Abstract

The research paper is a conceptual paper which is an empirical research as part of a doctoral study which enlightens us on the new wave of technology, haptics which has forayed into the consumer market to woo customers in this generation of nuclear families, where consumers are deprived of considerable human interactions and touch. Smart gadgets have become substitutes for sensory human perceptions, which have enhanced the customer experience and are conceived to be the new wave of innovation for boosting the sales of products. The paper depicts the different products in which haptics has been integrated into the products and how it has spelt out a totally new tangent of customer experience. It also analyses the future of haptics and how products have integrated haptic technology in them to enhance their features. The research being nascent and evolving technology has more content on company websites rather than journals.

1. Introduction

Technology has advanced to unimaginable heights and haptics is the new wave that affects the consumer senses and affects consumer behavior. The sensory aspects of the products affect the consumer preferences, choices and consumption of these products. The ultra-modern companies have plans to give smart phones and tablets new powers with video games that communicate and virtual guitars with strings that feel real.

Haptics has been derived from HAP-tiks, from the Greek haptein, meaning “to fasten”. It is the science of applying touch (tactile) sensation and control to interact with computer applications. The use of special input/output devices can help users receive feedback from computer applications in the form of felt sensations delivered to their hands or other parts of the body. A visual display with haptics technology can be used to train people for tasks requiring hand–eye coordination, such as
surgery and spaceship manoeuvres. Haptics is also being used for games in which you feel as well as see your interactions with images.

2. Research Objective and Method Justification

The research methodology adapted includes exploratory research since this is a comparatively new technology and does not include much literary content. The research purely relies on secondary data gathered from journals and websites as is truly relevant for an exploratory research. The research would include identification of products and services inclusive of haptic technology and gathering information on how it enhances user experience.

The objective of this research is to understand the following parameters relevant to haptic technology. The research methodology adopted is an exploratory research and this will not include any primary data.

I. To identify the products and services in the market which have adopted haptic technology
II. A study on how haptics has been integrated into products
III. To gather how it haptics intends to create a new experience for the customer.

3. Identifying Products and Services in the Market adopting Haptic Technology

Let’s survey a few products which introduced haptics to enhance its features and boost sales with haptics.

i. Samsung Galaxy S III
ii. New Door for BMW
iii. Smart Phone With See through Sensors
iv. Kindle Voyage
v. Apple Watch
vi.

4. Haptics Integration for user friendly products

4.1 Samsung Galaxy S III

The Samsung Galaxy S III (Fig 1&2) includes an advanced feature called Auto Haptic that uses vibration to create engaging physical response in downloaded 3rd party apps. The Auto Haptic feature helps you feel the sling stretch as you fling an angry bird in the game Angry Birds. It also makes you feel the impact of a grenade explosion in a first person shooter game. Auto Haptic is based on Immersion’s Reverb technology, which automatically creates haptic effects by monitoring the application’s audio track. In most Galaxy S III handsets, the feature is turned off by default, but the settings menu gives users flexibility to use Auto Haptics only in apps that you want as indicated in the image below Fig 1 and Fig 2. In fact you have the option to switch on the haptics mode. The most important feature is that Auto Haptic actually has very little impact on battery life, which is a common concern among users.

Figure 1: An advanced feature called Auto Haptic
4.2 New Door for BMW

This technology is the brainchild of Michael Graf at BMW and Michael Strolz's team at the Technical University of Munich. The technology states that the "haptic" technology gives tactile feedback that can be utilized in automobile doors as indicated in Fig 3. This could cut both road injuries and repair bills. If sensors detect a nearby obstacle at the same time as an accelerometer detects an attempt to open the door, the door's swing is restricted by a linear motor attached to the bar. The technology ensures more safety for users.

Figure 3: "haptic" technology gives tactile feedback that can be utilized in automobile doors

4.3 Smart Phone With See Through Sensors

A new technology developed by researchers from Montreal and the New York based company Corning Incorporated has created a first laser written light guiding systems that are efficient enough to be developed for commercial use. This includes glass which is embedded on phone with layer upon layer of sensors that can capture your temperature, assess your blood sugar levels and even
analyze your DNA. It includes a temperature sensor and a system for authenticating smartphones using infrared lights18.

4.3 Magnetic Skin Sense
Scientists from Germany and Japan have developed a thin and pliable magnetic sensor which can be adapted to the human skin. The intention is to equip the human s with magnetic sense. The electronic skin helps humans develop a sixth sense to perceive magnetic fields. The magnetic sensors withstand extreme with radii of less than three micrometres and survive without sacrificing the sensor performance. The ultra-thin magnetic sensors are ideally wearable. An on skin touchless human machine interaction platform, motions and displacement sensorics for soft robots and medical implants has been demonstrated as functionalities of electronics on skin.

4.4 Kindle Voyage

![Figure 4: Kindle Voyage- e-book readers and 3 android tablets](image)

Amazon has launched devices like e-book readers and 3 android tablets. The most interesting projects is on the new high end reader the Kindle Voyage as indicated in Fig 5.1. The left and right of the Voyage screens has touch zones designed by Amazon for turning the pages. A gentle squeeze on either side turns the page of the book you are reading in the direction accompanied by haptic vibration designed to substitute the feeling of paper sliding across paper. A pair of grey lines and dots on the front bezel can be touched lightly to advance the page. The haptic feedback gives your hand a little buzz which confirms that the command has been received. A small pressure left or right makes the appropriate changes. The intensity of haptic feedback based on the pressure can be fed into the device settings. There is an option of disabling it entirely also. The technology also enables Kindle Voyage to enable the feel of a physical page. It also includes a light sensor which automatically adjusts to the time of the day. The existence of all these features through haptic technology does not even slightly affect the battery19.

4.5 Apple Watch
The recently developed Apple Watch has a tactics engine that will send physical sensations to your wrist to accompany the action that reinforces to your brain what you are doing. The tactic engine
will drive Apple Watch’s subtle vibrating notifications. If you select a person from the list of favourite persons he or she will feel the taps if they are wearing the same device. Even a heartbeat can be send and both can and watch and feel the haptic simulation of your heartbeat. You can even use your finger to sketch and your friend on the other end can watch it. Images can be changed with your finger to give it a different mood.

It has multiple layers of sensitivity which includes fitness tracking and health oriented capabilities like Move Ring which indicates how many calories you need to burn and exercise ring which indicates how much brisk activity was done for the day. Stand Ring indicates you have been sitting long enough and you require standing.

4. Haptics Improves The User Experience

A sensory age has been initiated which integrates haptic technology into all kinds of device. Haptics has been an integral part of consumer electronics starting from your phone being on vibratory mode. Haptics will add depth and texture and literally add a good feeling to computers, phones and wearable devices which will have some practical benefits and will make us love our gadgets.

There are three new uses for Haptics:

I. To augment tactile experience of using hardware
II. To convey pattern specific information
III. To communicate

Haptics can enhance products and services to be more user friendly which adds to the experience of that product. Haptics can include computing devices to be embedded into glass surfaces such as windows or table tops that can create transparent touchscreens as seen in movies like Avatar and Ironman. A particular European Project is testing on a system that has a car brace for impact before collision by strengthening his frame. Margaret Minsky’s doctoral thesis completed in MIT centered on simulating texture with lateral force using a custom software environment called sandpaper to feel various textures.

5. Limitations

The research has included only a few products which has enhanced user friendly and revolutionizing technology due to constraint and time and content restraint in journals. The few products discussed has been selected specifically to bring out the growth of haptics till present and the future growth in this field which can result in breakthrough technology and solutions for social causes also.

6. Future of Haptics

Haptics is the future and has potential much more than 3D. It promises a lot of potential in smart phones and mobile gaming. It also makes touchscreen phones more accessible for the disabled, elderly and blind which is more of a societal cause. Synaptist Technology Strategist Andrew Hsu father of the captive touchscreen has stated that refined haptics can bring us to feel software keyboards and buttons. The new 13 inch MacBook of Apple includes the latest innovation using electromagnetic motor to trick your fingers into feeling things that aren’t actually there. Heavy investments, innovative technology, expertise in research and development can trigger haptic technology to revolutionize the world. Haptics is still in a nascent stage and has immense potential to develop in every possible field whether it be healthcare, education, entertainment, mobile technology etc.
7. Conclusion

The study has identified new generation products which have integrated haptics technology positively to enhance customer experience. The research has indicated that the technology and software that has been incorporated in the devices to create a unique sensory outcome integrating tactile feedback and technology. The products discussed above reflect mostly in company websites rather than research papers in journals. They indicate how haptics has improvised gadgets and services in a manner that it provides applications which triggers unique experiences and real feelings. It even triggers sensors which contribute towards a healthy lifestyle with efficient battery consumption. Haptics has improved user experience in electronic devices and has progressed to a stage where more research can contribute an evolution of products and services in collaboration with technology.

The haptic exposure and solutions enhance the a unique user experience which gives a competitive edge to the product.

References

Research Papers

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