Pitney Bowes
Software

Location Intelligence Backwards and Forwards

Associating people and places in new and profitable ways

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ABSTRACT

AS OF NOVEMBER 2011, CELL PHONE USERS NUMBERED 6 BILLION AND COUNTING[1] AND ACTIVE MOBILE BROADBAND SUBSCRIPTIONS HAD ALREADY CROSSED THE ONE BILLION MARK. WITH CLOSE TO 700 MILLION SMARTPHONES IN THE HANDS OF CONSUMERS, LANDLINE USAGE IS DECLINING, AND MORE CONSUMERS ARE RESEARCHING AND MAKING PURCHASE DECISIONS ON THE GO.

EACH SMARTPHONE IS A MOBILE GPS; AND, EACH SMARTPHONE CAN BE USED TO FIND ITS USER ON A MAP, GET DIRECTIONS, AND FIND LOCATIONS OF INTEREST NEARBY. THIS IS THE START OF SOMETHING BIG. REVERSE GEOCODING—TRANSLATING A LATITUDE AND LONGITUDE TO A SPECIFIC ADDRESS—OFFERS THE MEANS TO CONNECT PEOPLE WITH PLACES, THINGS AND, MOST IMPORTANTLY, WITH DATA ON THEIR BEHAVIORS, PREFERENCES AND INFLUENCERS IN REAL TIME. IT ENABLES MARKETERS TO DELVE INTO THE DATA BENEATH THE MAPS, MAKING SMARTPHONES SMARTER, MARKETING MESSAGING MORE RELEVANT AND ACTIONABLE, AND ENABLING BUSINESSES TO SERVE CUSTOMERS IN NEW WAYS FUELED BY GEOGRAPHIC INSIGHT.

THIS WHITE PAPER EXPLORES THE HISTORY BEHIND LOCATION INTELLIGENCE, THE ESSENTIAL ROLE REVERSE GEOCODING IS PLAYING TODAY, AND THE HUGE POTENTIAL INVENTIVE LEADERS ACROSS INDUSTRIES SEE FOR REVERSE GEOCODING IN THE FUTURE OF THEIR BUSINESSES.

THE POTENTIAL FOR REVERSE GEOCODING
IS GROWING EXPONENTIALLY

Reverse geocoding defined

What reverse geocoding does sounds simple: it grabs a mobile GPS signal from a customer's smartphone, pinpoints where he or she is, and translates the coordinates to a specific address.

There are several reasons why reverse geocoding is poised to be a game changer:

- The speed and accuracy with which it can make this translation—it can return results within milliseconds

- Its scalability—high power reverse geocoding can translates millions of records concurrently

- The many uses there are for the addresses it can provide in informing real-time marketing, logistics, service and other essential business decisions

With so many people using smartphones today, the potential for reverse geocoding is growing exponentially.

Here are two quick snapshots of ways that reverse geocoding can provide a new level of immediate, location-based insights to inform applications for marketing and emergency response.

Marketing use case: The informed traveler

A manager arrives in a new city for a conference and "checks in" using his smartphone. With reverse geocoding, his location is translated from latitude/longitude coordinates to a specific address—providing input for applications for instant local retail marketing. Reverse geocoding applications immediately combine this address information with any a host of other inputs they have available on the manager's preferences, such as prior purchase behavior, demo and/or psychographics, etc. This tailors marketing messages specifically to the manager's most likely next actions and needs.

For example: The manager has "liked" a number of barbeque places on a social media site. The social-media site can offer up the location, menu, coupons and more on a great place for barbeque nearby the conference; and, if the site has access to the conference schedule, this messaging can even be

personalized with conference information and sent just before the conference breaks for lunch or dinner.

With the right applications, all of these connections can be made in seconds, ensuring the manager receives his offers when and where he has the highest potential for putting them to use.

> Note that reverse geocoding offers a level of precision that goes beyond other geo-location solutions such as geofencing. Specifically, because reverse geocoding provides an exact address, the "nearby" suggestions it provides can account for one-way streets, pedestrian-only thoroughfares and other factors so that "nearby" is, in fact, truly a short distance away from the message recipient in terms of travel time.

Logisitics use case: The 911 emergency

A call comes into a 911 operator: the caller is panicked and cannot provide the location of the emergency. In days past, the emergency operator would trace the 911 calls back to a landline location. Today, however, as is increasingly the case, the call is placed from a mobile phone.

Reverse geocoding immediately pinpoints where the call is coming from. It holds the key to quick deployment of emergency services to exactly the right address, ensuring that travel time is minimized and help is on the scene as quickly as possible.

These are just a few examples of how reverse geocoding can inform immediate interactions. Reverse geocoding has numerous potential applications across industries including telecommunications, insurance, retail, and government.

> Mobile technology, combined with reverse geocoding and other applications, can have numerous uses for law enforcement, potentially redefining house arrest and restraining-order enforcement, as well as ensuring rapid and accurate deployment of emergency response.

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Getting technical: how reverse geocoding works

In simplest terms, the geocoder takes X/Y (longitude/latitude) coordinates and returns the closest address for that location. These coordinates get transmitted automatically to the geocoder whenever a smartphone user "checks-in;" there is no need for the user to manually enter any locational information.

Geocoders perform reverse geocoding using street-segment and/or point dictionaries to pull addresses with the highest degree of accuracy. And, if multiple dictionaries are available, the geocoder returns the closest possible match regardless of which point or street segment dictionary produces the address.

How accurate is reverse geocoding? The best reverse-geocoding solutions are the product of those with the best geocoding solutions—they have the most extensive geographical reach, and the most specific and accurate data dictionaries. The returned address must be available within a defined search distance.

Reverse geocoding from Pitney Bowes Software uses a default of 150 meters. And businesses have the option to select different search-distance definitions depending on their requirements.

Location Coordinates
Latitude: 40.008050
Longitude: -105.240945

Output Address
4423 Colorado Ave
Boulder, CO 80303-2175

A brief history:
the growing role of location intelligence

The world has never seemed smaller—nor have consumers ever been more mobile. Increasingly, through mergers and acquisitions, and the economic imperative for many businesses to operate worldwide, companies of all types need to travel, transact, and even build up offices and infrastructure around the globe.

Yet, even as globalization is more and more the norm, the saying "All business is local" continues to be true. Consumers, regions, and countries, even continents do have many commonalities—they also have distinct differences. And, increasingly, these differences must be recognized, as consumers and businesses cross borders, and in a marketing environment where being "customer-centric" and investing in 1:1 communications is helping to increase effectiveness in a communications-cluttered world.

For marketing, highlighting locational differences has been important for decades—but the ability to do so was, at first, highly limited. Using census tract and neighborhood information, businesses segmented customers to identify best prospects for store placement and consumer communications. The data was often anything but fresh. The perspective it provided was often a step forward, but the results were still broad generalities.

Data capture at point-of-sale increasingly included geographic elements—both in terms of where consumers shopped and where they lived. That information, combined with other insights, began to feed richer customer profiles of individual behaviors, preferences, buying patterns and demographics.

INSIGHTFUL SPATIAL ANALYSIS CAN HELP INCREASE EFFICIENCIES THRU AUTOMATION OF LOCATION-BASED FUNCTIONS

At the same time, in operations, for businesses and consumers, paper maps gave way to interactive, online mapping tools of increasing intricacy; and, scanning devices captured point-in-time travel information for toll collection and border controls. GPS (Global Positioning System) access opened for wide-spread consumer use at the beginning of this century, and latitude/longitude positioning gained in relevance and use.

These capabilities fuel insightful spatial analysis and help to increase efficiencies through automation of location-based functions from routing to sales planning, risk management to tax-jurisdiction assignment, even automation of geographic marketing segmentation.

Yet, there were and are still significant challenges to ensuring the accuracy and actionability of geographic insights. Key among them:

Non-standard data: Issues of data quality and the wide variety of data format continue to hamper ability to get an accurate locational view across databases and geographies.

Reliance on approximations: Postal codes were designed for delivering mail. They lack true locational precision and therefore, while often used, can seriously misinform decisions on tax assignments, risk management and more.

Moving targets: Jurisdictional definitions are numerous and change often. New buildings and roads are built; and others are retired, rerouted, or repurposed. Postal codes change. And nature runs its course making its own topographical alterations through erosion, and natural disasters that redefine future risks for underwriters and challenges for logistics personnel.

Information delay: When it comes to applying location-based insights to consumer needs and preferences for marketing purposes, the critical element—understanding where a consumer actually is at a point in time (unless, they are in the midst of a transaction), hasn't been possible—instead, marketers have had to make best educated guesses on where they will be.

Output Address
Michele's Couture
307 N. Rodeo Drive
Beverley Hills, CA 90210-5106

Location Coordinates
Latitude: 34.072
Longitude: -118.391

Bridging the gap between retail and social media, reverse geocoding allow you to capture a GPS signal from a customer's mobile phone, determine their precise location—and then deliver an offer at the right time and place.

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Seeking the best in geocoding and reverse geocoding solutions

Reverse geocoding takes a latitude/longitude and returns an address. Geocoding takes an address and provides its latitude/longitude coordinates. Together, they introduce a new level of immediacy and accuracy that enable better, faster decision making—helping business and government entities quickly take actions that yield more profitable results.

Geocoding came first; and, to truly understand what drives quality in reverse geocoding, it's important to understand the fundamentals of high-quality geocoding. This is because the point and street-segment dictionaries that reverse geocoding call upon for addresses have been built, all or in part, to support the geocoding process—and the quality of the dictionaries helps to determine the quality of the reverse geocodes. Here is how the best geocoding helps to tackle the key location-intelligence challenges outlined above:

Standardizing data: Best practices in ensuring that underlying data can be used efficiently and with confidence starts with a three-step process called Global Address Verification. Through this process, address data is standardized, validated and formatted to ensure completeness and consistency. This Address Verification process makes the address data better, consistently, across the enterprise. It increases opportunities to match and enrich customer data—and associate customer data with real-time reverse geocoding that pinpoints customers' locations by address for marketing purposes.

Reliance on approximations: Latitude/longitude coordinates have proven to be far more precise than postal addresses. In fact, there are instances where, for tax assignment purposes, businesses are not permitted to use ZIP codes—they just don't match up enough of the time. Geocoding and reverse geocoding are very accurate, and the degree to which they are accurate can be clearly discerned.

Moving targets: By using standardized data and address formats, the geocoding, reverse-geocoding processes can quickly and easily be adjusted and tied back to other information.

Information delay: With geocoding and reverse geocoding, the delay is one of milliseconds, with results generated practically in real time.

Geocoding and reverse geocoding truly transform the scope of location intelligence. Geocoding is already in use across industries. Reverse geocoding is just coming into its own.
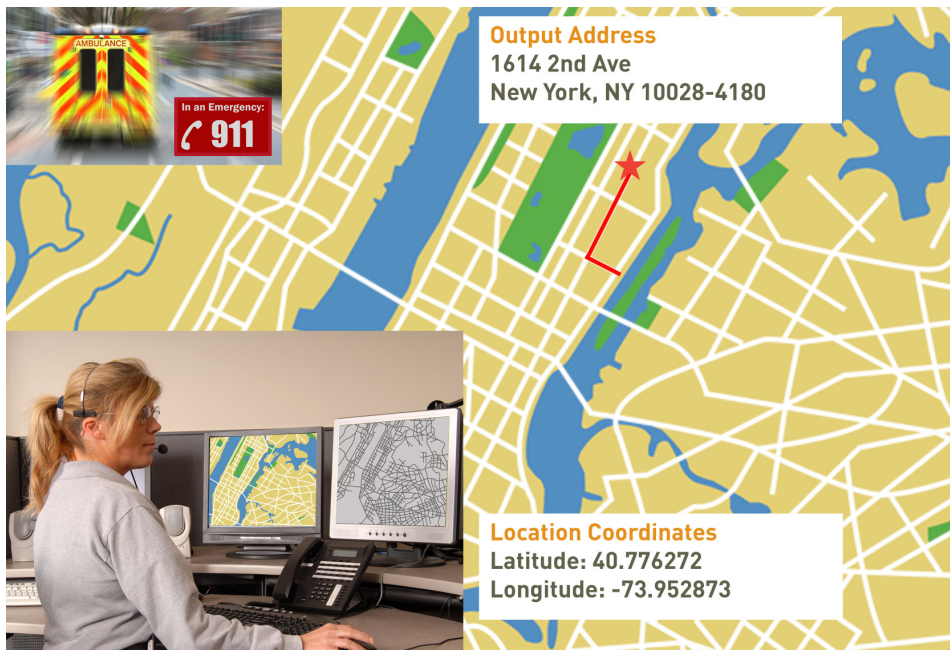
Output Address
1614 2nd Ave
New York, NY 10028-4180

Location Coordinates
Latitude: 40.776272
Longitude: -73.952873

Reverse geocoding is making a difference in insurance (claims, risk management), telecommunications (network optimization) as well as the public sector (homeland security, tracking, emergency response). Now, for example, 911 operators can pinpoint locations and route responders even if a caller is unsure of their address.

REVERSE GEOCODING CAN HELP ORGANIZATIONS PROMOTE SERVICES WITH LOCAL PRECISION

The future is wide open: New uses for new insights

This paper opened with a few examples of how reverse geocoding can be put to use. The brightest minds in social media are exploring ways that "check-ins" powered by reverse geocoding can inform users, increase usage, and generate revenues for their companies and the companies that advertise through them.

> "We are really starting to see location based services 'come of age'. People are realizing that sharing their location often offers some kind of reward in terms of a discount or deal. It is the combination of time and context—directing people towards a deal when they can easily redeem it—that unlocks a powerful tool for marketers to develop precise targeting approaches."
>
> James Fergusson,
> Global Head, Digital & Technology Practice, at TNS

Telecommunications companies, too, are exploring opportunities for melding real-time location intelligence garnered through reverse geocoding with the masses of data that they have on customers to promote their own services and those of partners.

Insurance companies see potential uses in their own emergency response efforts for locating customers in crises; and, in cases from hurricanes, to earthquakes to wildfires and more, to rapidly tying destroyed properties back to specific addresses.

And government entities, as previously mentioned, have opportunities to deploy reverse geocoding in emergency response and law enforcement.

Many other opportunities are sure to develop for this burgeoning technology—it offers long-sought immediacy in location intelligence.

Learn more

Pitney Bowes Software leads the market in international geocoding and reverse geocoding solutions. As a part of our modular Spectrum Technology Platform, they are easily combined with our mapping, address quality and data quality solutions for unparalleled accuracy, coverage and spatial analysis capabilities. As of the beginning of 2012, Pitney Bowes reverse geocoding coverage spanned across 52 countries and territories around the world. Our coverage is continuously expanding into additional markets.

FOR OPTIMAL INSIGHTS AND GEOGRAPHICALLY INFORMED DECISION MAKING, LOOK TO PITNEY BOWES FOR THE HIGHEST QUALITY GEOCODING SOLUTIONS. TO LEARN MORE, CALL 1-800-327-8627 OR VISIT WWW.PB.COM/SOFTWARE.

[1] Key Global Telecom 2011, International Telecommunications Union
[2] Global Mobile Statistics 2012, mobiThinking.com

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