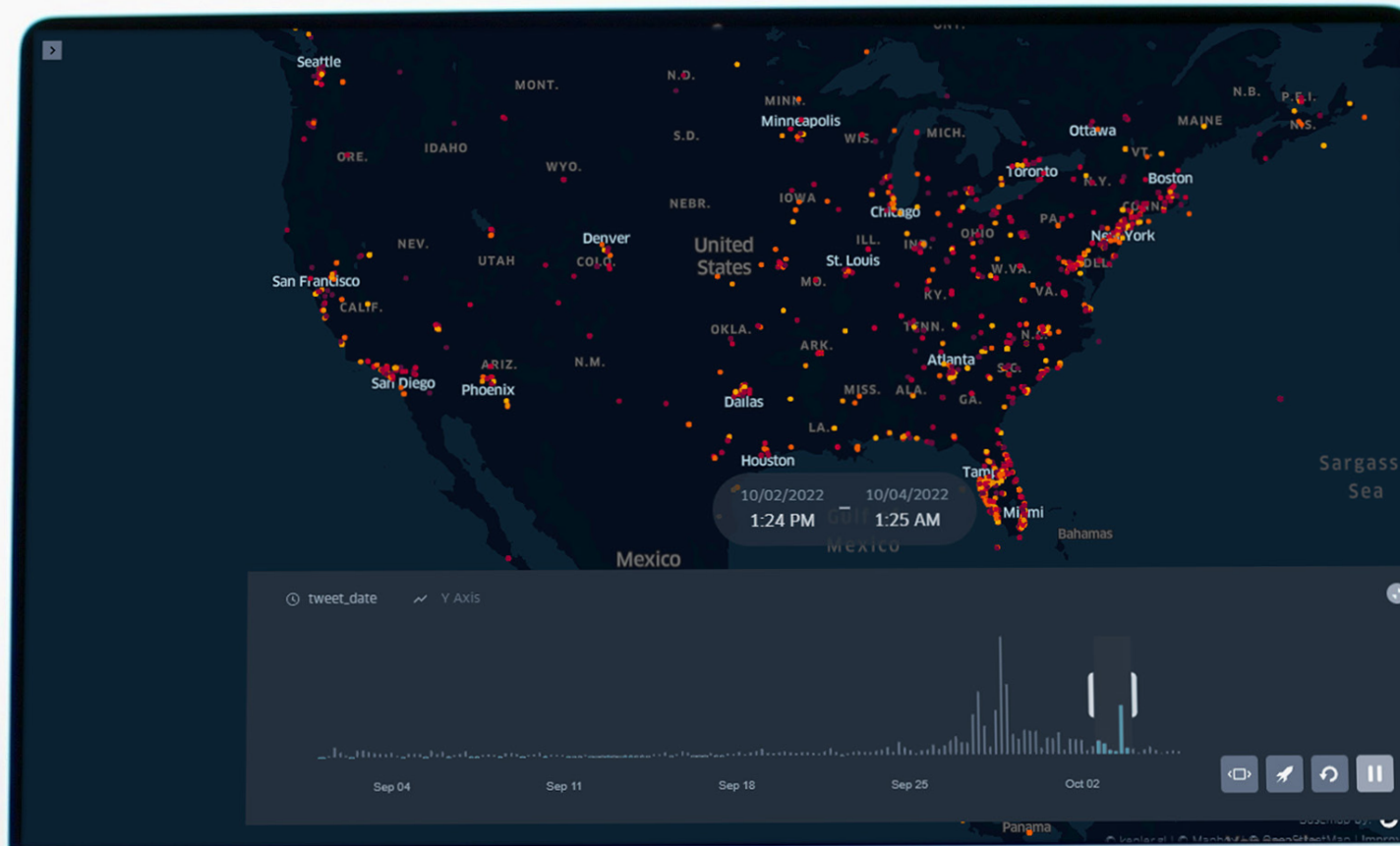


The Non-Expert's Guide to Geospatial Analytics

Geospatial analysis made easy by KNIME





Adding an extra layer of knowledge to your data (the “where” to the “what”) and being able to visually understand connections between variables facilitates more accurate analysis. This additional dimension allows organizations to quickly identify and map patterns, which can be difficult without the ability to visualize.

Today, teams don’t need their own devices or sensors to gather geospatial data. Driven by the development of sensor technology and strides in storage capabilities over the last decade, this information is available in numerous online repositories for anyone to access. The challenge is that once you have the raw data, it’s difficult to process and contextualize. Geospatial data puts a high demand on conventional analytics platforms due to its size and complexity, and most businesses don’t have the expertise to apply it.

In this guide, we explain the most common ways geospatial data can be used in different areas of business and how you no longer need to be an expert in the field to benefit from it.





Hyper-localize Marketing with Better Customer Segmentation

According to McKinsey, faster-growing companies drive 40% incremental revenue from personalization compared to their slower counterparts. Consumers feel more valued when marketing is personalized to their wants and needs. And to deliver personalization, businesses need smart segmentation strategies.

Without a detailed view of consumers, segmenting them into distinct groups is challenging. Compared to traditional market research, geospatial data (especially in real time) provides a deeper understanding of consumer behavior.

For example, census and demographic information, combined with geospatial data, allows businesses to understand not just who their target customers are, but also where they are located so they can target more effectively. Additionally, it provides insights into shopping habits based on location, showing where the highest areas of demand are so that marketing teams know where to focus campaigns or what to promote. Trade area data tells us, relative to where people are located, whether their lifestyle would lead to them actually purchasing the goods a company sells, and if they can afford it based on average area income.

Knowing local consumer shopping habits and geographic accessibility allows teams to better plan promotional outreach and maximize marketing return. This more detailed analysis also makes it easier to establish cross-sell opportunities, hyper-localize merchandise, create personalized promotions, and even assess competitive impact.

Build Competitive Advantage

Businesses can build a strong competitive advantage in many ways that have nothing to do with geography, but sometimes it simply takes “knowing thy neighbor” to stand out from the competition. For storefronts, it’s imperative to know the surrounding landscape, or that company might as well be wearing a blindfold. How do they take advantage of a rival’s weaknesses if it’s not even clear who they are?

Geographic data can show whether a specific storefront has more or fewer locations than a competitor in a specific area. Should the team focus efforts in one location to increase market share (because competitive density is lower) or open a storefront in a new location (because competitive density is higher)? Coming at another angle, it can show if consumers are choosing a competitor because of shorter drive time and better transportation routes.

Combining demographic information, road infrastructure, and traffic data, and determining gaps and overlaps in market coverage based on locations helps define market potential and competitive threats (or lack thereof). Location data like this is critical in determining how much geographic influence a company has in relation to where their customers come from and where their competitors are.



Optimize Site Selection

Analyzing risk and return on a particular brick-and-mortar location is data-driven. Understanding geographic attributes around competition, location, and transportation can lead to increased market share and foot traffic if a site is chosen properly. The challenge is that the data which businesses need to analyze such factors comes from limited mapping tools.

Geospatial data can tell us numerous things: What are nearby stores, and how close are they? How accessible is transportation to that location? How close or far away do target customers live? Is parking easily accessible or limited? Is there a tricky intersection nearby? The list can go on. Incorporating this information into selection forecasting models helps teams better understand risk or return on sites.

Visit attribution – also powered by geospatial data – logs data related to a consumer physically entering a store, or just passing by. Building footprint data combined with GPS data from mobile devices can be used to determine the number of people who entered a store compared to other areas of interest to see if they get more foot traffic.

Geospatial analysis is especially useful in site selection because it helps determine if a potential storefront location will succeed or fail, or if changed circumstances make it no longer attractive.



React Faster to Changing Demand with Near-Real-Time Data

The COVID-19 pandemic proved how vulnerable supply chain management can be. Most businesses didn't have the proper processes in place to adjust to unforeseen circumstances and how fast they happened. During difficult times like a global pandemic, supply chains get disrupted by slower deliveries due to border closures, downsizing of employees, and cluttered processes.

Geospatial data can be leveraged during times like these to monitor disruptions almost in real time. With insight into where these incidents are happening, supply chain managers can quickly analyze how the entire chain might be affected. With geospatial analysis, companies can respond to a surge in demand and better manage turnaround time by finding optimal drop-off and pickup centers with reference to cost and time. Mapping enables companies to understand available shipping routes and see which are most vulnerable/subject to delays.

Geospatial analysis enables companies to map opportunities and demands with different areas in real time to make faster and better strategic decisions and enhance supply chain management.





Enhance Sales Coverage for More Opportunities

Sales territory mapping is based mostly on geography, and helps companies reach the right customers, promote growth, and hit revenue goals. Not considering location when establishing sales territories can lead to loss of productivity and operational inefficiencies, and ultimately cost a business money.

Geographic data, such as the location of customers and prospects, for this type of analysis helps identify where targets are located and where additional resources might be needed to cover any gap. This can optimize coverage to allow for more client/prospect visits per sales trip and allow for better distribution of coverage to ensure sales reps have equal opportunities to make sales and realistically make their quota.

Understanding where demand is shifting enables faster reactions to change, smart realignment of visiting sites, and assurance of the most coverage possible.



Get Better at Managing Business and Environmental Risk

Effectively analyzing and managing future risk isn't possible without access to a historical log of events. But only knowing what happened (as opposed to where) doesn't provide the full picture needed to detect and mitigate potential money loss, fraud, accidents, or other events.

While risk can present in many different ways, geography is a common denominator. Geospatial data can tell insurance companies where a building is, how much space it takes up, and its surroundings, allowing them to better assess vulnerability to environmental disasters. Financial institutions count on this data to analyze fraud because it provides insight into regional variations, anomalies, and other geographical links to the presence of fraud. It can even be used to determine weather-related risk, flood assessment, and storm surge analysis with information related to land and coastline.

Geospatial analysis provides the visualization aspect that makes it easier to understand historical patterns and trends to better predict risk in the future.

Challenges of Data Integration



It's important to note that integrating this valuable multidimensional analysis into your business comes at a cost. Being large and complex, it can be difficult to integrate geospatial data into your current data set. There are ways to overcome this, but here are some challenges you'll want to consider when you first start working with geospatial data.

Data Preparation

Geospatial data has a reputation for being inaccurate, and this can happen in a number of ways during the collection process: misrepresentation of coordinate systems, incorrect use of units of measure or longitude/latitude, or topological errors (problems with spatial relationships between points, lines, and polygons).

It's also difficult to standardize because of the vast amount of ways it's measured or represented (units of measure, timestamps, coordinates, address formats, and more). Identifying differences and then manually converting the data so it's all represented the same way is extremely time-consuming and error-prone.

Institutional Knowledge

Very few (around 5%) data scientists in an organization have experience working with geospatial data, hindering them from effectively incorporating this valuable information into their business. There's a skill gap because this type of data has always been studied separately from general engineering, since it's visualized and stored in a unique way (analog and digital formats vs. rows and columns).

Processing Capabilities

Think about the amount of information collected when analyzing census, cellphone, social media, and weather pattern data. Basic BI or analytics tools don't have the processing power or storage capability to handle the complexity and file sizes of geospatial data.

Overcoming Blockers and Scaling Across Your Business

The first step is investing in a platform that can reduce manual efforts and accelerate the process of combining, cleaning, and validating geospatial data, allowing for simple and streamlined data preparation. You'll need one that can bridge the institutional knowledge gap and enable non-experts to work with geospatial data while simultaneously learning from pre-built workflows and applications.

A low-code/no-code approach benefits both the data scientist and the business's bottom line because it's investing in more efficient working groups, knowledge sharing, and upskilling. They let you save the workflows you build in a library so you can reuse and share with colleagues to upskill other teams in your company. This environment accelerates adoption because teams are able to learn from and use existing geospatial workflows, build upon them, and tailor to their needs. No longer is a niche expertise required to bring the benefits of geospatial analysis into business.

The right data analytics platform can integrate with, combine, and transform different kinds of geospatial data, mitigate these blockers, and even help you scale geospatial science across your business.



Why KNIME for Geospatial Analytics

KNIME takes the intimidation out of working with complex geospatial data with its low-code/no-code approach. Non-experts can access shared examples of geospatial-specific workflows via the KNIME Community Hub, and then easily apply them with the analytics platform without having to understand or write a single line of code.

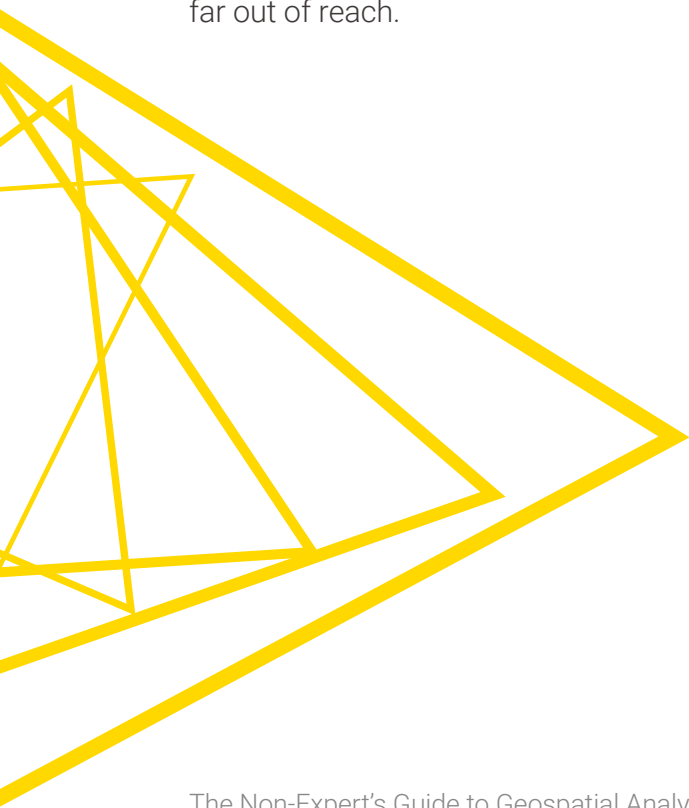
Since KNIME can work with and integrate data from multiple sources, not only does it make loading, combining, and manipulating geospatial data of differing types and from different sources easy, but it also allows you to combine this data with other types of data (demographic, weather, time, etc) for better insights across multiple dimensions.

After the prep and analysis work, presenting your findings to end users puts your results into action. Having more capabilities than a non-flexible dashboard, **KNIME data apps** bring your geospatial analysis to life in a visual and interactive way. End users can filter through different results, select or deselect specific components, or deeply explore algorithms to understand or manipulate their data.

This approach allows data teams to not just create geospatial science, but also explain it to the greater organization. For example, data apps can help marketing teams visualize geographically if there are any increases in demand or help a customer care team visualize if client complaints are concentrated in a specific area. At any level of complexity or sophistication, they can be created in KNIME without any HTML, CSS, Javascript, API-wrangling or staging environments.

What's more, KNIME's open-source nature enables the spreading of geospatial knowledge with dedicated spaces to collaborate. A perfect example is the **recent effort between KNIME and Harvard's Center for Geographic Analysis (CGA)**. Working together to make geoanalytics available to all, the two teams have created platform extensions specifically for geospatial data science that allow anyone to perform geospatial analysis without the need for specialized skills or training.

When you're equipped with a flexible platform that has the processing power needed to analyze geospatial data, makes it easy to understand, and doesn't require an expert in the field, then it suddenly doesn't seem so far out of reach.





Learn more about KNIME's geospatial analytics capabilities here:

[Geospatial Analytics Extension for KNIME](#)

[Geospatial Analytics Examples on the KNIME Hub](#)

