HAPTICS & DIGITAL SIGNAGE
Technology & trends report

April 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.

Our sense of touch has strengths that cannot be replicated by audio-visual experiences. Yet in today’s digital signage landscape, while we may interact by reaching out and touching screens, those screens do not give rich tactile sensations (or haptic feedback) back to us.

Haptic feedback is a fundamental component of natural and intuitive interaction with objects, whether those are real or virtual.

Touch also has a strong persuasive power. Humans respond emotionally and instinctively to haptics, and tactile interaction strengthens consumers’ connection to brands and products.

Until recently, technological limitations meant it was hard to incorporate haptic feedback into larger or fixed screens. However, haptic technologies now in the market – including Ultrahaptics’ own ultrasonic mid-air technology – have overcome these limitations.

At Ultrahaptics, we believe that digital signage and kiosks are about to change from an audio-visual (AV) mode to an audio-visual-haptic (AVH) mode. For the first time ever, the power of touch can be fully leveraged in these markets.

We look forwards to exploring with you the opportunities this will create.

Steve Cliffe  
CEO & President
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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 10.¹

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

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
From AI to glasses-free 3D to haptics, new technologies entering the digital signage space 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.
WHAT HAPTIC FEEDBACK ADDS TO DIGITAL SIGNAGE

Touchscreen technology has revolutionised the way we interact with small screens and is now starting to transform digital signage as well. Yet today’s digital signage screens are one-way: we can touch them, but they do not give tactile sensations (known as haptic feedback) to us.

Until recently, technological limitations meant incorporating haptic feedback into larger or fixed screens was extremely difficult. However, innovation in haptic technology (such as mid-air and electrostatic haptics) means that haptic feedback is now a viable option for digital signage.

Multiple studies show the importance of haptic feedback in making interfaces more intuitive, while real-world deployments in both online and offline marketing demonstrate positive impacts on key metrics such as engagement, dwell time and recall.

“Tactile stimuli go much deeper than visual or auditory stimuli and they are recalled for much longer.”

Dr Martin Grunwald | Director of Haptic Research Laboratory, Leipzig University

1 https://www.eppi-online.com/2014/03/25/haptic-advertising-a-touch-of-science/
THE IMPORTANCE OF TOUCH

EMOTIONAL POWER
Humans respond strongly, instinctively and emotionally to touch.2

ENGAGEMENT, PERSUASION & RECALL
Incorporating haptics increases engagement and recall and makes messages more persuasive, even when the product is not inherently tactile in nature.3

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.4

“Natural human interface research is showing that touch is everywhere.”
Planar1

CONNECTION
Tactile interaction strengthens consumers' connection to brands and products.5

INTERACTION
Haptic feedback makes interfaces easier, more intuitive and more enjoyable to use.6

http://www.planar.com/products/touch-displays/
See for example David J. Linden, Touch: The Science of Hand, Heart and Mind (Penguin, 2016)
https://play.google.com/books/reader?id=XgnEAgAAQBAJ&lr=&printsec=frontcover&pg=GBS.PA246
https://electronics.howstuffworks.com/everyday-tech/haptic-technology5.html
AN INTEGRATED SENSORY STRATEGY FOR DIGITAL SIGNAGE

Our senses complement each other and are designed to work together.

Enriching today’s audio-visual digital signage by incorporating haptics and moving from AV (audio-visual) to AVH (audio-visual-haptic) opens up the opportunity to create powerful integrated interface solutions.

AVH will form a crucial part of the next wave of the digital signage revolution, creating user experiences that are innovative, intuitive, seamless, persuasive and emotionally powerful. Companies that deploy these integrated sensory strategies will gain an advantage by increasing user satisfaction, brand satisfaction and recall.

59%

The increased likelihood that a user will replay an ad on tablets when haptic feedback is included.¹

¹https://www.adcolony.com/blog/2016/06/09/captivating-senses-haptic-ads-improve-engagement/
HOW 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.

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.

“\textit{It is having an effect on me, one that an [audio-visual] advert wouldn’t have.}”

Tester on Ultrahaptics’ haptic posters\textsuperscript{1}

\textsuperscript{1}\url{https://www.ultrahaptics.com/news/blog/haptics-digital-signage/}

\textsuperscript{1}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.
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 on 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 is 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 $40m in two rounds of funding and established a worldwide presence, opening offices in California, Germany and Korea.

Ultrahaptics is currently engaged with blue-chip clients 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.

Products include consumer-grade technology and rental models, plus a bespoke customer program for creative agencies and consultancies who are creating and building next-generation products, services and experiences.

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