adsquare

Footfall Measurement

The five foundations of effective store visit attribution

Advertising's known unknowns

The advertising profession has undergone many changes over the past few years, but one thing has remained constant: measuring the success of campaigns isn't easy.

There are, of course, a large number of Key Performance Indicators (KPIs) used to measure campaign performance. They're a nightmare for anyone who dislikes acronyms and, whatever the merits of ROAS, CPC, CPA, CTR and CPM, they are not up to the task of answering a simple but very important question: did my advert actually inspire someone to go into one of my stores.

Until recently, there has been no robust way to measure the success of drive-to-store campaigns. This metric has been the advertising industry's great 'known unknown'. Yet this is an important number to crack. After all, while 88% of consumers research their purchases online[1], 90% still take place in bricks and mortar stores[2]. If you can measure which of your adverts are driving these visits you will be well on your way to increased sales.

Data-driven insights

The good news is that advances in mobile technology and data capture and analysis have finally found a reliable and robust method to get this metric. In this report, we look at the emerging science of footfall measurement and its application in drive-to-store campaign attribution.

In a nutshell, the approach combines mobile location movement data with spatial data to provide an indication of footfall following exposure to an advertising campaign. At last, brands and advertisers can see whether their campaigns are succeeding in driving store visits. What's more, when viewed in real-time, the metric allows advertisers to optimise their campaigns on-the-fly to secure maximum value for their spend.

In this paper, we look at the benefits to advertisers of this metric, provide examples of companies that are already using it, and outline some of the technical underpinnings that make it possible. Our argument is simple: footfall measurement should be added to existing KPIs to help brands get a more holistic, retrospective understanding of campaign effectiveness, and to help generate tactical real-time insights to fine-tune live campaigns. The result will be much more effective advertising and ultimately more sales.

Enjoy the read.

Tom Laband,
CEO & Co-Founder
at Adsquare

Contents

01. Three factors that make footfall measurement a 'must have' 05

02. Privacy regulation and the question of consent 06

03. The five foundations of effective footfall measurement 08

04. The technicalities of footfall measurement 15

05. Footfall measurement the Adsquare way 17

06. Conclusion 24

07. References 25

01.

Three factors that make footfall measurement a 'must have'

As with any new innovation, advertisers will want to know why they should bother. With so many KPIs already available to measure campaign success, what makes footfall measurement different? This is a simple question to answer, and ultimately comes down to three key factors:

1. **There's no better way to measure drive-to-store campaigns.** Until now it has been impossible to know for certain if a person first viewed your ad and then went to one of your stores as a result. The combination of Mobile Advertising IDs, which show ad exposure, movement data pinged from mobile phones, and spatial data finally provides a way. Outside of the US, spend attribution models are still in their infancy. Until these become more reliable, footfall measurement remains the most robust way of measuring the real-world impact of your campaigns.

2. **It's a great way to optimise campaigns in real-time.** Footfall measurement can provide a feed of real-time store data into your Demand Side Platform for analysis. This information allows you to see what happens if you tweak elements of the campaign on-the-fly, such as the creative, the targeting or channel in use. You can thereby fine-tune your campaign to ensure every dollar of spend delivers value.

3. **It helps you understand the behaviour of specific customer groups.** By combining spatial and movement data with information taken from Mobile Advertising IDs you can see how different audiences reacted to your drive-to-store campaigns. This provides useful insights that can be used to hone future targeting campaigns.

These three benefits mean that footfall measurement should be an important part of the advertising measurement mix. It provides a useful new vector by which you can link your campaigns to actual consumer behaviour.

The three data inputs for footfall measurement

- ***Spatial data:*** *offline data describing the context of a geographical area, e.g. points of interests (landmarks, businesses, OOH locations etc.)*
- ***Audience data:*** *socio-demographics, affinities, interests, place visits, purchases etc. connected to Mobile Advertising IDs*
- ***Movement data:*** *end user location data connected to Mobile Advertising IDs with timestamps and latitudes/longitudes*

02.

Privacy regulation and the question of consent

For some, the idea of tracking consumers as they move around will set alarm bells ringing. More than ever, consumers and regulators alike are wary of corporate surveillance and keen to ensure that the ability of advertisers to reach consumers is matched by robust protections around personal data.

In Europe, these principles have, of course, been enshrined in the landmark General Data Protection Regulation (GDPR), which places strict controls around what type of data organisations are allowed to collect and process, as well as rules for how they handle that data.

Under the regulation, there are six legal bases for the processing of personal data, one of which is consent. As GDPR sets out: data processing is lawful if 'the data subject has given consent to the processing of his or her personal data for one or more specific purposes'[5].

You can only process location data if you are a public communications provider, a provider of a value-added service, or a person acting on the authority of such a provider, and only if:

- *the data is anonymous; or*
- *you have the user's consent to use it for a value-added service, and the processing is necessary for that purpose.*

The UK Information Commissioner's Office[6]

As set out in the IAB Europe's Transparency & Consent Framework Version 2.0 there are 10 purposes for consent, including value-added services such as personalised advertising and ad placement.[7] As long as location data is being collected, with consent, for one of these value-adding services then the data processing is compliant.

In the US, the California Consumer Privacy Act (CCPA) takes a broadly similar approach to GDPR. Under the terms of the law, businesses processing the personal data of Californian citizens must include an opt-out for consumers who don't wish their data to be sold.[8] As with GDPR, CCPA means that advertisers need to be more vigilant than ever about the data they use in campaigns.

If you would like to learn more about GDPR and its implications for the marketing industry, we recommend our whitepaper 'GDPR in practice' available for free at www.adsquare.com/resources.

The direction of travel

Regulations such as GDPR and CCPA are changing the ad industry. Increasingly the data needed for applications like footfall measurement will not be available in huge volumes. As we shall see, however, data volume isn't as important to effective footfall measurement as data quality. To see why, we will need to dig a little deeper into the methodology of footfall measurement.

03.

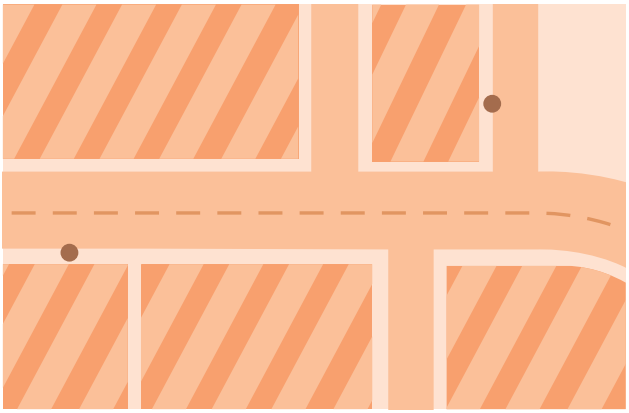
The five foundations of effective footfall measurement

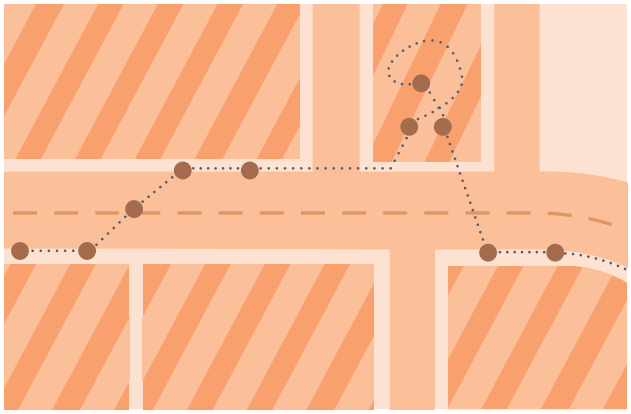
Footfall data has much promise as a tool for measuring the success of ad campaigns and ensuring campaigns are optimised. However, as with most measurement methodologies there are right – and wrong – ways of doing things. We've identified five foundations for a successful methodology that will ensure you avoid potential pitfalls and extract full value from your store visit attribution measurement.

#1. The right movement data

Footfall data comes in two varieties:

- **Foreground data**: constitutes records of location visits triggered by a device owner when they actively access an app and then agree to share their location data. The data is usually sourced by data providers from the bid stream.
- **Background data**: information that is shared by a mobile app, even when the app is not in use. In this case, users provide consent in advance for this data to be shared. The data is collected by aggregators and app publishers.





Of the two, background data is much more useful for footfall insights. There are several reasons:

1. Background data is more **detailed and granular** than foreground data. It is also more **accurate** for location placing. Foreground data in part relies on devices' IP addresses, which are unreliable for accurate placing. Background data uses much more precise longitude and latitude information to place devices.

2. There are potential **GDPR compliance and privacy** issues with foreground data. Our analysis suggests that consent permissions for location data sharing are often missing in the bid stream – something that is already being picked up by regulators.

3. Foreground data is only triggered when people open relevant mobile apps. As background data is constantly being shared, it provides for a **greater number of location events** each day.

4. Foreground data does not allow for the tracking of movement routes or dwell time. This makes it much more difficult to cluster data points being received from the mobile device, also known as "pings", and group them according to **dwell times**.

The only area where foreground data is ahead of background data is in terms of volume. This is for the simple reason that background data requires explicit consent from users to agree to the use of their location data.

However, accessing data in large volumes is not actually a requirement for effective campaign measurement and optimisation, as all that's needed to generate uplift metrics is a statistically relevant sample. For all these reasons, any measurement approach worth its salt must be built on background data.

Why quality beats volume

As mentioned earlier in this paper, the regulatory direction of travel is for greater control of data. Technology companies are taking note and reacting accordingly. In one of its latest updates, for instance, Apple has included a feature which notifies users every time their location data is used by an app. The concern among advertisers is that features like these might encourage users to turn off their location services for many apps.

In fact, we at Adsquare have not seen the slowdown many feared would follow the update. More generally, however, it seems likely data flows will begin to slow as transparency and security rise in importance. The future of footfall measurement will therefore lie in securing representative, high-quality data that you can draw insights from. The future is in quality, not volume.

That's why Adsquare is committed to investing in the very best supply side data sources to guarantee a maximum of data supply while respecting data privacy regulations.

#2. Real-time analysis

Footfall insights are useful in establishing the true effectiveness of your drive-to-store campaigns. The insights derived from post-campaign measurement can help you answer critical questions such as how ad exposure impacts store visitations and which audiences are most receptive to your campaign.

However, if your post campaign measurement shows that your ads didn't deliver in full, there's nothing you can do to recoup the wasted investment. That's why real-time measurement is so important. Real-time data feeds into your DSP enable you to immediately identify how many consumers actually visit your store following exposure to your ads. This allows you to dynamically tweak elements of the campaign, such as the creative or channel, and see the impact of these changes immediately. You are thereby empowered to hone your campaign on-the-fly, allowing you to realise the full value of your media spend.

Adsquare provides both detailed post-campaign analysis reporting and real-time campaign optimisation services.

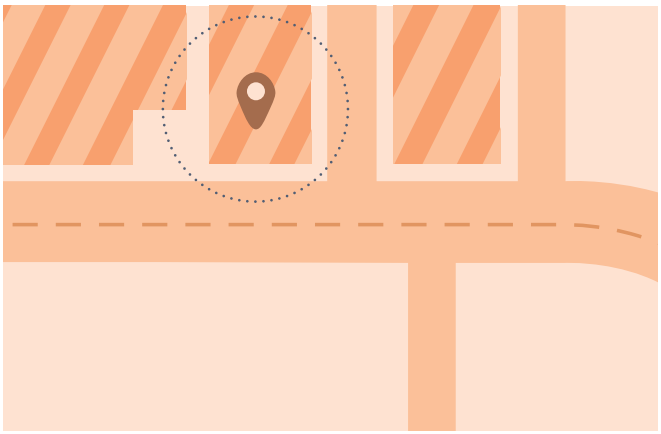
#3. The right POI data

Above all, successful footfall measurement relies on the accurate placement and clustering of data points, or pings from mobile devices. Imagine you have a store in a busy high street, for example. If the accuracy of your place attachment is even slightly out, a visit to your store may be misrepresented as a visit to the small florist right next to it – or vice versa.

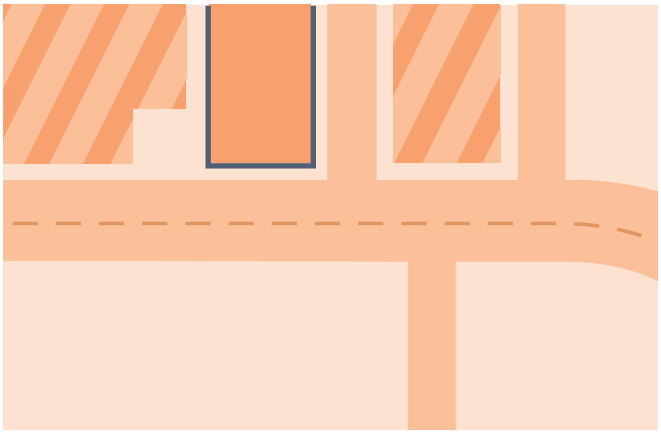
To ensure the greatest accuracy, we recommend using 2D polygons that define the shape of the buildings. Adsquare provides access to a database with millions of polygons worldwide, updated regularly. Additionally, you are able to share your own store list, ensuring that all relevant stores are on the list, which can then be matched to polygons. Now more than ever, it is important to work with the latest list of POIs for best results.

Alternatively, you could use POI data in form of lat/long data combined with radius to gauge the likelihood the device owner entered your POI. However, as can be seen in the illustrations, this method tends to be less accurate than working with actual POI polygons and is therefore not recommended by Adsquare.

Latitude and Longitude of a building



Polygon of a building

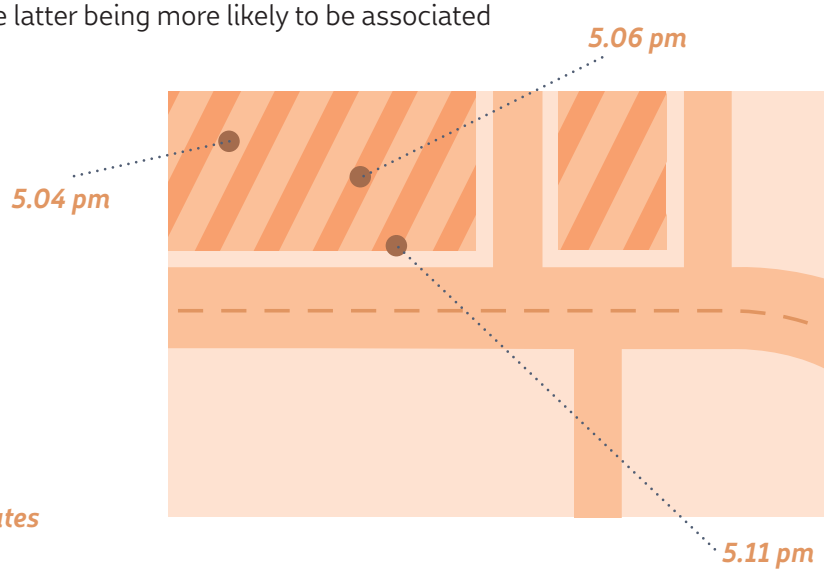


In cases where you do not have POI data and have no way of getting it, you can access it from managed data service providers such as Adsquare. In these cases, we can extract POI polygons based on addresses supplied by customers.

#4. Interrogate your data fully

With footfall measurement, the aim is to take a cleansed and validated data feed and then apply as many analytics filters as possible to gain deep insights for campaign optimisation. Some analyses to consider include:

- **Dwell time**. Dwell time is integral to understanding whether a device owner lingered in your store. As mentioned above, you can discount all pings that simply passed by your store as these can't be classified as true visits. Dwell time can also give you insights into the quality of the store visits inspired by your campaign. How many people merely popped by for a quick visit, compared to those who stayed for significant amounts of time (the latter being more likely to be associated with a purchase)?



First seen 5:04
Last seen 5:11

Dwell time is 7 minutes

- **Audience insights.** Another important analysis to conduct is into who was most receptive to your campaign. By using audience, geo-contextual or app-contextual insights revealed from Mobile Advertising IDs acquired (with consent) from apps, you can get a good idea of who responded best to your campaign.

- **Campaign insights.** You can also uncover other key insights such as the time between exposure to your ad and the store visit, which ad locations and channels delivered the most store visits and which times of the day/week did your campaigns have the most effect. You can also see how many times exposure is required to drive a store visit, providing insight into frequency capping. The list goes on. What's clear is that with the right data and the right analysis, footfall measurement can open up a wide world of insight that could transform your campaigns.

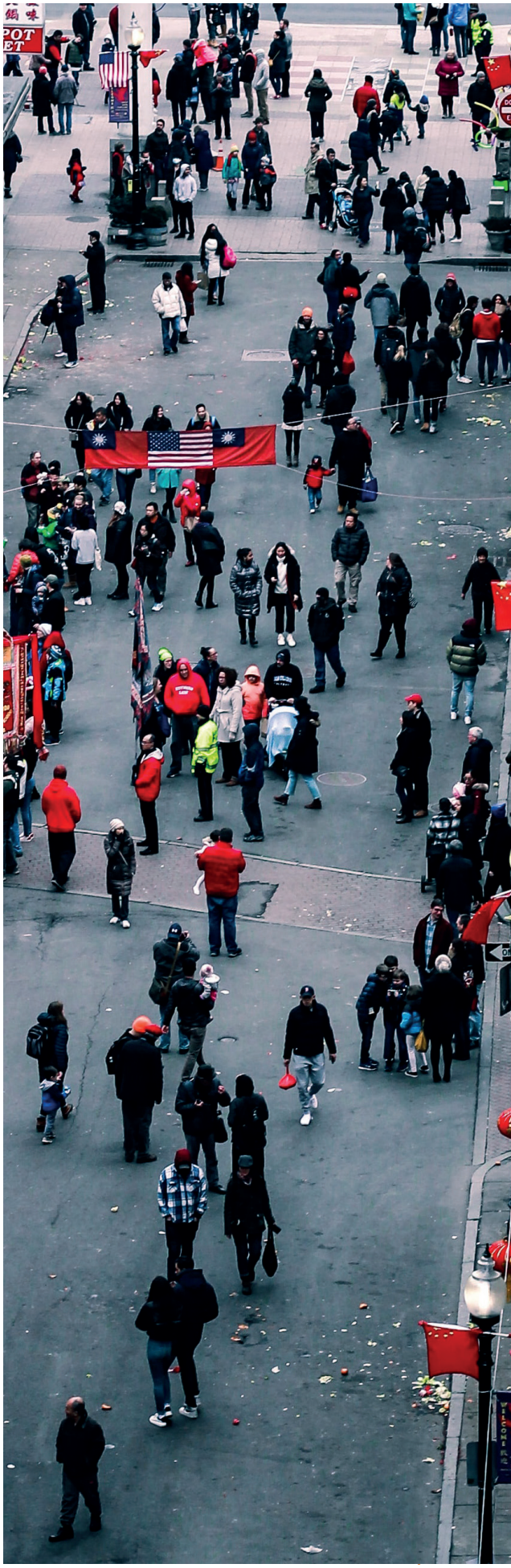
Adsquare draws movement data from a wide variety of location-enabled apps including transportation, weather or dating apps to renounce any bias. The movement panel consists of a representative cross-section of the society in terms of socio-demographic characteristics.

#5. Use an independent source

As in any field, measurement is at its most robust when conducted by a third party. In the context of footfall measurement, it's important that the technology measuring the results of a campaign should be independent of the technology running the campaign. Media partners should, in short, not mark their own homework.

The obvious answer to this challenge is to work with an independent data partner to conduct your measurement analysis. Such partners need to be able to work with whichever DSP you use, but also be completely independent of the platform provider as well as your business. Using an independent partner in this way will give your measurement more credibility, helping to make future budgets easier to secure. It will also provide you with unbiased insights into how you can make your campaigns more effective.

Adsquare's Real-Time Footfall Measurement can be activated and delivered to your DSP of choice, including Adform, Fusio, Google Marketing Platform, MediaMath, Mediasmart, Hawk, and The Trade Desk.



04.

The technicalities of footfall measurement

For those of you interested in the technical side of footfall measurement, the raw ingredients are movement and spatial data. Mobile app publishers often integrate Software Development Kits (SDKs) into their apps, through which users can give permission for their background data to be collected and shared with data specialists like Adsquare.

With permissions enabled, mobile devices ping data to satellites (GPS), WiFi routers and mobile base stations (cell towers). Ping data includes information such as the Mobile Advertising ID, latitude and longitude, and the timestamp.

Ping data can then be overlaid on Point of Interest (POI) data either in the form of geofences created by advertisers around specific geo-coordinates (lat/long + radius) or in the form of building footprints (known as polygons). Doing so indicates where a mobile phone is/was at any given time in areas such as in retail stores, restaurants or fitness studios. Viewing this data through their Demand Side Platform (DSP) dashboard, brands and media agencies can see when devices entered their stores.

Pinning down your pings

Once the GPS ping data has been gathered, it needs to be filtered for speeding, hot coordinates, horizontal accuracy, and duplicate bumps to ensure the dataset is 'clean'. Next, the pings can be sorted according to whether the device owner was stationary or on the move.

The longitude and latitude of the ping is what's used to understand the location of the pings. To classify the data according to whether a device owner was walking by a store or actually visited it, we have to analyse the position of the device to the predefined point of interest and how long a device owner dwelled in the given location.

Turning measurement into insight

Footfall data alone isn't enough to measure campaign performance. Advertisers need to establish a baseline by analysing spatial and movement data from a control group of devices.

Comparing this data to movement data sourced from devices owned by people who have seen your advert (as identified through Mobile Advertising ID data from individuals who have consented to their data being used in this way) provides the all-important metric: an indication of store-visit performance attributable to your ad campaign.

> ***Footfall measurement isn't about absolutes. It's about understanding the success of your campaign by analysing a statistically relevant sample size and comparing it to a baseline of activity.***
>
> **Tom Laband**, ***CEO*** & ***Co-Founder***
> *at Adsquare*

05.
Footfall measurement the Adsquare way

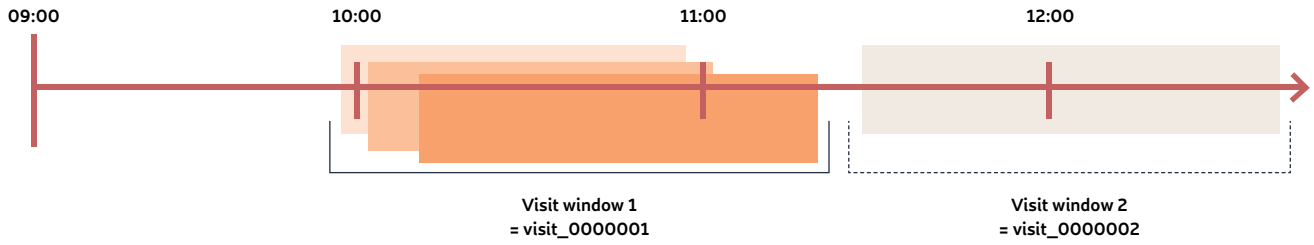
Making it count

At Adsquare, we use our independent data scoring methodology to ensure that only the highest quality and most accurate location data is used in our clients' footfall measurement. Filtering the data for speeding, hot coordinates or duplicate bumps ist just the start. Let's dive in.

#1. The Visit Resolution Algorithm

Our visit resolution algorithm helps us to cluster multiple signals from one visit. The visit resolution algorithm is programmed based on a dynamic visit window deduplication. A visit window starts when the first signal for a given Mobile Advertising ID at a given POI on a given day is received with the window being 60 minutes long. Any signal for a given MAID spotted within one hour from the last observation will be considered as part of the visit. For any new signal matched, a new 60 minutes window will start.

Visit Resolution Illustration - Dynamic Visit Windows



#2. The Place Visit Algorithm

Our place visit algorithm helps us to understand if a visit was actually a real visit. For this we work with individually weighted attributes that pay into an overall confidence score. The weighting for each metric is derived from a model based on historical data and truth sets.

a. Distance to the POI

Distance to the POI is a technical term for a metric which gives us the distances of a location signal to the nearest corner of the polygon in meters, where a negative value indicates a signal from within the polygon and a positive value from outside the polygon. The results are grouped based on scoring buckets and the attribute is weighted 20% of the overall score.

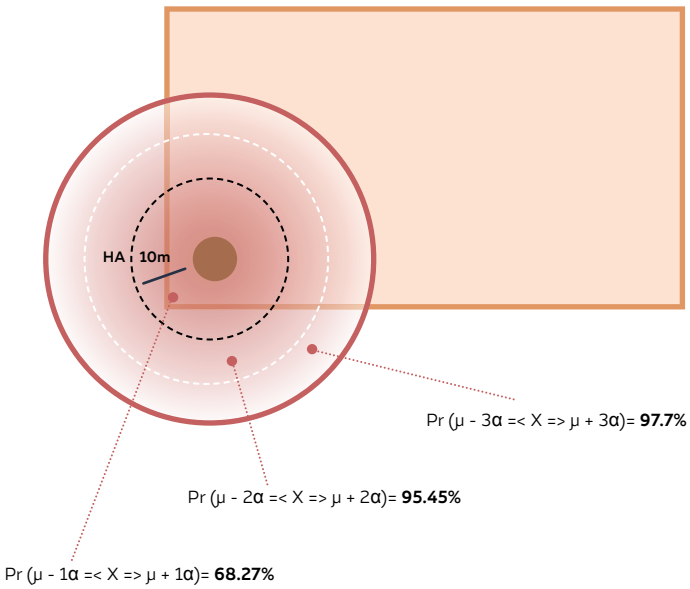
b. In-Shape Probability

In-Shape Probability defines the probability of a signal being inside the desired catchment area by taking into consideration the horizontal accuracy of the location signal. The signal's horizontal accuracy is a radius around a two dimensional location, implying that the true and unknown location is somewhere within the circle formed by the given point as a center and the accuracy as a radius in meters.

With a probability of 68%, the location point lies in the center of the specified radius; This is a standard used by Google and Apple when determining a users' location and represents one standard deviation. Adsquare then extrapolates the horizontal accuracy to achieve a 100% probability for the signal position to lie within the radius.

Adsquare then intersects the signal information with the polygon and applies a probability calculation to get an understanding of the signal being in the catchment area. This attribute of In-Shape Probability (%) is weighted 40% of the overall score.

In-Shape Probability Illustration:



c. Number of Events

The Number of Events corresponds to the number of signals part of one visit attributable to one Mobile Advertising ID spotted at one point of interest. The results are grouped based on predefined event buckets. This attribute is also weighted 40% of the overall score.

d. Dwell Time (DT)

Dwell Time is the duration of a visit in seconds and is available as an additional, separate metric. We do not currently include dwell time metrics as part of the overall score because what constitutes a good dwell time varies dramatically according to the type of business. For instance, a dwell time of five minutes may indicate a high-quality visit for a fast food chain, but is unlikely to mean the same for a luxury jeweller retailer. Dwell Time is presented as an individual metric in addition to the confidence score.

Once the range scores of the first three attributes have been identified they are calculated along with the respective weightings to produce an overall score using this formula:

$$\frac{(Wa \times \text{Distance to the POI}) + (Wb \times \text{In-Shape Probability}) + (Wc \times \text{Number of Events})}{100}$$

We only send data to clients that have passed our internal benchmark, helping to ensure only the highest quality footfall measurement insights. With Adsquare, businesses benefit from independent, quality-assured footfall measurement data that delivers the intelligence they need to significantly improve campaign outcomes.

Adsquare's footfall measurement in numbers

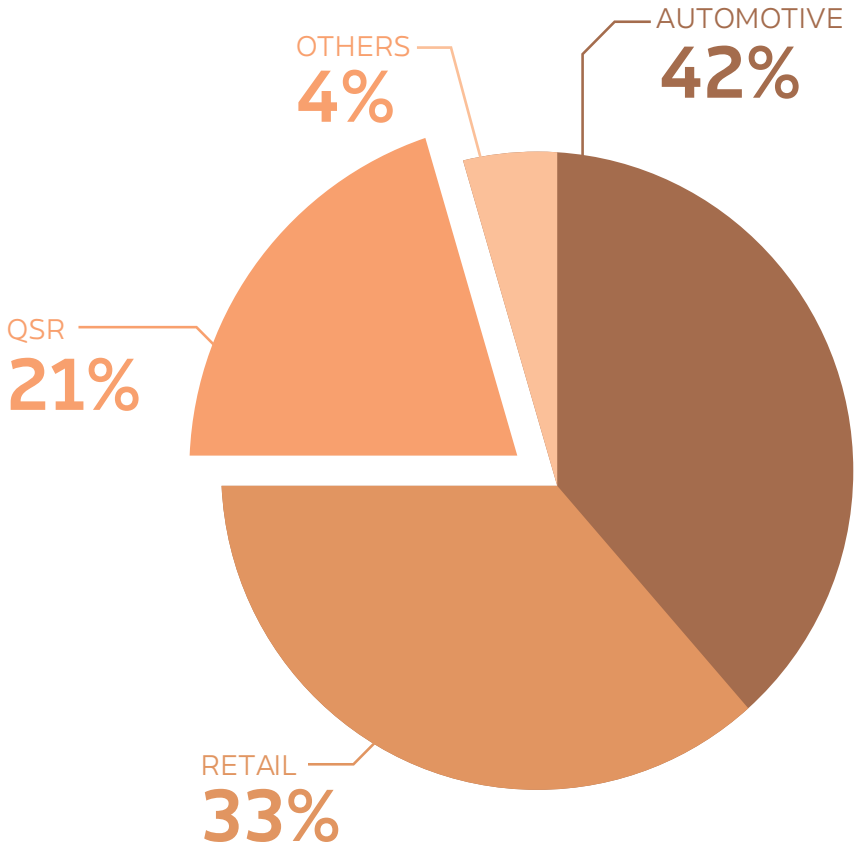
Using spatial and movement data to track the performance of drive-to-store campaigns works, as Adsquare's findings reveal.

16.120
Measurement configurations per year

31%
Month over month growth rate

23
Countries live

193
Clients live



Adsquare's Measurement usage by advertiser industry

CASE STUDY ☞

Supersized measurement for McDonald's

Looking for a way to measure the success of its multi-channel drive-to-store campaigns, McDonald's turned to Real-Time Footfall Measurement from Adsquare, accessed as a feed into its DSP.

The company can now calculate in-store visits for all digital media activations, including display, video, audio and search. It can also analyze which creative, devices and targeting criteria are best at driving visits to its restaurants, helping it improve ROI on its campaigns.

> ***Thanks to Adsquare's Footfall Measurement functionality, we can now clearly link our advertisements to restaurant visits and proactively optimize campaigns in real-time. We definitely plan to leverage real-time visits data to craft more successful digital marketing campaigns.***
>
> ***Stephanie Pelz, Department Head, Marketing CRM & Loyalty***
> *at McDonald's*[3]

Driving ad success

Renault was looking for a way to measure store visits based on cross-channel campaigns and attribute them to all formats and channels, such as Google search, YouTube, audio and display and approached Adsquare to solve this challenge.

In the past few years, we have been looking for ways to reconcile our marketing efforts to our in-store traffic. Thanks to Adsquare's ability to measure footfall directly in Campaign Manager, we are now able to connect our digital advertising campaigns with in-store visits to Renault dealerships. What has captured our attention is the possibility to measure our digital campaigns regardless of device type or channel.

Flavien Taquet, Head of Media
at Renault Group France[4]

(symbolic picture)

CASE STUDY ☞

Ain't no mountain high enough

OOH specialist WallDecaux had recently run a campaign for their client, an outdoor and sporting goods manufacturer. Adsquare was asked to measure how many consumers that had been exposed to their campaign went into pre-defined retail stores and potentially became buyers. To do so, Adsquare analyzed the movement data of exposed users with a radius of 50 meters around relevant poster locations during ad time and examined whether the same users went into the corresponding retail stores after the campaign.

Adsquare compared control and exposed user groups and identified a visitation uplift of 38%. This proves that OOH campaigns leave a real impact, boost store visits and consequently lead to a higher ROI.

For the first time it is possible to use mobile data in a scalable way for better out-of-home advertising.

Andreas Knorr, Director Marketing
at WallDecaux

06.

Conclusion

Scale is important, but it's even more important what you do with your data

We live in the age of 'big data' and we are constantly told that huge volumes of data are required for the best insights. But when it comes to understanding the effectiveness of your drive-to-store campaigns and optimising your approach, this patently isn't the case. By putting in place a focused methodology that prioritises accuracy over volume you can reveal all the insights you need.

As you look to incorporate movement data into your measurement approach, ask yourself these five critical questions:

- Can I access quality controlled, cleansed and statistically relevant data sets?
- Can I benchmark this data against a control group?
- Is the data set compliant with GDPR and does it protect the personal information of consumers?
- Can I accurately attach the data to the POIs that matter to my business?
- Can I filter the data for rich audience insights?

If the answer to these questions is 'yes' then you are on a fast track to more effective drive-to-store campaigns.

07. References

1. *PYMNTS, Consumers are increasingly researching payments online, 2018 https://www.pymnts.com/news/retail/2018/omichannel-ecommerce-consumer-habits/*
2. *Forbes, Ecommerce may be only 10% of retail, but that doesn't tell me the whole story, 2018 https://www.forbes.com/sites/stevendennis/2018/04/09/e-commerce-fake-news-the-only-10-fallacy/#2198cf6639b4*
3. *Mobile Marketing, Adsquare ties up with Google Marketing Platform and The Trade Desk for footfall solution, 2019 / https://mobilemarketingmagazine.com/adsquare-ties-up-with-google-marketing-platform-and-the-trade-desk-for-footfall-solution*
4. *Mobile Marketing, Adsquare ties up with Google Marketing Platform and The Trade Desk for footfall solution, 2019 https://mobilemarketingmagazine.com/adsquare-ties-up-with-google-marketing-platform-and-the-trade-desk-for-footfall-solution*
5. *GDPR.EU, Art. 6 GDPR Lawfulness of processing, https://gdpr.eu/article-6-how-to-process-personal-data-legally/*
6. *CO, Location data, https://ico.org.uk/for-organisations/guide-to-pecr/communications-networks-and-services/location-data/*
7. *IAB Europe, TCF 2.0 https://iabeurope.eu/tcf-2-0/*
8. *Fieldfisher, Privacy, Security and Information Law, https://privacylawblog.fieldfisher.com/2019/ccpa-blog-series-part-3-confused-over-opt-out-rights*

About Adsquare

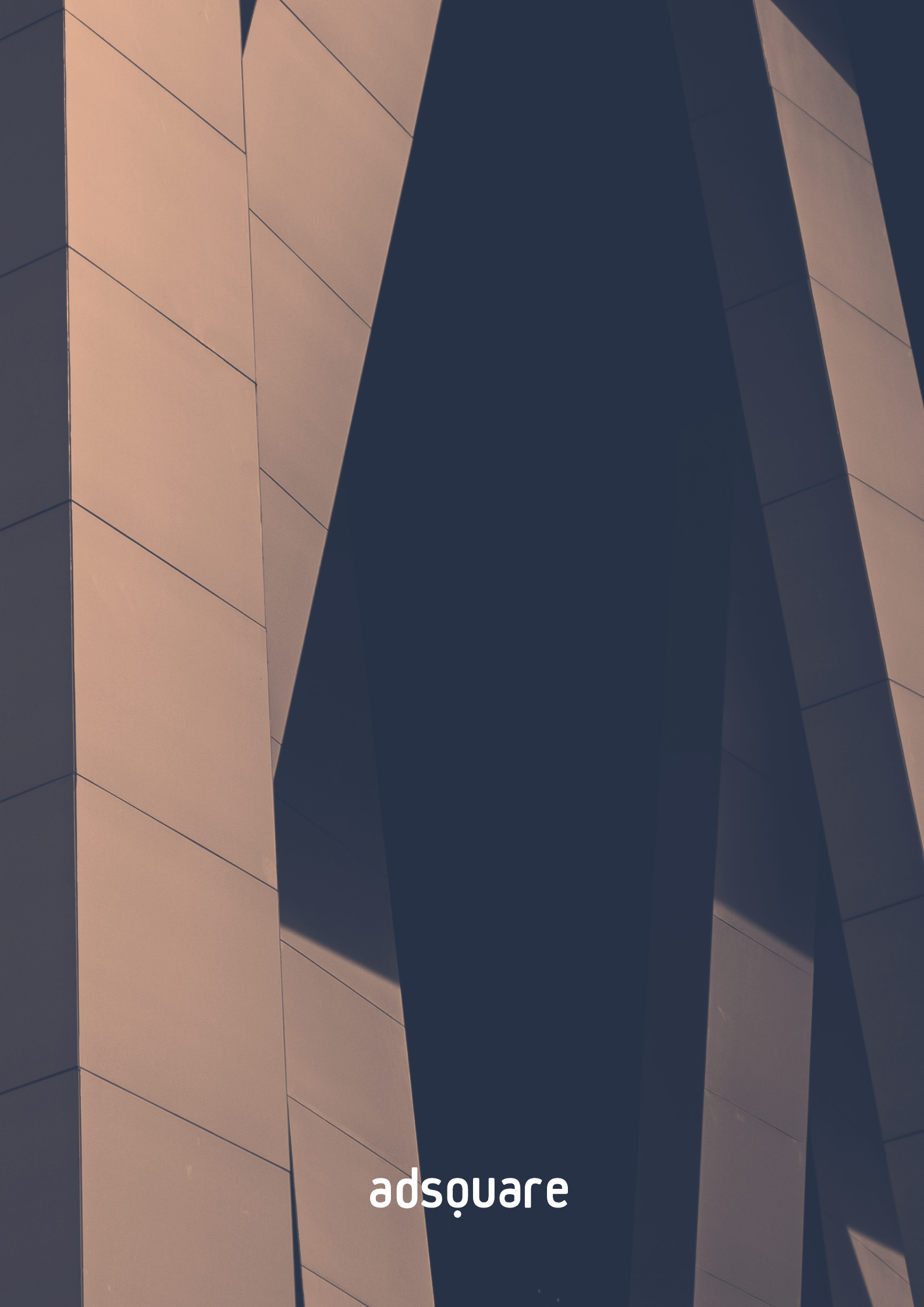
Adsquare is the global audience & location intelligence company transforming data-driven marketing. We help businesses understand consumers by connecting their digital and physical worlds. We do this by leveraging audience and location data to reveal consumer behavior. These insights enable you to better target and engage with your audiences and to measure your marketing effectiveness.

Using Adsquare's independent platform solution, companies can access various data dimensions and apply them in 40 countries worldwide.

Founded in 2012 by Tom Laband (CEO), Sebastian Doerfel (COO) and Fritz Richter (CTO) Adsquare is headquartered in Berlin, with additional offices in New York, London, Paris, Milan, Madrid, Singapore and Dusseldorf.

Contact us

For more information visit **www.adsquare.com** or contact us via **info@adsquare.com**.


adsquare