

## Audience Measurement with Anonymous Video Analytics

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Advertisers now have a method to determine viewership metrics for digital signage content.

One of the key challenges related to digital signage-based advertising is how to accurately measure the audience viewing a particular message. That information is used for everything from determining the rates a network operator might charge to deciding what types of content work best at various times of the day.

Although television and radio have Nielsen ratings and print has circulation numbers, there hasn't been a similar measurement tool for digital signage. It's certainly easy to count passing traffic, but not everyone passing a sign takes a look.

As digital signs become increasingly commonplace, network operators are incorporating a solution known as Anonymous Video Analytics (AVA) to more effectively measure the audience viewing a sign.

### How it works

Anonymous Video Analytics is based on computer vision technology using a technique known as pattern detection. Starting with a database of hundreds of thousands of anonymous face images, pattern detection algorithms scan those images for pixel intensity variations, such as dark

areas where eyes tend to be and light areas where noses tend to be. Using that information, the algorithms determine the type of pixel arrangements which resemble the general pattern of a human face.

Those algorithms are then extended to recognize pixel combinations that correspond to gender, age and other key demographics. AVA software ultimately can take an image, convert it to a mathematical pattern and categorize that image into general demographic groups.



AVA uses mathematical algorithms to detect faces and categorize them into general demographic groups.

AVA typically combines an inexpensive USB or Ethernet camera sensor mounted on a digital sign with a computer running AVA software.

“If you were to walk up to a digital sign that is AVA-enabled, the sensor is going to take what it sees and run it through the AVA software, which will determine if there are pixel patterns present that resemble a human face,” said Haroon Mirza, director of business development with Markham, Ontario-based CognoVision Solutions Inc, a company specializing in audience measurement.

“It then counts that pattern as a viewer,” Mirza said. “AVA doesn’t know who that face belongs to, since the technology doesn’t look for minute details; it just knows that this set of pixel intensity variations correspond to a human face.”

Although AVA is occasionally referred to as facial recognition, that’s a misnomer, Mirza says. “The appropriate terminology is ‘face detection,’ as the technology does not recognize who someone is; it only detects the presence of a mathematical human face.”

“When an AVA system detects a face, it is not comparing that face to an image database,” Mirza said. “In fact, there is no database; there are only algorithms that use mathematical information to determine if a combination of pixels matches a statistical pattern of a human face.”

“What is important to note from a privacy standpoint is that there are no images or video footage stored and that each data entry is completely anonymous,” he said. “The log files only store information such

### AVA technology benefits

Anonymous Video Analytics measure:

- Actual viewers who look at digital signage, 24 hours a day, seven days a week
- How long the viewer looked at the digital signage
- Key demographic information

as the time of day, number of viewers and some general demographic characteristics. There is no information that could link back to any specific individual.”

### The benefits

Advertisers are looking for solutions that can help them understand the effectiveness of the dollars they are spending on their advertising initiatives and digital signage is no different. Currently, there is no standard way of measuring that information — such a measurement, once adopted, could help spur the growth of digital place-based media.

“We are trying to get digital place-based media in the core communication plans for advertisers. The combination of AVA and other new breakthrough technologies is just what advertisers need to substantiate the dollars they are spending on this media,” said Ashley Flaska, vice president of marketing for Itasca, Ill.-based NEC Display Solutions, a provider of digital signage solutions.

Traditional audience measurement tech-

niques for digital signage usually have involved teams of people who physically count the numbers of passersby. Although such techniques are still prevalent, the scope of the information they can generate is somewhat limited.

“For example, if you take a metro area like Phoenix, Ariz., where there is a population of between 3 and 4 million people, using traditional sampling methodology you might get feedback on a few households in the entire metropolitan area,” said Jose Avalos, digital signage director with Santa Clara, Calif.-based Intel Corp.

AVA technology, on the other hand, has the capability to count virtually every viewer of a particular sign, 24 hours a day.

When a person looks at a digital sign outfitted with AVA, the system generates a computer log file about the event. Information contained in that log file includes the time that person started looking and when they stopped looking, along with demographic information about that viewer generated by the AVA software.

“With this type of data, each individual entry in the viewership log doesn’t have that much meaning in itself, but when you take a look at hundreds of thousands or even millions of data points, this drives great meaning because we can see viewership patterns and trends evolve,” Mirza said.

“We can learn, for example, that for a particular digital signage network, or even for a specific digital screen, between the hours of 1 p.m. and 4 p.m. on Mondays, there is a 70 percent male audience watching for an average of 5.6 seconds. It also may be found that viewership is highest between

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10 a.m. and 10:30 a.m. and lowest between 3:30 p.m. and 4 p.m.,” he said. “As those patterns and trends emerge, they can serve as a window into viewer behavior within the environment.”

That information can then be used by network operators to set rates for a particular geographic area, time slot or group of signs, as well as by advertisers to test the effectiveness of a particular campaign.

“This opens up many doors for the digital place-based media world. We finally have the sophisticated analytics that advertisers need to validate their media spend on digital displays,” said Flaska.

“If it is a very large campaign, typically what you will find is that the creative piece of the campaign is relatively inexpensive,” said Avalos. “It could be very beneficial to an advertiser to have multiple sets of creative that can be very quickly tested to get feedback on the metrics before that campaign gets rolled out across the nation or across multiple countries.”

AVA also can be linked to a content management system, which displays content on the digital signs, for real-time ad selection.

“If a 15-second advertising spot is playing and in the last few seconds of its airtime AVA determines that the audience in front of the display is 70 percent female, right

before playing the next ad, the system can pull an ad meant for the female audience in order to increase the relevancy,” Mirza said.

### Getting started

The most cost-effective way to incorporate AVA into a network is to do it in the design phase. Deployers can choose equipment that is powerful enough to run both the content management system and the AVA system together.

Alternatively, existing networks also can be retrofitted with an AVA system.

“Based on analyzing your current digital signage network architecture, the best and most cost-effective way to implement AVA can be determined,” Mirza said.

“Let’s say you were looking at an existing digital signage network that happens to have four screens per venue,” he said. “If you are going to put up four AVA sensors and four additional CPUs, that could get

quite expensive. A more cost-effective option would be to link the four sensors to one centralized, high-powered CPU, such as an Intel Core i7 processor.

“However, for new networks, deployment costs can further be reduced by choosing an appropriate CPU for each screen that can optimally run both the CMS and AVA technology simultaneously.”

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