HAPTICS & DIGITAL SIGNAGE
Technology & trends report
December 2018
Digital signage is expanding rapidly and changing dramatically. Signage systems are transitioning from static displays to rich, dynamic interactive experiences,¹ while the technology that supports these is also evolving quickly.

Motion tracking technology now allows users to interact with digital signage using mid-air gestures. This mode of interaction is becoming increasingly common. However, it currently misses out the critical component of haptic feedback.

In other sectors (such as gaming and mobile), gestural interfaces are typically coupled with haptic feedback. There are good reasons for that.

Our sense of touch is a fundamental component of natural and intuitive interaction. Touch also has a strong persuasive power, and tactile interaction strengthens consumers’ connection to brands and products.

Until recently, technological limitations meant it was impossible to add haptic feedback to mid-air gestures (the user had to be in contact with a surface, such as a game controller). However, the development of ultrasonic mid-air haptic feedback means this is no longer the case.

A recent Ultrahaptics study investigated the effects of adding mid-air haptic feedback to interactive digital signage. It showed that adding mid-air haptics had dramatic effects on a range of advertising metrics.²

Digital signage and kiosks are about to change from an audio-visual (AV) mode to an audio-visual-haptic (AVH) mode. We look forwards to exploring with you the opportunities this will create.

Steve Cliffe
CEO & President

¹ http://www.morganclaypool.com/doi/abs/10.2200/S00558ED1V01Y201312MPC011
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Today, digital signage is pervasive across multiple sectors including out-of-home advertising, retail, location-based entertainment and workplaces. It’s easy to forget that the industry as a whole is less than 20 years old, and has arguably only seen significant traction in the last 10.²

The truth is that we are still in the early days of the digital signage industry, and in another 20 years’ time the landscape is likely to look very different.

Users will demand more and more from digital signage – more interactivity, better responsiveness, more personalisation and increasingly social experiences. Meanwhile, the companies who succeed in capitalising on these opportunities will be the ones who leverage new technologies to evolve and create the next wave of the digital signage revolution.

"... interacting with displays may become increasingly common and it will take greater interactivity to impress with immersive digital signage experiences.”

Top 5 digital signage trends | Samsung, February 2018²

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SIX TRENDS DRIVING THE NEXT WAVE OF DIGITAL SIGNAGE

**DISPLAY BLINDNESS**
Many passers-by look at displays for less than 2 seconds. As digital signage becomes ever more pervasive, companies will need to find new ways to stand out from the crowd.

**SOCIAL EXPERIENCES**
Users respond strongly to shared experiences, and digital signage solutions that offer this will have an advantage.

**TECHNOLOGICAL INNOVATION**
New technologies such as haptics, motion tracking, face recognition, AI, IOT, voice UI, mobile integration and NFC will create both disruption and opportunity.

**INTERACTIVITY**
Increasingly intuitive and seamless interaction will create new opportunities to improve user experience and increase brand and product engagement.

**DATA & METRICS**
Digital signage technology that embeds sophisticated data capture and analysis will create competitive advantages.

**PERSONALISATION & RESPONSIVENESS**
Users will increasingly gravitate towards digital signage systems that offer rich, responsive and unique user experiences.
WHY GESTURAL INTERFACES NEED HAPTICS

The development of motion tracking technology now allows users to control digital signage using mid-air gestures. However, evidence from other sectors (such as gaming and mobile) suggests gestures are far more effective when coupled with haptic feedback.

EMOTIONAL POWER
Humans respond strongly, instinctively and emotionally to touch.5

ENGAGEMENT, PERSUASION & RECALL
Incorporating haptics increases engagement and recall and makes messages more persuasive, even when the product is not inherently tactile in nature.6

INTRINSIC VALUE
People enjoy tactile sensations for their own sake. Haptics adds perceived value even when it does not provide direct information about the attributes of a product.7

CONNECTION
Tactile interaction strengthens consumers’ connection to brands and products.8

INTERACTION
Haptic feedback makes interfaces easier, more intuitive and more enjoyable to use.9

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5. See for example David J. Linden, Touch: The Science of Hand, Heart and Mind (Penguin, 2016)
7. The development of motion tracking technology now allows users to control digital signage using mid-air gestures. However, evidence from other sectors (such as gaming and mobile) suggests gestures are far more effective when coupled with haptic feedback.
HOW GESTURAL INTERFACES WITH HAPTICS WILL CHANGE DIGITAL SIGNAGE IN FOUR KEY VERTICALS

OUT-OF-HOME (OOH) ADVERTISING & MARKETING

Haptic marketing in malls and cinemas, and at events, will bridge the gap between offline and digital, offering tangible, tactile and emotional brand experiences with all the benefits of digital marketing technology: flexible, interactive, quantifiable, cost-effective and targeted.

LOCATION-BASED ENTERTAINMENT

Adding haptics to digital signage experiences will turn screens into interactive gaming devices in a cost-effective way that will surprise and entertain guests at arcades and theme parks. Mid-air haptic technology will remove the need for controllers or haptic gloves, creating true walk-up-and-play experiences.

NAVIGATION & KIOSKS

Haptic feedback will make interactive information systems and kiosks in malls, museums, schools, universities, offices and hospitals easier, quicker and more intuitive to use. Mid-air haptics will allow interfaces to be operated without physically touching them, reducing maintenance and user anxieties around hygiene.

OFFICE COLLABORATION & COMMUNICATION

The changing work environment is driving new methods of collaboration, both within the office and between offices and remote workers. Annotation, ideation, presentation and collaborative conferencing will be transformed by interactive, 2D and 3D digital displays that incorporate the sense of touch.
HOW MID-AIR HAPTICS WORKS

THE TECHNOLOGY BEHIND VIRTUAL TOUCH

Ultrahaptics’ patented algorithms modulate ultrasound waves to create haptic sensations in mid-air. No controllers or wearables are needed: the “virtual touch” technology uses ultrasonic transducers to project complex, detailed shapes and textures directly onto the user’s hands.

Digital signage installations typically include an array of ultrasonic transducers mounted under a durable protective fascia and combined with a hand-tracking system. They can provide the sense of touch up to a metre away from the surface and can accommodate multiple points of interaction.

“\textit{I felt more engaged and immersed with the haptic feedback.}”\\Tester on Ultrahaptics’ haptic posters\textsuperscript{1}

CASE STUDY: ZEROLIGHT, META & THE CAR CONFIGURATOR OF THE FUTURE

For CES 2018 Ultrahaptics collaborated with AR pioneer Meta and automotive visualisation specialist Zerolight to imagine the car configurator kiosk of the future. In the award-winning interactive experience, users can see, hear and feel a holographic Pagani Huayra Roadster.

The ultra-high-quality virtual car was also fully customisable through an intuitive virtual interface that combined hand tracking with mid-air haptic feedback to enable users to feel and manipulate virtual controls.

\textsuperscript{1}https://www.ultrahaptics.com/news/blog/people-prefer-haptics-in-digital-signage/\\Image copyright: Zerolight
KEY BENEFITS OF ULTRASONIC MID-AIR HAPTICS

WOW FACTOR
A groundbreaking technology that makes experiences magical and campaigns unique and memorable.

HONEYPOT EFFECT
Audience interaction with digital signage using gesture tracking and mid-air haptics is eye-catching. This inspires passers-by to try it too, thereby increasing the marketing value for advertisers.

DATA & TRACKING
Quantifiable interactions that can be measured and analysed.

NO PHYSICAL CONTACT
The cleanest interface ever: reduces user anxieties about hygiene, reduces the need for maintenance and increases security and durability.

THREE-DIMENSIONAL INTERACTION
Creates a three-dimensional interaction zone that can extend the reach and capabilities of 2D screens, or be combined with 3D imaging to create “haptic holograms”.

COMPELLING CALLS TO ACTION
Combining an engaged audience with real-time analytics opens up new opportunities to embed effective call-to-action features.

CASE STUDY: ASUKANET & HAPTIC HOLOGRAMS
For CES 2018 and VR/AR/MR World 2018, mid-air haptics was combined with Japanese firm Asukanet’s glasses-free 3D technology and Leap Motion® gesture tracking to create a futuristic 3D holographic ATM.

The ATM’s interactive display is an intuitive 3D holographic display with virtual buttons that can be felt and operated easily and intuitively. The holographic image can be seen clearly only by the user standing directly in front of the display, providing increased privacy.
GETTING IN TOUCH WITH BRANDS

What happens when you add mid-air haptics to interactive digital signage?

83% of people prefer haptics
73% increase in purchase intent
50% increase in interaction time
+56 increase in net promoter score

“It would sell the product a lot quicker to me to be honest.”
- Quote from study participant

2018 study measuring 17 participants’ response to 4 motion-controlled interactive digital signage movie posters with and without mid-air haptic effects. Engagement was measured using Net Promoter Score (NPS), emotional self-assessment, engagement survey, galvanic skin response, time taken to assess each experience and qualitative description of experience.
USES OF MID-AIR HAPTICS IN DIGITAL SIGNAGE

TACTILE PRODUCT EXPERIENCES
Create rich, three-dimensional tactile product experiences with no need for wearables or controllers.

SOCIAL GAMING
Leverage mid-air haptics to create multi-player mini-games for movie posters or in arcades.

IMMERSIVE WORKPLACE COLLABORATION
Accelerate innovation through intuitive collaboration platforms and a richer sense of presence and control.

SELF-SERVICE KIOSKS
Develop more intuitive user interfaces and reduce user error, the time needed to complete tasks and the need for support from representatives.

CUSTOMISATION & CONFIGURATION KIOSKS
Add a memorable extra dimension to retail customisation and configuration kiosks. Make experiences more immersive and intuitive and generate footfall.

2D HAPTIC POSTERS
Create immersive interactive experiences using a 2D screen and drive increased engagement, dwell time and recall for out-of-home advertising campaigns.

3D “HAPTIC HOLOGRAMS”
Combine with glasses-free 3D imaging techniques to create 3D visuals users can touch for retail, kiosks or location-based entertainment.

INTUITIVE NAVIGATION
Create intuitive navigation systems that users can operate without touching for malls, museums and hospitals.
CASE STUDY: BARCO & HAPTIC MOVIE POSTERS

Ultrahaptics’ range of interactive digital posters use ultrasound to create the sensation of touch in mid-air and create a three-dimensional interaction zone in front of a display.

At New Scientist Live in 2017 this technology was used in a Star Wars poster to allow users to experience what feels like the Force.

For Digital Signage Expo (DSE) 2018, Ultrahaptics collaborated with BARCO to create an interactive poster for the Ready Player One movie that turned into a retro mini arcade game.

With a simple hand gesture, the movie logo can be turned into a maze. Players were challenged to guide their avatar through the maze using hand gestures in mid-air in front of the screen, to reach the “Easter egg” at the end. The game also included QR codes and a call to action.

“With virtual touch-based movie posters there’s a lot of dwell time and excitement.”

Jim Molony, Director of Strategic Partnerships, Digital Cinema, BARCO
ABOUT ULTRAHAPTICS

UltraHaptics was founded in 2013 to offer a different type of haptics, which creates the sensation of touch in mid-air using ultrasound. Since then, the company has raised over $80m in three rounds of funding and established a worldwide presence, opening offices in California, Germany and Korea.

UltraHaptics is currently engaged with blue-chip customers and partners from numerous markets, including digital signage, location-based entertainment and automotive. The first products featuring UltraHaptics’ technology launched commercially in 2017.

PRODUCTS & PROGRAMS

Whether you are looking for a plug-and-play kit to enable you to experiment with mid-air haptics, or in-depth support to develop an immersive application with haptic feedback, UltraHaptics is there to support you from bright idea to commercial success.

Choose from STRATOS Inspire, our robust, ready-to-go haptic module certified for public use, or flexible and scalable development kits STRATOS Explore or Touch. UltraHaptics also offers a range of customer support programs that include hardware, software and in-depth support tailored to your business needs.

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