

Magic Numbers: Five Ways

Network Operators Can

Measure Their Audiences

an aka.tv special report, part II

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SAN FRANCISCO – Much discussion of measurement in digital signage leads to more questions than answers. What is being measured? How important is a standardized metrics system? What constitutes an impression? How do you compare metrics across different networks?

In this second part of an ongoing series, **aka.tv** takes a look at five innovative solutions that are attempting to tackle the measurement elephant head-on, and assesses the strengths and weaknesses of each for different applications.

Traffic data: Orbit from ShopperTrak There are a number of technologies that facilitate and standardize traffic counts, enabling retailers and network operators to establish a known universe of prospective digital-signage viewers. Prominent among these is Orbit from Chicago-based ShopperTrak, an application that uses video sensors with high-speed processing components to unobtrusively track customers' in-store movements.

The device provides data on customer entrance and exit activity, and can be incorporated into digital-signage installations to monitor passing traffic. Orbit's technology has the ability to count side-by-side traffic and differentiate between adults and small children. Additionally, it time-stamps each record, enabling the breakdown of data to any desired time increment.

Through the use of multiple Orbit sensors, digital-signage stakeholders – network operators, advertisers and retailers – can also tell how many people pass within 15 feet of their store location or outward-facing displays, and compare that number to the total number of people who entered.

ShopperTrak's solution is currently employed by a number of digital-signage network operators, including Colorado-based Intermall Media, which uses the technology to measure the number of customers passing its in-mall displays.

Good for: Measuring traffic into and out of public locations to determine the number of people in the vicinity of a digital-signage network, as well as specific data on the traffic passing by each screen.

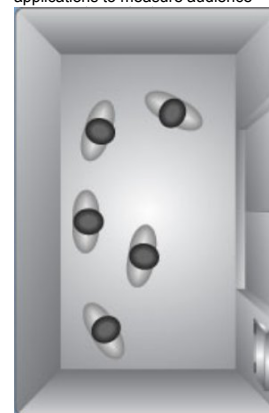
What it doesn't do: Used in isolation, does not give any indication of the number of people actually engaging with the network content.

Decent exposure: Arbitron's PPM While it is important for stakeholders to know the gross number of potential viewers, the process of counting traffic in and out of a location is at least as old as Noah and his ark, and as the first article in this series noted, footfall data alone is not enough to meet the needs of ever more sophisticated advertisers.

To better understand the number of people actually engaging with the network's content, a more granular, individualized measurement methodology is called for. The most high-profile application in this area over the past year has been the Portable People Meter (PPM),



Arbitron's PPM will allow operators of audio-enabled digital-signage applications to measure audience



Using an application called Stereo Vision, The Elevator Channel can track the movements of elevator

$$\int_0^1 x^2 e^{2x} dx = \left[\frac{x^2}{2} \right]_0^1 - \int_0^1 2x e^{2x} dx \quad [IBP]$$

$$= \frac{e^2}{2} - \left(\left[\frac{3x^2 e^{2x}}{4} \right]_0^1 - \int_0^1 \frac{6x e^{2x}}{4} dx \right)$$

$$= \frac{e^2}{2} - \frac{3e^2}{4} + \left[\frac{6x e^{2x}}{8} \right]_0^1 - \int_0^1 \frac{6 e^{2x}}{8} dx$$

$$= \frac{-e^2}{4} + \frac{3e^2}{8} - \left[\frac{6e^{2x}}{16} \right]_0^1$$

The Digital Signage Agency has developed a complex mathematical solution for calculating impressions

developed by media-research firm Arbitron. Currently undergoing a large-scale trial in Houston, Texas, involving 2000 randomly-selected participants, the PPM is a cellphone-sized device that passively measures a consumer's exposure to all PPM-compatible media.

Through a process called 'psychoacoustic masking', the PPM picks up an inaudible signal embedded in the output of all forms of audio-enabled ambient and personal media. While much attention has been paid to the implications of the PPM for improving the accuracy of TV and radio consumption measurement, the device works equally well for digital-signage applications with audio output, such as in-store television, digital cinema advertising and other captive audience networks.

Arbitron says that the PPM has the capacity to detect multiple media outputs, allowing retailers to track customers' exposure to individual ad campaigns, as well as store-wide applications such as radio. Significantly for in-store network operators, more than 50 retail companies are participating in the Houston trial, including Best Buy, Gap, and Old Navy.

Pierre Bouvard, president of Arbitron's Portable People Meters division, has said that the PPM will allow measurement of retail visits as easily as measurement of marketing efforts, a solution that will give retailers "powerful measures of return on investment and accountability".

In an expansion of the PPM application, Arbitron is also gearing up for a trial of Apollo, a joint initiative with VNU Media's ACNielsen, which will simultaneously track participants' exposure to media via the PPM and their purchasing behavior via Nielsen's Homescan consumer panel.

Using Apollo, digital-signage stakeholders will be able to track not only exposure to in-store content, but also the direct results that exposure has at the checkout, to determine the effect of the signage message on customer behavior.

Due to the mobile nature of the PPM, Apollo is also likely to become a valuable tool in determining the effectiveness of off-site digital signage campaigns that aim to drive traffic to retail locations. Viewers' exposure to a digital-signage ad campaign in the gym or at a subway station, for example, could be recorded and then compared to subsequent purchasing patterns.

Arbitron says it plans to commence a seven-month pilot of the Apollo system later this year among 5000 households across the United States.

Good for: Aggregating data on the total exposure individuals have to digital-signage content overall and to specific ad campaigns. Apollo will give retailers valuable insight into uplift associated with specific campaigns.

What is doesn't do: Currently, the PPM can only measure exposure to audio-enabled displays, leaving audience exposure to many silent digital-signage networks uncounted.

Seeing all: The Elevator Channel The Elevator Channel, which operates a network of in-elevator digital-signage displays in corporate office towers in and around Charlotte, North Carolina, uses a camera-based application called Stereo Vision to monitor the numbers and movements of all passengers who ride its networked elevators.

According to Rudy Alexander, the company's CEO, the cameras work by "tagging" individual passengers as they enter the elevator cab, and tracking them until they disembark.

Using two calibrated cameras with slightly different angles, Stereo Vision effectively sees passengers in three dimensions, explains Alexander. With this ability to perceive depth, computer algorithms can track passengers without the problems of occlusion (one object passing in front of another) found in two-dimensional applications.

As well as providing an audit of in-and-out numbers, Alexander says that the Stereo Vision application allows the network operator to monitor people's movements within the cab and, importantly, in relation to the digital displays.

Once recorded, passenger information is then time-stamped, enabling The Elevator Channel to give advertisers

actual – rather than estimated – figures on the number of people exposed to their messaging. The Elevator Channel combines data from the tracking cameras with the results of independent ad-recall and awareness studies to offer advertisers figures on audience reach as well as frequency.

Good for: Giving buyers of airtime an exact count of the number of people exposed to programming on elevator displays.

What it doesn't do: Like the PPM, Stereo Vision only provides information on the number of people in the presence of – rather than actually watching – displays; however, this is less of an issue in a confined elevator, where it is comparatively difficult to avoid noticing the displays, than in retail stores.

We do the math: The Digital Signage Agency While figures on media exposure together with gross traffic data bring network operators closer to understanding their viewership, the practice of selling airtime on digital-signage networks based solely on the number of people with opportunity to see (OTS) is perceived by many as problematic.

As highlighted in the first article in this series, media planners and buyers draw a distinct line between consumers in the presence of a display, and those who actually view its content.

A more mathematical approach to conversion rates of digital-signage audiences is being developed by Toronto-based The Digital Signage Agency (TDSA). Using a complex series of calculations based on probability coefficients and a plethora of variables including viewer 'captivity', ad length, screen size, number of screens, and average exposure, TDSA's measurement team have come up with what they see as a formulaic way to extrapolate the actual number of views from the universe of potential viewers.

From this figure they are then able to derive a standardized cost-per-thousand (CPM) value, with which media buyers can be approached.

The formula-based measurement system is currently undergoing third-party checks and auditing which it hopes will be complete within the next six months, says TDSA. Raji Kalra, TDSA's director, says that when available the new metric will be "customized CPM" for digital signage, a medium in which he says that measurement has "not been able to keep up with technology".

In addition to a standardized measurement solution, TDSA is addressing the lack of cross-network collaboration among digital-signage operators, another factor identified by media buyers as an obstacle to mainstream adoption of the medium. Kalra says that the current competition between network operators selling different packages on different formats using different metrics is making the industry appear "scattered and disorganized".

Recognizing the need for a one-stop shop for media buyers to buy digital-signage airtime on a standardized basis and across multiple networks, TDSA positions itself as an independent intermediary between media buyers and digital-signage-network operators.

The company currently acts as an ancillary sales house for a growing number of major Canadian networks, including VST International's Esso forecourt network, Freefone's 400-plus-site network, and Impulse TV's Foot Locker and Sport Mart networks.

Good for: Providing a one-size-fits-all model for a range of diverse digital-signage applications, thereby allowing advertisers to buy across multiple networks.

What it doesn't do: By standardizing airtime on different networks, TDSA's measurement system does not take into account differences in content, which play a critical part in the effectiveness of commercial networks. **Seeing is believing: VideoMining** The use of cameras to track digital-signage viewership is developed even further by VideoMining, a division of Pennsylvania-based Advanced Interfaces.

VideoMining's suite of products range from generic behavior-monitoring services such as its Customer Traffic and Queue Management solutions, to its sophisticated Customer Segmentation, an application that wouldn't be out of place in the movie *Minority Report*.

According to VP Jeff Hershey, all VideoMining's products use advanced software and video-processing techniques to derive behaviors and characteristics captured from ordinary video footage. For simple impression-counting, VideoMining's cameras can register faces from a distance of several feet even when viewers are in motion, giving an exact count of impressions. Hershey explains that the screen-mounted cameras can be calibrated to correspond to the size – and therefore visibility – of the display, and that network operators can set threshold limits, so that only views that last over a certain amount of seconds are counted as impressions.

With Customer Segmentation, analysis or 'mining' of the video footage is taken several steps further to create a demographic profile of the viewers. Guided by certain data points on a viewer's face, the application processes captured images through a series of algorithmic calculations to produce detailed data on a viewer's gender, age range, and ethnicity (for example, Caucasian, African-American, Asian).

This information can then be used in real time to tailor messaging on the in-store displays to the specific demographics. Hershey explains that the longer viewers stand in front of a screen, the more frames the computer can process and therefore the more accurate the demographic profiling can be.

VideoMining's products are currently being used by a number of retail clients to understand the link between certain demographic characteristics and purchasing patterns. Hershey says that one global quick-serve restaurant chain has used the application for "several years" to better target its customers by collating data on eating habits, geographical region and day-part.

To date, most deployments of VideoMining have been standalone cameras, but Hershey says that the company has begun to offer an integrated display solution with the application built into digital-signage network screens.

Good for: Providing exact viewership counts, as well as demographic profile of audience.

What it doesn't do: Make coffee. With the availability of more dependable tracking technology and the emergence of third-party measurement agencies such as TDSA, the issue of impressions for digital-signage networks is being addressed from numerous angles. The next part of this **aka.tv** series will cover another challenge for retail-network operators: measurement of sales uplift.

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