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POI DATA 101

EVERYTHING YOU NEED TO KNOW ABOUT POINT-OF-INTEREST DATA

AN EBOOK FROM QUADRANT

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OVERVIEW

In today's increasingly complex digital economy, almost all modern applications and consumer systems depend on Point-of-Interest (POI) data. Both users and businesses need timely and accurate locations to find and deliver relevant services.

A POI represents a location, building, or landmark in the physical world. Combined with other POIs around it, POI data supports a range of applications such as navigation systems, urban planning and architecture, transit management, and more.

Businesses need POI data to connect with their customers in the physical world: delivering or picking up a package, picking up a passenger who requested a ride on their ridesharing app, assessing competing outlets before expanding to a new neighbourhood, and more. Users also rely on POI data to navigate their surroundings to find emergency services, get transportation, find places to shop, etc.

POI data can facilitate the interaction between consumers and businesses. Therefore, POI data collectors aim to build exhaustive databases of relevant locations. Companies and governments can leverage these POI data to identify trends and patterns in a region and derive actionable insight in order to:

- Commission research and monitoring studies
- Improve navigation and mapping systems
- Making supply chain operations more efficient
- Improve transit, healthcare, and public services
- Match consumers with service providers, etc.

An ideal POI database evolves with changes happening in the physical world. New businesses open, existing ones move or close, neighbourhoods expand, new parking facilities become available in high-density areas (where they are most needed), and more. Businesses, therefore, need access to fresh, accurate, and reliable POI data.

In this eBook, we dive deep into what POI data is and the mechanisms behind it. We introduce various use cases and discuss strategies that can help companies and governments make well-informed decisions.

WHAT IS A POINT-OF-INTEREST?

A Point-of-Interest (abbreviated POI) is a record of a place on a map that someone finds useful or interesting. A POI is typically defined by its geographical coordinates and a few additional attributes like name and category: ***The Fullerton, a hotel at latitude 1.286546, and longitude 103.853721 is a good example of a POI.***

Information about a specific location or – even more – about a collection of similar locations can help businesses drive better decisions for navigation, logistics, communications, business promotion, public safety, and more. Using additional contextual parameters such as human mobility, sociology, dynamics of an area, and more, POI can be used to build meaningful information structures that enable robust analysis and planning.

THE NEED FOR POI DATA

There's been a seismic shift in how consumers interact with businesses and locations around them. Hailing a cab on the street has been replaced by rideshare services like Uber and Grab. Instead of queuing or making appointments at their favourite restaurants, people have their food delivered to their doorstep. There's an app for everything, from buying clothes to running errands, from finding housekeeping to laundry services, and so on. It is almost unimaginable that we once lived in a world where all these services did not exist.

With the rapid increase in 'at your door' services, POI data becomes vital to efficiency. Without an accurate reference of location, delivering these services would be difficult. Uber drivers need to know the restaurant's exact location to pick up the next passenger, and it makes sense for a fast-food chain to open a new store in a growing residential area where customers are underserved. Furthermore, urban spaces are constantly changing. Recently, our world was greatly impacted by the COVID-19 pandemic, as many businesses went out of business and closed down. According to the 'Yelp: Local Economic Impact Report 2020,' more than 97,966 businesses have permanently shut down during this pandemic in the United States in 2020 only. This results in almost 100,000 out-of-date POIs and potential for newer ones to be added as the economy rebounds.

All these changes in the physical world need to be documented to keep our complex digital economy going, and POI databases do just that. POI data providers map the world and enrich it by adding new places and removing outdated information. Businesses can leverage these data to optimise operational efficiency.

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Use Cases

With the right context, POI data can be used by retail outlets to monitor traffic to one of their sites or of their competitors. Logistics businesses can save costs and improve customer experience with accurate address data. Real estate companies use POI data for site selection and project planning based on market potential. Governments can use POI data to enforce regulations, monitor public health and well-being, plan public infrastructure and services, and more. The main goal of POI data is to identify a place of interest, establish its accurate location, and help businesses understand the happenings around that place to make better, well-informed decisions. POI can be essential in assessing competition, improving operational efficiency, planning the expansion of your business, and more.

A few common and widespread use cases of POI data are:

- Retail Analytics
- Delivery and Logistics
- Rideshare Services
- Human Mobility Studies
- Advertisment Deployment
- Site Selection
- Navigation Applications
- Demographic Studies
- Disaster Management
- Urban Planning

Industry Applications

LOGISTICS AND TRANSPORTATION

With retail increasingly moving online, last-mile delivery costs increased significantly. As a result, companies must optimise their logistics to remain profitable. By using accurate and reliable POI data, postal services, fleet and freight businesses, on-demand transport companies, and online marketplaces can improve their routes, minimise errors, plan placement and expansion of pickup and delivery points, etc. They can also use POI data to build reliable apps that ensure efficiency and save time. Cab hailing services can use accurate POI data to enrich their apps, optimise their routes, and fulfil customer requests faster.

- **Map residential complexes to optimise delivery operations**
- **Assess coverage to expand drop off and pick up points**
- **Optimise fleet route to improve efficiency & save time & costs**

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RETAIL

In combination with mobile location data, POI data can help retailers increase profits and provide better services to their customers. Knowing where their customers are can help them optimise Out-of-Home advertising, increasing footfall in their stores. POI data can help retailers get an accurate idea of footfall of their competitors as well. With POI data, retailers can also conduct performance and comparison analyses for all stores across a region. POI data can also be used to drive customers from online venues to physical retail locations.

- **Identify competition in a particular neighbourhood**
- **Site and footfall analysis for new stores and point of sales**
- **Plan expansion in a new city or country**

INSURANCE AND FINANCIAL SERVICES

Facing increased regulation and disruption from new technology, banks and financial institutions that want to maintain their competitive edge need to leverage POI and mobility data. In the insurance sector, the POI data in a region can be paramount to risk assessment and formulation of policies tailored to that region. In retail banking, POI data can be used to map a network of bank counters or ATMs across the city. Combined with mobility data, retail banks can explore new ways of engaging customers, enhance touchpoints, and improve operational efficiency.

- **Map buildings and structures in disaster-prone zones**
- **Engage customers with targeted Out-of-Home advertising**
- **Assess and improve ATM coverage in a region**

REAL ESTATE

When looking to buy or rent a home, customers always want to know about the amenities and attractions in an area. POI data can help real estate developers gather insights before investing or building in a new neighbourhood. Providing rich and accurate data about their project's surroundings also helps drive sales. Online property directories can utilise POI data to provide customers with accurate data about a neighbourhood, facilities in their areas of interest, directions, and more.

- **Map restaurants, schools, hospital, and facilities around new residential projects**
- **Assess neighbourhoods for competition research and perform valuation**
- **Build or enrich online selling and renting platforms with location precision**

TELECOMMUNICATIONS

Network and high-speed internet availability are paramount to mobile usage, television consumption, etc. Therefore, it's more important than ever for telecom companies to adequately plan for network capacity in a region. POI data can help them assess coverage needs, perform competitive analysis, and determine exactly where to build new infrastructure. Combined with data points like area density and competition, businesses can use POI data to plan store openings and offer lucrative plans for their customers.

- **Assess coverage and plan expansion in specific areas**
- **Gain a competitive edge over other networks and services**
- **Expand customer base by providing stores in ideal proximity**

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MARKETING AND ADVERTISING

POI data can be used to plan and optimise Out-of-Home marketing campaigns. Using location-based ads, businesses can deliver tailored, relevant messages and drive customers to their points of sale. Inaccurate POI data can quickly turn a location-based campaign into an irrelevant barrage of messages, wasting money and diminishing brand equity.

- **Improve ROI, reduce ad waste and increase footfall**
- **Perform competitive analysis in regions of interest**
- **Strategise ad placement and target the right audience**

GOVERNMENT

Governments and local authorities as well as emergency and public service agencies can leverage POI data in multiple ways. They can use POI data to map regions accurately and optimise services like public transit, emergency healthcare, law enforcement, and more. Combined with mobility data, POI can help fast-track activities like contact tracing, crime alerts, and more.

- **Improve public services based on the availability of facilities in a region**
- **Optimise and monitor traffic management, healthcare services, and public infrastructure**
- **Create strong crime and disaster response plans by mapping emergency services**

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Ways to generate POI data

There are multiple ways businesses generate or acquire POI data. Some of the most popular methods are:

DATA EXTRACTION FROM OPEN SOURCES

The most rudimentary way of acquiring data is the automatic extraction of POIs from web sources like Google Maps, OpenStreetMap, etc.

Some companies use web scraping tools to export POI information directly into a file or database. While sites like OpenStreetMap allow the extraction of geospatial data points, others are actively preventing mass scraping with stopgap measures like IP blocking. Getting around these might not be illegal, but it is discouraged. Overall, this method is time-consuming and labour intensive, and it is not ideal for large-scale POI projects that need a larger volume of data. The data acquired from these sources also requires intensive data preparation to be used for analysis.

Location engines like Google Maps also heavily rely on businesses and places supplying their own information. If they do not voluntarily update these data points, information can become outdated and introduce inconsistency and inaccuracy into the data set.

USER GENERATED

In the past decade, there's been a surge in the use of social media and thus in user-generated content, including location data. Many businesses rely on user-generated location data or purchase data from vendors who run applications that collect such data. Remember your last check-in on your favourite social media app? You probably added a new location or verified one for a location data collector.

Location data collectors record locations pinned by users and create their own POI records based on that information. However, geographic data provided by a user does not guarantee accuracy, as it is dependent on the hardware, the location permissions of the application, and precision settings. Unintentional mistakes can also deteriorate the quality of data.

GOVERNMENT DIRECTORIES

Most government bodies require businesses to provide their commercial location as part of their business registration process. These postal addresses can form a POI dataset. Many countries make this data publicly available. For example, the Accounting and Corporate Authority (ACRA) of Singapore makes the historical and current data of 1.5 million companies available for public use, research, or application development purposes under their open data initiative.

However, businesses close, grow, and move offices or operate at a different location than their officially registered address. Since they may not proactively update this information with the government body, these data can become outdated and inaccurate over a period of time.

MANUAL VERIFICATION

Some POI data providers hire or contract personnel to manually maintain their POI database: walking the city with a smartphone running a purpose-built app and adding new locations or verifying existing ones. Compared to other methods, this process guarantees accuracy and promises a healthy stream of POI data.

This method of data collection also steers clear of infringement on users' privacy and sale of their location data. These purpose-built apps do not store, collect, or share any data other than the physical location (without tying context back to an actual human being and their mobile device).

POI Formats
Ways to represent POI

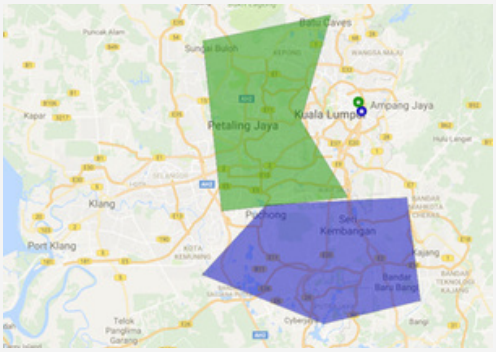
POIs can be placed on a map using a variety of formats, all coming with a unique way of data representation and granularity. Using these formats, POI attributes can be used to specify a place on a map and define its spatial relationship with places around it.

COORDINATES

Commonly expressed in latitude and longitude (Lat/Long), the geographic positions of a location are called coordinates. A POI can be identified with data points as minimal as the latitude and longitude.

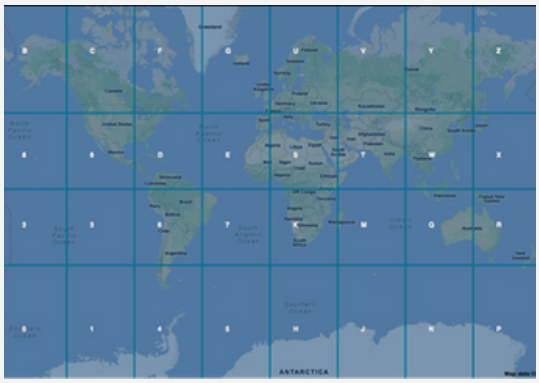
These data can be procured from satellite-based mapping services or collated using GPS-enabled devices (such as smartphones, fitness trackers, tablets, etc.).

Using multiple coordinates, it is possible to create a larger virtual perimeter for a real-world geographic area known as Lat/Long Boundary or Geofence. A boundary can be radial or in the shape of a polygon formed by connecting multiple Lat/Long points. These boundaries help businesses identify and assess POIs within a specific area to draw trends and patterns.



GEOHASH

Invented by Gustavo Niemeyer, Geohash is a geocoding system that allows the expression of a location anywhere in the world using an alphanumeric string. Geohash is a unique string derived by encoding and reducing the two-dimensional geographic coordinates (latitude and longitude) into a string of digits and letters. A Geohash can be as vague or accurate as needed depending on the length of the string.



A Geohash uses grids for spatial indexing where the world is recursively divided into small grids, with each added grid introducing an extra level of accuracy. One of the primary benefits of a Geohash is that it is excellent for precisely pinpointing a POI. By dividing a larger area into grids, you can eliminate most unwanted areas upfront and only focus on the square where your potential targets are in. It also allows for faster geofencing than the lat/long method, saving time and money.

H3

H3 is a spatial indexing system much like Geohash, but it uses hexagonal grids instead of rectangular grids. H3 was developed by the popular ridesharing app Uber to optimize ride pricing and dispatch by visualizing and exploring spatial data. The H3 grid system was open-sourced in early 2020 and is slowly gaining popularity. The H3 system works best for calculating distance between two places and allows circular geofences.

POSTAL CODES

Another common method to represent a POI is its physical address, which usually includes a government-assigned Pin, Postal, or Zip Code. Initially aimed at helping mail carriers sort and deliver mail efficiently, the postal code system became widely used to determine the location of a place of interest.

However, there is no global standard for postal codes. In some countries, like Singapore, a postal code can identify an individual housing block. On the other end, Hong Kong, a territory comparable in size and population, does not use the postal code system at all. Most places fall somewhere in between, where a postal code is not enough to pinpoint an individual Point-of-Interest but can be used as an “official geofence” in data analysis.

Choosing a POI vendor

When looking to acquire POI data, you must start with defining a clear objective. The second step is answering what data points you need to achieve this goal. Thirdly, you must assess your challenges and existing in-house capabilities for working with the procured data.

While quality and accuracy are paramount for POI data, there are other important factors to consider. What are the data provider's delivery capabilities? What is the effort you need to put into preparation to use the data? How do you pick the right partner from a sea of POI data providers?

A few considerations to make before you procure POI data for your business are:

- Define your goals and challenges
- Identify the category of location data you need.
- Determine the frequency of updates (daily, monthly, annual)
- Align accuracy with your use case (What happens if the accuracy is off by 100 meters, how does it affect your business?)

01 COVERAGE

The first step in assessing a POI data provider should always be determining their coverage of regions and various POI categories. Are they providing enough data in the area your project is focused on? Does the region have enough data points from the POI category your analysis needs? Most POI data providers claim global coverage, but they will always have more density in one country, state, or city than another. To ensure adequate data procurement, you must verify the coverage of POI data by requesting updated numbers and sample data from the regions you are interested in.

02 ACCURACY

The accuracy of POI data is paramount to your analysis. To determine the accuracy, you must understand your data provider's POI collection and verification methods. You can also create a reference dataset to compare information when you receive sample data from a vendor in evaluation. Do the latitudes and longitudes in the sample align with the reference data set? Is an inaccuracy of a few meters acceptable? You must also understand how they classify POIs and define attributes, as the lack of standards and clear naming conventions can result in inaccurate analysis despite the volume of data.

03 RECENCY

The physical world is ever-changing. While some POIs such as historical sites, beaches, etc. are unlikely to change, retail outlets, hospitals, offices can move or shut down. Outdated POIs can lead to false insights; therefore, POIs must be frequently updated. Ask your prospective vendor questions about the frequency of updates to their database. How they ensure that the data points are up to date? When was the data last updated?

04 METHODS OF COLLECTION AND VERIFICATION

The accuracy and freshness of POI data greatly depend on how your data provider collects their POI and keeps them updated. Most user-generated and web scraped POI data tend to be outdated, especially compared to manually verified data sets.

05 USABILITY

Even recent and accurate POI data can be challenging to work with if they are not normalised and deduped, and you might need to procure additional resources (data preparation skills and tools) to clean the data. Manual vetting can ensure quality and customisation to your needs, but it can be time-consuming and as expensive as generating the original data, thus, defeating the purpose of buying data from an external supplier.

06 DELIVERY METHODS

API Integration - API-based delivery can directly feed the POI provider's database into the customer's data platform or analytics applications.

Advantages
- Ideal for powering an analytical platform or automated analysis
- Data is stored, processed, and maintained by the provider, resulting in less overhead
- Pick, choose, and import only the data that you need
- Embed data into any application supported by the data provider

Disadvantages
- Lack of control over data health and quality
- No way to self-update an incorrect record
- APIs do not allow do bulk optimisations and analysis
- Can be costly when requiring POI in large volumes
- Need to build custom integrations for unsupported applications

Bulk Delivery - Companies can also choose to obtain data from a data provider in bulk, using data storage services like Amazon S3, Azure Blob, or Google Cloud. Bulk data delivery allows customers to procure raw data which they can customise or modify to fit their own use case. Bulk delivery is the best format to use with machine learning and other artificial intelligence analyses.

Advantages
- Ideal for both independent and automated analyses
- Greater volume of data transfer against API method
- The buyer has full control and ownership of data
- Freedom to update, refine, or enrich data with new data.
- Perform bulk analysis, analytics, machine learning, etc

Disadvantages
- Buyers need to purchase large volumes of data at once
- Additional cost of procuring and maintaining your own database
- Not ideal for small scale analysis projects

Conclusion

By staying informed about the mechanics of POI collection, you can ensure that you acquire high-quality POI data and perform accurate and profitable analysis in a cost-effective manner.

Making sure that you carefully select your POI data partner is crucial. You must do your due diligence, define goals, and identify challenges before choosing a vendor to fit your unique business needs. To avoid a surprising upsurge in costs, you must also assess your data partner's ability to prepare data so that the data is consumable 'out of the box' and requires minimal upkeep.

POI data has enormous potential and numerous use cases for businesses and research-based development, and new ones are being identified every day. Whether you are doing a competitive analysis before selecting a new store site, improving your logistics and delivery systems, or mapping transit, healthcare, and residential facilities to enhance public access systems - a healthy POI database is foundational. As a data buyer, your choices for POI data procurement can influence the result and utilization of your services, thereby impacting revenue and growth.

ABOUT QUADRANT

Quadrant (An Appen Company) is a global leader in mobile location data, POI data, and corresponding compliance services. Our data is verified, trustworthy, and ready to use, allowing businesses, organisations, and innovators to build tailored solutions for a myriad of real-world problems. Since September 2021, we are part of Appen, the global leader in AI training data that helps build and improve the world's most innovative artificial intelligence systems.

Quadrant's POI Data-as-a-Service provides geospatial applications a contextual layer of comprehensive and actionable information on landmarks, key features, business areas, and custom metadata attributes. We offer on-demand data collection and verification services that fit unique use cases and business requirements. Our POI data is powered by our proprietary POI collection and verification platform, Geolancer, ensuring manually verified, accurate, up-to-date, and complete datasets.

TO LEARN MORE ABOUT OUR POI DATA TALK TO A DATA CONSULTANT TODAY

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