

Multi touch technology

[Technology](#)



**ASSIGN
BUSTER**

The development of human technology has reached a new height. As Bill Gates have also revealed, people no longer interested in sophisticated gadgets which are hard to interact with. The term he use was ' natural technology', which represent the rise of technological devices that can be interacted with using human's most natural abilities, like writing on screen instead of using keyboards, and touching screens instead of using stylus. The growing popularity of natural technology has spawned new gadgets, new features which are previously considered impossible.

Multi Touch Technology is one of those rising technology today. It is the symbol of a world entering new era where technology actually serves to make lives easier rather than more complicated. In this paper I will elaborate the applications, history and development of the Multi Touch Technology in our modern world. II. Rise of Multi Touch Technology Steve Jobs made a demonstration of Apple's new phones at Macworld in 2007, and the feature that people are most interested at the time was the touch-screen interface which allowed more than one touch at a time.

The function allows people to perform functions that might previously be unimaginable, like zooming in and out by pinching the screen with 2 fingers and expand the pinch or narrow it (Green, 2007). In reality however, the capabilities of multi-touch technology is not actually maximized within phones, but in larger screens. The New York University has developed a multi-touch screen which is capable of accommodating as much as 20 or more fingers, in the form of interactive whiteboards or touch screen tables. Using these screens, multiple users can become collaborators.

The collaboration itself could take many forms, like networked brainstorming system, an animation collaboration interactive whiteboards and a diamond touch table, using which a group of people can sit around and collaborate on projects. . III. History of Multi Touch Technology Unlike what most people thought, the history of Multi Touch Technology has actually begun a long time ago. Bill Buxton from Microsoft Research stated that his team has been working on the technology since 1984, and he is sure that they are not the first to start developing the technology.

Other sources reveal that multi touch technology dates back to 1982 with the University of Toronto developing the first finger pressure multi-touch display. Afterwards, it was Bell Labs that engineered a touch screen that could change images using more than one hand. They actually collaborated with the University of Toronto and developed the Digital Desk which form supported the multi-finger and ‘pinching’ technology (Baig, 2007). The quite meaningful history of how the technology was developed however was actually made by Fingerworks, a Newark-based company run by the University of Delaware.

The device was called the iGesture Pad and TouchStream keyboard. Fingerworks was acquired by Apple in 2005. IV. Technicalities of the Multi Touch Technology Touch sensing in high tech devices has been around for quite some time, but multi touch sensing technology allows interaction in multiple points so that a user can interact with a system using more than one finger at a time. In further development of the technology, the system can even interact with multiple users at one time.

The technicalities of this technology allow much more sophisticated interaction formats than just allowing poking actions that we could get with the typical touch screen. Within the multi-touch system, the capacitors are arranged according to a coordinate system. The circuitry of this system then can sense changes at many points along the grid. This is possible because every point of the grid generates independent signals when they are touched and then it will relay the signal to the iPhone's processor.

This technology allows the multi-touch device to determine the location and movement of simultaneous touches within multiple locations. However, due to this system's reliance on capacitive material, the device would only work if we touch it with our fingertip. Using a stylus or wearing a non-conductive glove will not work (Buxton, 2008). In most multi-touch enabled devices, there are two choices of methods available. The first is mutual capacitance. Within the mutual capacitance, the capacity circuitry requires two distinct layer of material.

One layer carries the current and other detects the current at nodes. The other method is self capacitance which uses one layer of individual electrodes connected with capacitance-sensing circuitry. Both methods send touch data as electrical impulses to the system and it will react in response. To further elaborate on the technical aspects of the technology I will mention several different aspects makes the technology possible. Those aspects are: ? Degree of touch A multi touch technology enables a device to sense the degree of user's touch to the screen.

The degree of touch which we are talking about here is referring to the extent of the pressure but the amount of area contacted, because as users

<https://assignbuster.com/multi-touch-technology/>

push harder on the screen, their finger tip spreads over a wider point of contact and the system will pick up on the amount of area contacted. ? Angle of approach The technology can also sense the angle of the finger, relative to the screen's surface. This would give the finger the capability of functioning like a virtual joystick, which is useful in 3D applications. ? Force vectors

Another feature of a multi touch screen is its ability to exploit the friction between the finger and the screen in order to apply various force vectors. For instant, a user can apply a force along any vector parallel to the screens surface, even a rotational one (Nakatani, 1983) V. Development of The Multi-touch Technology In order to describe development of multi touch technology development, I will be necessary to discuss how older multi touch enabled gadgets are operating. ? Multi Touch Screen, 1984 In 1984, the Multi Touch Screen was actually available using a transparent capacitive array of touch sensors overlaid on a traditional CRT.

It was already able to manipulate graphical objects with excellent response time. ? Multi Touch Tablet, 1985 It is a tablet capable of sensing arbitrary number of simultaneous touch inputs, absorbing data regarding the location and degree of touch. The technology take utilizes capacitance rather than optical sensing. It was considered thinner and much simpler than camera-based system. ? Sensor Frame, 1985 This type of touch screen uses optical sensors in the corners of the frame in order to detect fingers. The device uses DRAM IC with glass covers for imaging. The sensors can detect up to three dingers at one time reliably.

The device could also detect the angle that the finger came into the screen (McAvinney, P. 1986). ? Digital Desk, 1991 The next milestone in multi touch technology development is the digital desk. It is the earliest projection of Tablet top system that used optical and acoustic techniques to sense fingers and other objects also (Wellner, 1991). ? Active Desk, 1997 Afterwards we have the active desk, which is a drafting table size desk that had a rear-projection data display. The rear projection screen was a translucent controlled graphics tablet and the stylus was operated with the dominant hand (Leganchuk, 1998).

T3 is a multi touch screen technology that uses bimanual tablet-based system with a number of techniques. Activities that are enabled include grabbing the drawing surface and scaling its size by moving the hand apart or towards each other, grabbing the background and rotate it and controlling the pivot point as well as the degree of rotation. VI. Recent Applications of Multi Touch Technology Applications of the Multi Touch Technology were actually stayed under the radar until Apple revealed the iPhone and Microsoft started to introduce surface computing.

iPhone was recognized as the gadgets that practically generated a wave of interest in multi touch computing, due to its small touch screen feature. Based on the iPhone technology, new programs like Truetouch appeared. In this chapter I will reveal the recent applications of the multi touch technology. Due to the presence of many competitive companies developing on the technology, it would be easier if the discussion of multi touch technology applications is divided in sub-chapters. Figure 1 Apple's iPhone

VI. 1. Apple's Products As mentioned, the first application of multi touch technology was in the iPhone.

This application actually received many criticisms because experts believed that the multi touch technology can be maximized much more than that features which are available in iPhone. Afterwards however, there was the iPod touch, MacBook Air and Macbook Pro, which represented Apple's commitment in utilizing the technology to its maximum extent. The latest version of MacBook Pro features a full glass multi touch trackpad which enables various gestures like scrolling, swiping between pages, rotating pictures and launching programs like Expose. VI. 2. Microsoft's Products

After years of developing the multi touch application, in 2007, Microsoft produced the Microsoft Surface. It is a functional multi-touch table-top computer based on a standard Personal Computer Platform. In short, the product was a computer embedded in a table with a large, flat, touch responsive display. It utilizes small cameras allowing it to the touch of any object. The activities made possible with this application varying from a simple picture and video organizing until ordering food at a restaurant. Furthermore, it allows multiple users to work on one table at the same time.

Microsoft has also launched the Microsoft Windows 7 which is supported by the multi-touch applications. The product will contain multi-touch mapping application, photoviewing program and incorporation in the internet explorer 8 VI. 3. TacTable's Products Tactable is a spin off from the graphics company Near Life. Their original product, the Near-Life, camera-based multi touch technology was transformed to a large multi touch table. This application of

multi-touch technology is actually more popularly used as a gaming device. The Tactable allows simultaneous interactions by several people at once.

VI. 4. CUBIT's products The next listed application was the technology by CUBIT. It is a scaled-down open source version of the Windows Surface. In practice, the engineers can actually reduce the cost of owning a multi touch table by sharing the CUBIT's hardware schematics and software source code. This application is actually fostering innovation by giving engineers open platform to develop multi-touch applications. VI. 5. Perceptive Pixel's Products Another application of the multi-touch screen is within the Perceptive Pixel's products.

It is actually a company spawned from New York University's consulting research department. The display within this application uses infrared LED (light emitting diode) and also an infrared camera to determine the point of contact. In this application, the inventor deliberately enable large collaboration spaces so multiple users can work and interact. The most famous application for the receptive pixel so far is the Multi Touch Collaboration Wall by CNN. VI. 5. Sparsh UI Sparsh UI is a device that can provide multi touch applications with tools that can quickly prototype and develop multi-touch applications.

It is an open-source platform framework device with multi touch gesture recognition, developed by the multi touch group in Iowa State University Virtual reality Application Center. VII. The Future of Multi Touch In addition to the developments and applications that have been displayed above, we are witnessing the development of multi touch into various other applications. One example of multi application support is on the BlackBerry Storm. Figure <https://assignbuster.com/multi-touch-technology/>

2 BlackBerry Storm The use of multi touch technology in telephones itself is expected increase up to 21 million sets by 2012.

The various other ways where multi touch can be used include: ? Governmental and military use ? Advanced gaming experience ? Concept mapping ? Enhanced Multimedia Experience ? Musical Composition, including mixing and recording ? Collaboration and Instruction on Interactive Whiteboards ? Concierge Services like planning the day, locating landmark, uplinking information to cellular phone, etc. ? Enhanced Dining Experience, using multi touch screens to order food, ask for refills, split check, pay the bills, order entertainment while dining, etc. Bibliography Baig, Edward.

2007. Table is set for computing. http://www.usatoday.com/tech/products/2007-05-29-microsoft-surface_N.htm Buxton, Bill. 2008. Multi-Touch Systems that I Have Known and Loved. <http://www.billbuxton.com/multitouchOverview.html> (accessed March 16, 2008). Green, Kate. 2007. Touch Screens for Many Fingers. <http://www.technologyreview.com/Infotech/18079/?a=f> Leganchuk, A. , Zhai, S. & Buxton, W. (1998). Manual and Cognitive Benefits of Two-Handed Input: An Experimental Study. Transactions on Human-Computer Interaction, 5(4), 326-359. McAvinney, P. (1986).

The Sensor Frame - A Gesture-Based Device for the Manipulation of Graphic Objects. Carnegie-Mellon University Nakatani, L. H. , John A Rohrlich (1983). "Soft Machines: A Philosophy of User-Computer Interface Design". Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI'83): 12-15. <http://doi.acm.org/10.1145/800045.801573>. Retrieved on 2009-01-28. Wellner, P. (1991). The Digital Desk Calculator: Tactile manipulation on a <https://assignbuster.com/multi-touch-technology/>

desktop display. Proceedings of the Fourth Annual Symposium on User Interface Software and Technology (UIST '91), 27-33.