers—not just BI or GIS experts—could use location analytics, which performs much of the complex processing behind the scenes, noted Esri’s Ovens.

“Twenty years ago, statisticians would have done most of the analysis,” said Indiana University’s Pedraza. “Today, business professionals can do most of it. This is important because business people are in a better position to communicate the results to senior management.”

**LOCATING OBSTACLES**

Location analytics faces several obstacles to widespread success.

“The biggest issue today is ensuring you have the right datasets to support what your business needs might be,” said Pitney Bowes Software’s Van den Heuvel.

An organization that wants to use location analytics needs people who understand how to get value from merging business and geographic data, stated Esri’s Ovens.
This is not currently the case for many companies, he explained, but the situation is starting to change.

“I think companies understand that there is value in location analytics, however the gap is that they think that they don’t have a starting place to measure the return on investment,” added Deloitte’s Gentile.

Another challenge is effectively combining multiple information sources and then cleansing, verifying, and geographically enriching the data, noted Van den Heuvel. The failure to do so could make location-analytics efforts ineffective.

As with other types of applications, said the Indiana University’s Pedraza, poor-quality data will yield poor-quality results. In addition, he noted, “If the analysis techniques are not appropriate, the results are not reliable. And if the analyst is not well trained or does not have an idea of what he is looking for, results may not be reliable.”

“It tends to be very data intensive,” said TerraGo’s Demmy. “And developing the datasets can be expensive. Also, putting together the infrastructure—for storing, managing, organizing, retrieving, sharing, analyzing—can be expensive and time-consuming.”

Working with the cloud could help with this, he noted, but many organizations won’t trust their data to a cloud-services provider.

“It’s a young thing,” Demmy stated. “A lot of it’s new. It’s a challenge moving things out of the laboratory into the marketplace.”

In some organizations, he added, there are cultural hurdles, with companies not wanting to try a new technology or to move away from traditional business analytics.

In the future, said Pedraza, location analytics will entail more real-time analysis and more accurate forecasts based on pattern identification and social media.

Cloud-based location analytics will also become more popular, added Deloitte’s Gentile.

The technology will get more sophisticated and make better use of social media, predicted Esri’s Ovens. At some point, he said, it could even provide 3D visualization and work with the geography of the interiors of stores and other buildings.

“As soon as we crack the issue of sharing [personal] data with trusted [partners and applications], you’re going to see an explosion of location-aware apps that will feed into location-aware systems,” stated TerraGo’s Demmy.

Location analytics, Ovens said, will continue to grow in popularity largely because of better software, better-trained people, new and advanced analysis techniques, and the massive use of social media.

“I believe that the level of [business] personalization that people request and demand today will make it among the most relevant and technologies today,” said Pitney Bowes Software’s Van den Heuvel.

“Location analytics will be transformational to businesses,” said Ovens. “There’s a lot of room for growth. It’s like we’re at the start of a big wave, a surge. It’s very exciting.”

“It’s going to become a foundation technology,” Demmy said. “In five years, it’s going to be a very natural way of looking at and exploring things. It’s just going to be another way of working with data.”

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