

HUMAN INTERFACE TECHNOLOGIES

Small Gestures, Big Opportunities

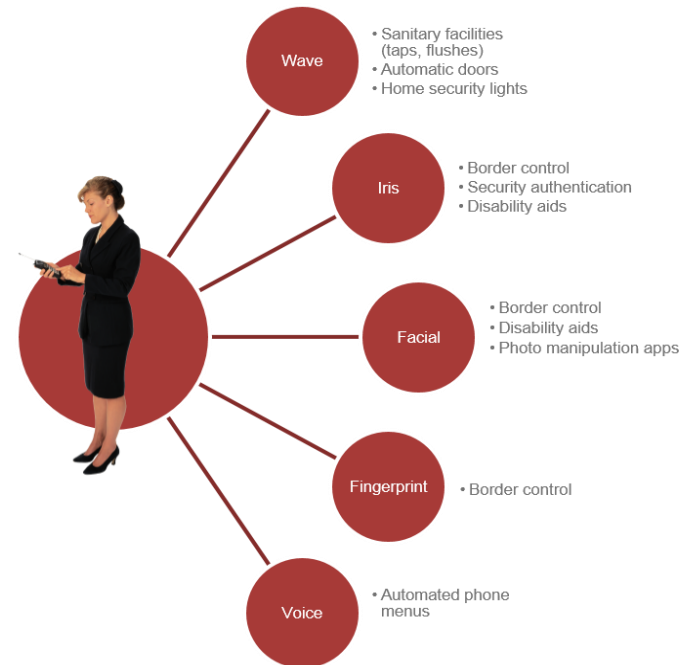


Whitepaper

1.1 Enabling Technologies

The mobile phone has long since graduated from being a device that purely enables person-to-person communication. Its role is far more expansive as it has become embedded into consumer lifestyles, being used to surf the web, take photos, connect to social networks, play games, get directions, manage our social and professional lives and so much more besides. The proliferation of the smartphone in particular has been a game changer, impacting on what phones are used for as well as expectations of the UI (user interface). This brings with it new expectations of functionality as phones are increasingly used in a broader range of environments for a broader range of functions. The upshot of this is that handset manufacturers have had to innovate in new modes of handset control that allow users to operate a handset without having to touch, or indeed, look at it.

Figure 1.1: Exposure to Gesture and Touchless Technologies beyond the Mobile Industry



Source: Juniper Research

The figure above outlines the consumer experience of gesture and touchless technology in everyday lives outside the mobile handset sector. The familiarity with such technologies no doubt aids adoption rates in the mobile handset sector and may also propel innovation in handset design and functionality.

1.1.1 Wave & Motion

Wave technology is widely used in modern lifestyles with the general public being familiar with the technology through auto flushes on public toilets, automatic doors and security lights. In their homes, motion sensors on some games devices such as the Xbox Kinect, and Nintendo's Wii Fit have helped to cement the role of wave and motion technology in modern lifestyles. It also marks a new interaction paradigm in the mobile phone industry as innovation looks to incorporate additional functionality.

Wave and motion commands can use either the smartphone's camera, sound, or proximity sensors. Having multiple modes of detection helps to drive usage in a wider array of environments.

1.1.2 Iris

At the same time that the number of cameras per device is increasing so, too, are the capabilities of those cameras. For example, while in 2009 just 4% of smartphone models offered a main camera with 8 or more MP, by 2013 that figure had jumped to 53%.

Improved camera sensor and processing technology, combined with higher MPs, is set to unlock new potential for facial and iris scanning to drive new avenues for mobile marketing. Whilst Samsung's Air Gesture on the Galaxy S4 was limited to gestures made within 3 inches of the camera, higher quality front facing (and indeed back-facing) cameras could see this range increase in the future. Juniper Research also anticipates that improving camera quality will also enable more detailed scanning and tracking of face and eyes to help further enhance the user experience. The

¹ <http://www.telegraph.co.uk/technology/news/10044493/Say-goodbye-to-the-pin-voice-recognition-takes-over-at-Barclays-Wealth.html>

segment could come under competition from ultrasound-based motion activation should technology, such as that of Elliptic Labs, grow in popularity in the future.

1.1.3 Voice

A survey, conducted by IT provider Unisys, ranks voice recognition as the leading biometric modality preferred by consumers (32%). However, the industry of voice technology can be divided into 2 broad disciplines:

- VAC (Voice Activated Command recognises words and actions commands accordingly). The general public is most familiar with VAC via automated phone options used by many large public-facing companies such as banks, utility service and healthcare providers already use it to direct calls to relevant staff. Its use by major handset brands has also familiarised people to this method of interaction.
- Voice Biometrics (ie voice or speaker recognition recognises nuances of language specific to an individual). This is less widely used in the public domain although there are signs that this is changing. In June 2014, it was announced that Barclays would be rolling out voice biometrics to customers using Nuance's Free Speech voice biometrics technology.¹

1.1.4 Facial

Juniper Research predicts that face recognition technology will become increasingly commonplace in the mobile phone industry and is highly likely to gain a foothold alongside other authentication and experience led applications. However, this immature technology is not without its faults

with Cognitec warning that, at present, it is relatively easy to ‘spoof’, for example by holding a photograph of the person to the camera. The emergence of emotion recognition goes some way to sidestepping such issues, helping handsets to distinguish between a live face and a photograph. The use of emotion scanning could open up a wealth of opportunities for facial scanning and recognition.

1.1.5 Fingerprinting

Although not strictly touchless technology, the role of fingerprint authentication in the mobile phone industry should be referenced in the context of other biometric UIs such as facial and voice recognition.

Fingerprint sensors are increasingly incorporated into new handset launches. Data from GSMarena.com suggests that almost 3% of smartphone handsets launched in January to August 2014 included a fingerprint sensor, compared to less than 0.5% 5 years ago in 2010.² A number of leading Samsung products, including the S5, the Note and the recently launched Galaxy Alpha, offer a swipe-over fingerprint scanner under the home button.

Juniper Research believes that fingerprint sensors are the most likely to gain adoption in the mainstream. However, manufacturers in the voice biometrics space are quick to highlight how easily fingerprint authentication can be compromised as it is a static biometric, ie does not change. Nonetheless, fingerprint authentication is gaining traction with a number of innovations in security applications. For specialists operating in the dynamic biometric space such as voice authentication, this is seen as

a disadvantage, as dynamic biometric authentication affords a degree of flexibility to security providers should their systems be compromised.

Juniper Research has also noted the integration of heart-rate monitors in fitness wear such as the (now discontinued) Nike Fuel+ wristband. The fact that heart rhythms are also declared to be as unique as fingerprints, presents the possibility of new opportunities to explore dual authentication through heart rate and fingerprint recognition in the mobile phone sector.

1.1.6 Biometric Identifiers

Now that smartphones are able to deal with various activities including payments and banking business, as well as sending and receiving emails, there is a growing need for improving their security system.

As user identification, PIN and password requirements become more stringent, biometric authentication is likely to grow in popularity. As well as being unique to the user, it is also impossible to lose or forget and although there will always be hacks, it offers greater security than other methods of identification in the majority of cases. However, as with any emerging technology, it can be expensive to implement and high costs, as well as initial glitches, could hamper growth. In addition, privacy concerns may also create a drag on growth, particularly in the case of biometric recognition technology.

1.2 Market Forecasts

The immaturity of the market ensures rapid growth for this sector, with Juniper Research estimating that unless an alternative technology has

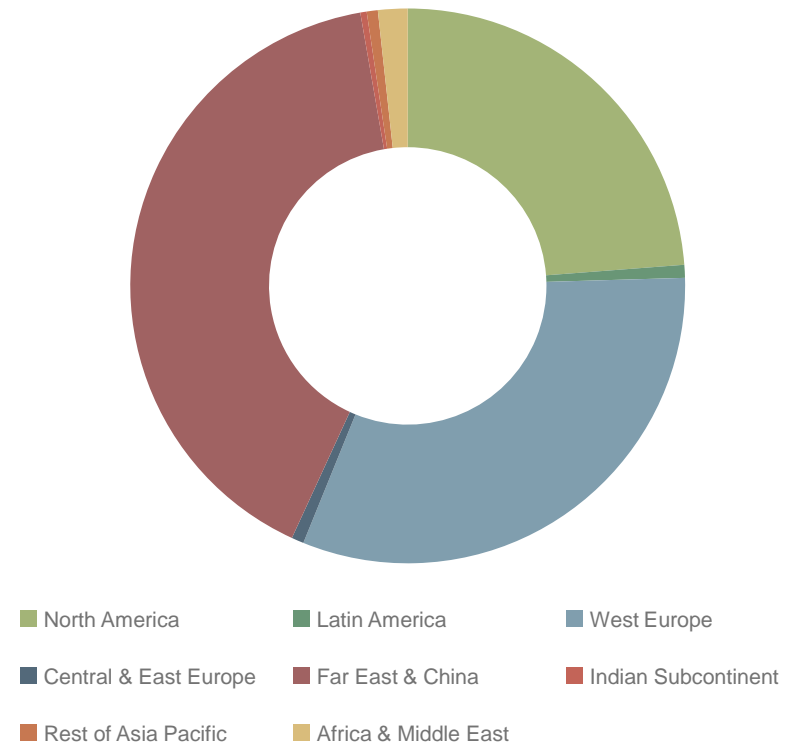
² <http://www.gsmarena.com/search.php3>

taken over by 2019, that handsets with 2 or more cameras will be almost ubiquitous, poising the Human Interface sector for dynamic growth. With enabling technology already embedded into handsets, it will be far easier for users to download appware that can make use of features such as the camera, gyroscope or microphone beyond their original purpose.

In 2014, the effective revenue per downloaded app is just \$0.09. This is due to the fact that the overwhelming majority of apps (around 99.9%) are free at point of download, with most used either to seed the market, drive brand awareness or, in some instances, to raise the profile of developers in this nascent space. However, we would anticipate that as the market develops, we would see greater use of the PPD (Pay Per Download) model, with around 1 in 5 Human Interface apps downloaded monetised using this approach. At the same time, we should expect to see a significant variety of consumer-facing apps monetised using the increasingly prevalent freemium model. The combination of these 2 factors should push the effective value of each downloaded app up to around \$0.68 by 2019.

The rising price of apps, rising adoption rates and enhanced technological capabilities mean that Human Interface technology is forecast to enjoy dynamic growth in the coming 5 years. Juniper Research anticipates that the market will experience year on year fivefold increases to 2019. The market is also expected to break the billion-dollar barrier in 2019, with estimated revenues of more than \$1.2 billion in that year.

Figure 1.2: Revenues from Mobile Consumer Services Using Human Interface Technologies, 2019 (\$1.26bn)



Source: Juniper Research

Order the Full Research Suite

Human Interface & Biometric Devices: Emerging Ecosystems, Opportunities & Forecasts 2014-2019

The Full Research Suite includes the following:

- **Market Sizing & Forecasts**

- a) **Benchmark forecasts** by 4 primary interface technologies (Gesture-Based, Voice Command/Recognition, Face/Eye Tracking & Recognition and Fingerprint Recognition) and 4 app categories (Games, Multimedia, Lifestyle and Authentication) on service adoption, pricing and revenues, including 18 tables and 14 charts.
- b) 87 tables, 6 What-if-analyses and over 4,500 Data Points.
- c) Additional forecast granularity including revenue splits by monetisation model.
- d) Available in **pdf** and **Interactive Forecast Excel** format.

- **Market Trends & Competitive Landscape**

- a) The research **explores the opportunities for the various technologies** underpinning gesture-based, touchless and biometric functionalities in the mobile device,
- b) **Highlights the key trends and drivers** in arenas such as voice commands, fingerprint authentication and facial recognition and tracking.

- c) **Explores the activities of players such as Apple and Google** in this space, and considers how their respective recent acquisitions, such as PrimeSense and Nest, might be used to enhance their service capabilities.
- d) **Invaluable insights** from interviews with the leading players across the Human Interface and biometrics sectors, including Cognitec, Crunchfish, Descartes Biometrics, Emotient, Nuance Communications, Umoove, ValidSoft and VoiceTrust.
- e) Vendor Matrix assessing capability and capacity of key players in the field.
- f) Available in **pdf**.

- **Executive Summary**

- a) Ready to use **PowerPoint** presentation of the Key Features of the Full Research Suite

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