Digital Signage with Intelligence

IoT devices and edge computing are changing the customer/visitor experience. Facilities that aren't taking advantage of the latest technologies run the risk of falling short of their full potential.

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DIGITAL SIGNAGE WITH INTELLIGENCE

Digital signage has long been recognized for its power to communicate messages and influence behavior, and the reasons are clear.

According to research published on NeuroscienceNews.com, as much as 80 percent of all the sensory data we receive from the environment is visual. Other information indicates that digital signage has an 83 percent recall rate, and people retain 65 percent of visually presented information after three days.

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While the incorporation of Internet-of-Things devices such as timers and temperature sensors has for years allowed deployers to refine the messages displayed on digital displays based on changes to their environment, new technologies have added another dimension to digital signage content: intelligence.

Combining digital displays with IoT devices and artificial intelligence tools allows content to be elevated from simple, prescheduled video clips to real-time messaging based on the conditions of their surroundings. And in these turbulent times, these devices provide value because the customer experience in airports, sports stadiums, restaurants or other space where people gather is going to be paramount as the COVID-19 pandemic subsides and the world reopens. People want to feel safe, they want a seamless experience, and they want a more personalized experience. Providing a great customer experience is going to be a requirement to attract people back into public spaces, otherwise they'll go elsewhere or stay home.

Making smart decisions

It's difficult to comprehend how much the world has changed in the past year. At the beginning of 2020, the term "social distancing" was rarely used. We thought nothing of sitting in a crowded movie theater, dining in a packed restaurant or jostling with other shoppers in a retail store to take advantage of the latest sales.

Everything is different now, and the changes that occurred throughout 2020 and the beginning of 2021 are likely to remain with us for years, if not forever.

In addition to promoting products or directing us to where we need to be, digital displays in public spaces are delivering important health and safety messages about mask requirements and capacity restrictions. Window-facing signage in restaurants and retail stores is showing information related to call-in ordering and curbside pickup. Entryway signage in facilities offers warnings along the lines of "Do not enter if you're feeling sick or have had these symptoms in the past two days," or "Only 10 people allowed in the store at a time."

These days, the display of a message on a digital sign isn't enough, even if it's delivered with flashy full-motion video. To truly capture the value of digital signage, those messages need to reflect changes to their surroundings as they occur. That's where IoT comes into play.

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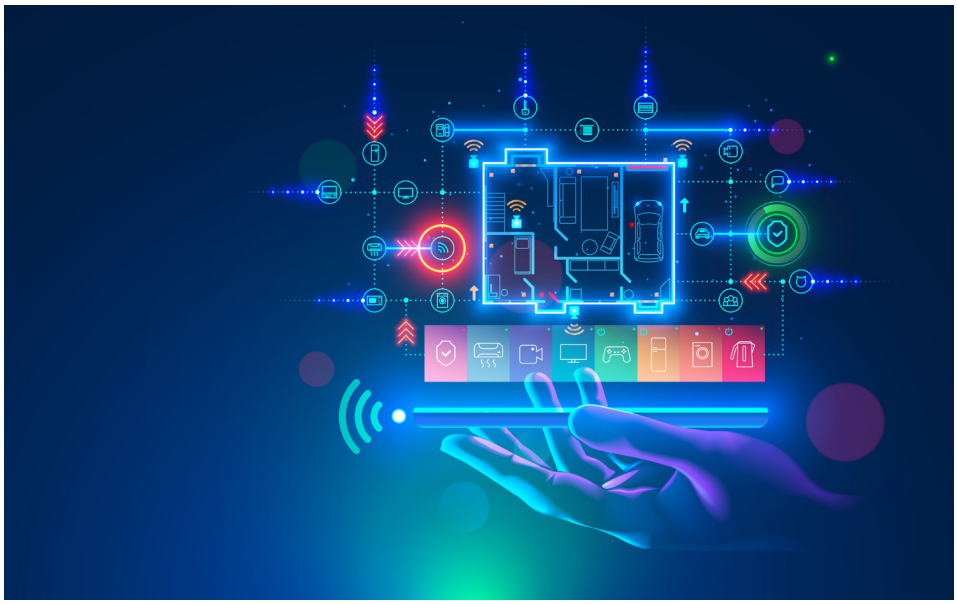
Reacting to the environment

Although recent events aren't the sole driver of the changes occurring in the digital signage arena, they've certainly served to accelerate those changes. IoT devices were becoming an increasing component of digital signage deployments well before the COVID-19 pandemic, and the trend has been gaining momentum. Temperature sensors incorporated into digital menu boards would trigger promotions for a soup-and-sandwich combo when the temperature fell below 40° Fahrenheit, or a refreshing iced coffee drink when the thermometer topped 80°. Timers in content management systems allow for "dayparting," or the delivery of different messaging based on the time of day.



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It's clear that IoT devices are going to be an integral part of digital signage networks in the future. A recent report issued by ResearchandMarkets.com predicts that annual shipments of so-called "connected" digital displays, or those that leverage IoT devices for content decisions, will grow at a 13.8 percent rate from 17.2 million units in 2019 to 32.8 million units in 2024. As a result, the number of connected digital signage displays in active use worldwide will grow from an estimated 63.8 million units in 2019 to 129.4 million units in 2024. That's a compound annual rate of 15.2 percent.

But while in the past the integration of IoT devices was limited to a few basic triggers, that's changing. The application of intelligent logic to digital signage content management systems is opening the door to digital signage networks that learn from experience and react in real time to their environment.

Signage strengthens intelligence

One of the ways signage deployers are making their networks truly smart is by leveraging the Intel® Distribution of OpenVINO Toolkit. The VINO part of the name stands for "open visual inference and neural network optimization."

According to Intel, the OpenVINO toolkit is "a comprehensive toolkit for quickly developing applications and solutions that solve a variety of tasks

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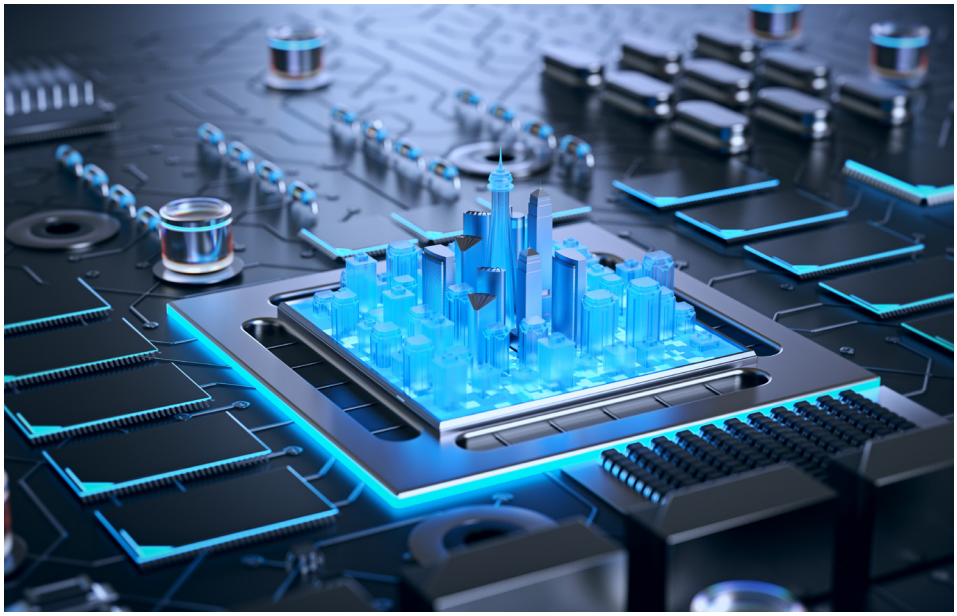
including emulation of human vision, automatic speech recognition, natural language processing, recommendation systems, and many others. Based on the latest generations of artificial neural networks, including Convolutional Neural Networks (CNNs), recurrent and attention-based networks, the toolkit extends computer vision and non-vision workloads across Intel hardware, maximizing performance. It accelerates applications with high-performance, AI and deep learning inference deployed from edge to cloud."

In layman's terms, OpenVINO allows deployers to incorporate intelligent applications into digital signage networks without the need for complicated coding. OpenVINO integrates seamlessly with several digital signage content management platforms, including the Moxie platform developed by digital signage software provider Omnivex. Moxie is a complete software solution designed for managing digital signage networks with the functionality to handle rich content, high-resolution media and real-time information right out of the box.

Digital signage applications that leverage IoT devices can extend far beyond the basic tasks triggered by IoT temperature sensors and the like. Using Bluetooth sensors that are GDPR compliant, for example, the application can tell if a visitor has visited a store or kiosk before and how long they were there, automatically adjusting the messaging they see based on that information. If that location is an airport environment and the sensors detect that a



person has come through that space 10 times in the last month, it would be reasonable to assume they're a regular traveler and the messaging they would receive would be different from a first-time visitor to the airport.

Cities can pair cameras with road signage to monitor traffic flow and make real-time decisions to help reduce congestion by directing drivers to alternate routes. IoT sensors in retail stores can help identify specific customers, increasing sales by delivering personalized messaging targeted to that customer.

At a health care facility, digital signage might recognize a patient arriving for their appointment, provide them with an estimated wait time and directing them to an examination room when it's their turn. Automating this previously opaque process can contribute dramatically to improving the patient experience. Another example might be using sensors for wayfinding, directing patients on how to navigate a large healthcare facility. Looking up their doctor's name or department on an interactive display could result in directions being sent to their mobile device.

And in a world dominated by COVID-19 concerns, temperature sensors at an entryway might lock a turnstile or close a door if someone with an elevated body temperature attempted to come inside, with digital displays directing the individual to the nearest testing center. Those sensors might even keep a count of the number of people who have entered a facility and prevent additional people from coming inside until enough people have departed, taking the task out of the hands of the person who may have previously been the target of a customer's wrath at being required to wait at the door.

The technology behind OpenVINO isn't limited to digital signage, either. In fact, it has applications for all sorts of computing devices that live "at the edge," or closest to those who will make use of them. Edge devices might include self-service kiosks, point-of-sale systems or any other computing device with which a consumer interacts directly.

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The path to recovery

As the world recovers from the effects of the COVID-19 pandemic, two things are clear: One, companies are under increasing pressure to optimize

their operations; and two, technology is going to play a major role in the current recovery.

Going forward, when people visit any public space, whether that's a street, a retail store, a restaurant, a health care facility or an airport, chances are the first thing they're going to see is digital signage, and that digital experience will follow them throughout their journey. The better the experience they have and the smoother their journey is, the better will be the service that the facility delivers. Intelligent signage will be the key to delivering that experience.

Benefits of IoT and digital signage in a COVID-aware world

- ***Entry screening*** – Temperature sensors can sense if someone has an elevated body temperature and make a decision on entry permission.
- ***Real-time capacity management*** – Sensors can track the number of people entering a facility and pause new entrants as the facility reaches capacity.
- ***Effective queue management*** - Cameras can detect crowded conditions, directing people to separate lines to enhance social distancing.
- ***Intelligent wayfinding*** – Signage can interact with mobile devices to guide visitors to their destination while at the same time minimizing overcrowding.
- ***Enhanced emergency messaging*** – Signage can quickly roll over to emergency messaging based on alarms or other indicators.

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