VIVEKANAND COLLEGE FOR ADVANCED COMPUTER AND INFORMATION SCIENCE

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SEMINAR REPORT

ON

TOUCH SCREEN TECHNOLOGY

AS A PARTIAL REQUIREMENT FOR THE DEGREE

OF

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GUIDED BY:

Dr. Nidhi Joshi

SUBMITED BY:

PARTH KAKLOTAR

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When we reach the completion of the seminar, giving credit becomes a must, as without the support of other so many people's help and guidance, this seminar couldn't be completed successfully.

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Thanking All.

PARTH KAKLOTAR

ABSTRACT

This document is meant for describing all the features and procedures that where followed while developing the technology.

This document specially mentions the details of the seminar how the technology was developed, the primary requirement, as well as various features and functionalities of the seminar and procedures followed in achieving these objectives.

It was the touchless screens which initially created great furore. Gone are the days when you have to fiddle with the touchless screens and end scratching up. touchless screen displays are ubiquitous worldwide. Frequent touchless a touchless screen display with a pointing device such as a finger can result in the gradual de-sensitization of the touchless screen to input and can ultimately lead to failure of the touchless screen. To avoid this a simple user interface for touchless control of electrically operated equipment is being developed.

Elliptic Labs innovative technology lets you control your gadgets like Computers, MP3 players or mobile phones without touch Lessing them. A simple user interface for touchless control of electrically operated equipment. The device is based on optical pattern recognition using a solid-state optical matrix sensor with a lens to detect hand motions.

This sensor is then connected to a digital image processor, which interprets the patterns of motion and outputs the results as signals to control fixtures, appliances, machinery, or any device controllable through electrical signals.

INDEX

Sr No.	Description	Page No.
1	Introduction	1
2	History	3
3	Functionality	6
4	Applications	10
5	Advantages	21
6	Disadvantages	23
7	Future Enhancement	24
8	References	25

1. INTRODUCTION

A touchless screen is works by detecting your hand movements in front of system. Touchless screen technology this unique screen was made by Touch Ko White Electronics designs and Group 3D. Touchless control is developed by Elliptic Labs. The processor converts the input signal into an electrical signal that is then used by the digital system to trigger an action. This Technology lets you control your gadgets like Computers, MP3 Players or Mobile Phones without Touching them. This is how contactless technology works in its simplest form.

A touchless screen is an important source of input device and output device normally layered on the top of an electronic visual display of an information processing system. A user can give input or control the information processing system through simple or multi-touchless gestures by touching the screen with a special stylus and/or one or more fingers. Some touchless screens use ordinary or specially coated gloves to work while others use a special stylus/pen only. The user can use the touchless screen to react to what is displayed and to control how it is displayed; for example, zooming to increase the text size. The touchless screen enables the user to interact directly with what is displayed, rather than using a mouse, touchpad, or any other intermediate device.

touchless screens are common in devices such as game consoles, personal computers, tablet computers, electronic voting machines, point of sale systems, and smartphones. They can also be attached to computers or, as terminals, to networks. They also play a prominent role in the design of digital appliances such as personal digital assistants (PDAs) and some e-readers.

The popularity of smartphones, tablets, and many types of information appliances is driving the demand and acceptance of common touchless screens for portable and functional electronics. a suitably intuitive, rapid, or accurate interaction by the user with the display's content.

Historically, the touchless screen sensor and its accompanying controller-based firmware

have been made available by a wide array of after-market system integrators, and not by display, chip, or motherboard manufacturers. Display manufacturers and chip manufacturers worldwide have acknowledged the trend toward acceptance of touchless screens as a highly desirable user interface

component and have begun to integrate touchless screens into the fundamental design of their products.

Optical touchless screens are a relatively modern development in touchless screen technology, in which two or more image sensors are placed around the edges (mostly the corners) of the screen. Infrared backlights are placed in the camera's field of view on the opposite side of the screen. A touchless block some lights from the cameras, and the location and size of the touching object

2. HISTORY

Touchless interfaces were controlled using inertia-tracking devices such as a wired glove to make gesture impressions on the screen. These were soon replaced with camera-based gesture recognition devices.

The cameras use a depth map of light interference to form a 3D representation of hand gestures. The custom mobile payment solutions remove the barrier of the need for a card. For instance, one can make payment with Apple Pay by simply holding the phone over the payment reader's light while placing a finger on the phone's touch sensor as verification.

A quick run-down of notable events in the development process of touchless technology into an industry-wide sensation that it is today included:

- The development of sensor-based gesture recognition interfaces used mainly in the video game industry.
- The release of the gesture controller fitted Nintendo video game, Wii, in 2005
- Use of Near-field communication (NFC) technology for contactless credit/debit cards • Google's launch of a custom mobile payment system for android devices
- Automatic doors in workplaces and gesture-controlled sink faucets.

The video game industry was (and still is) a fast-growing industry in early 2000. It gave birth to the now very broad touchless technology in the form of a gesture recognition device as a game controller. Touchless interfaces were controlled using inertia-tracking devices such as a wired glove to make gesture

impressions on the screen. These were soon replaced with camera-based gesture recognition devices. The cameras use a depth map of light interference to form a 3D representation of hand gestures. The development of optical sensors-based gesture controllers, however, changed the game forever.

One of the most widely embraced games that incorporated no-touch technology was Wii. Wii is a Nintendo video game released in 2005 which accommodated the use of both physical gestures and traditional buttons. The success of Wii was further amplified by the release of a gesture-based multi-touch device, the Microsoft surface in 2007. Gesture-based video game controllers have since then become a common technology in the gaming industry.

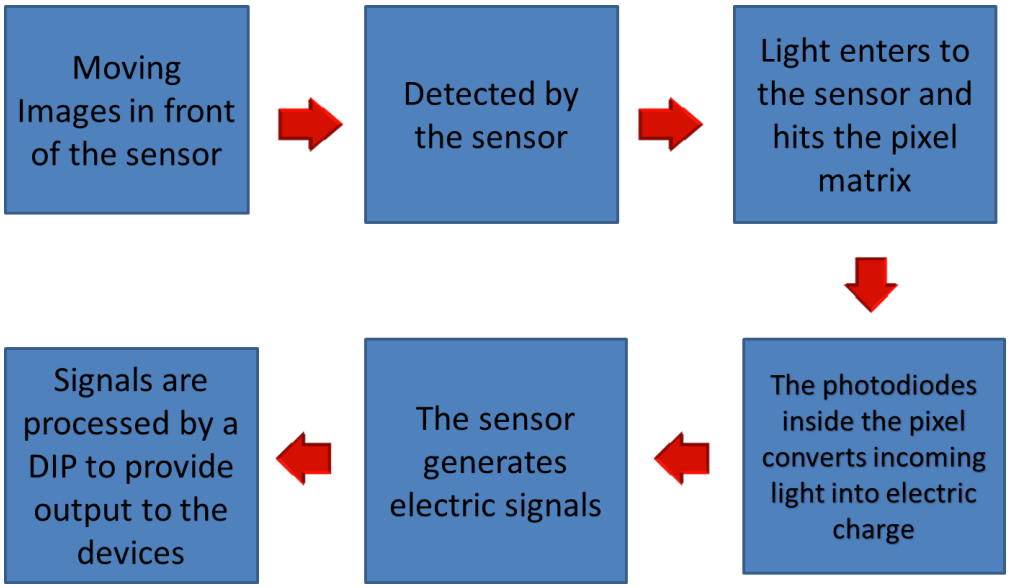
Staying healthy using a no-touch payment system Another industry that caught the wildfire of contactless technology early is the payment sector. What we have today as contactless payment started as a Near-field communication (NFC) technology which was used (and is still being used) for scanning luggage in baggage claim, grocery items scanning.

3. FUNCTIONALITY

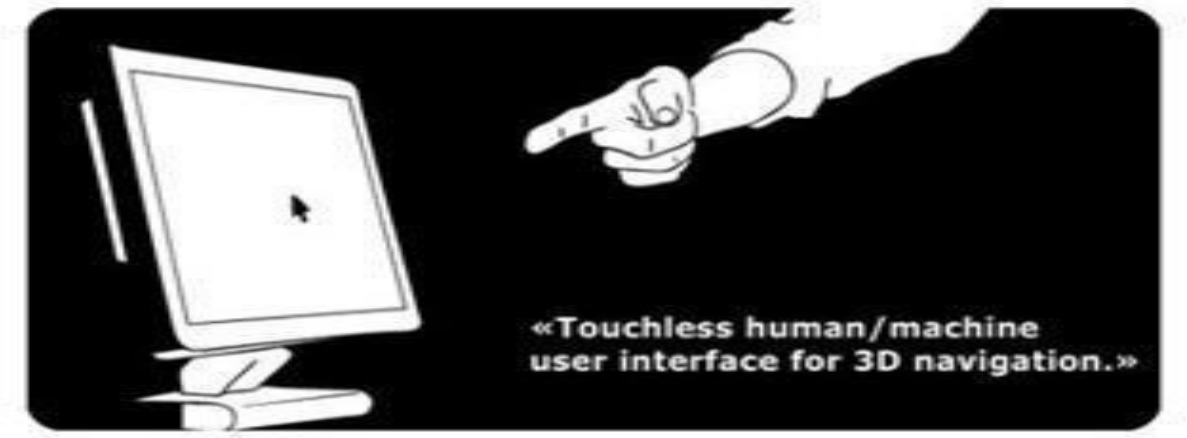
The system is capable of detecting movements in 3-dimensions without ever having to put your fingers on the screen. Sensors are mounted around the screen that is being used, by interacting in the line-of-sight of these sensors the motion is detected and interpreted into on- screen movements. The device is based on optical pattern recognition using a solid- state optical matrix sensor with a lens to detect hand motions.

Sensors are mounted around the screen that is being used, by interacting in the line-of-sight of these sensors the motion is detected and interpreted into on-screen movements. The device is based on optical pattern recognition using a solid-state optical matrix sensor with a lens to detect hand motions. The sensor can recognize the position of an object from 15-20 cm distant. System is capable of detecting movements in 3D without ever having to put your fingers on the screen.

✞ Block diagram



✞ Touchless touchscreen:

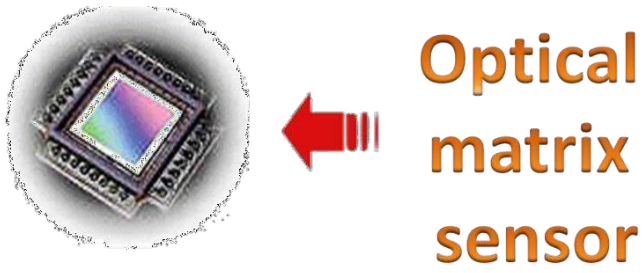


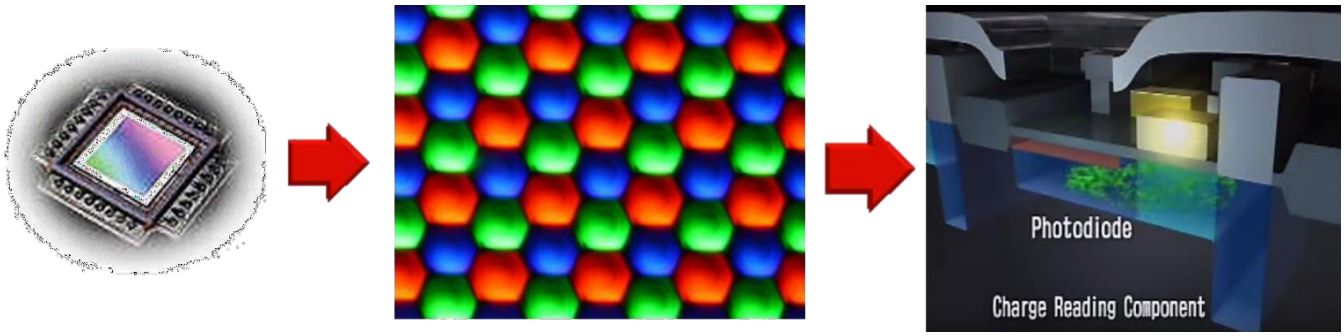
This sensor is then connected to a digital image processor, which interprets the patterns of motion and outputs the results as signals to control fixtures, appliances, machinery, or any devicecontrollable through electrical signals. You just point at the screen (from as far as 5 feet away), and you can manipulate objects in 3D. It consists of three infrared lasers which scan a surface. A camera notes when something breaks through the laser line and feed that information back to the Plex software.

The Leap Motion controller sensor device that aims to translate hand movements intocomputer commands. The controller itself is an eight by three- centimeter unit that plugs into the USB on a computer. Placed face up on surface, the controller senses the area above it and is sensitive to a range of approximately one meter. To date it has been used primarily in conjunction with apps developed specifically for the controller.

One factor contributing to the control issues is a lack of given gestures, or meanings for different motion Controls when using the device, this means that different motion controls will be used in different apps for the same action, such as selecting an item on the screen. Leap Motion are aware of some of the interaction issues with their controller, and are planning solutions. This includes the development of standardized motions for specific actions, and an improved skeletal model of the hand and fingers.

✞ Optical matrix sensor





This is based on optical pattern recognition using a solid-state optical matrix sensor. This sensor is then connected to a digital image processor, which interprets the patterns of motion and outputs the results as signals. In each of these sensors there is a matrix of pixels. Each pixel is coupled to photodiodes incorporating charge storage regions

✞ GBUI (Gesture-Based Graphical User Interface)

A movement of part of the body, especially a hand or the head, to express an idea or meaning Based graphical user interphase.

A Leap Motion controller was used by two members in conjunction with a laptop and theLeap Motion software development kit. Initial tests were conducted to establish how the controller worked and to understand basic interaction. The controller is used to tested for the recognition of sign language. The finger spelling alphabet was used to test the functionality ofthe controller. The alphabet was chosen for the relative simplicity of individual signs, and for thediverse range of movements involved in the alphabet. The focus of these tests is to evaluate the capabilities and accuracy of the controller to recognize hand movements. This capability can now be discussed in terms of the strengths and weaknesses of the controller.

4. APPLICATIONS

The basic idea described in the patent is that there would be sensors arrayed around the perimeter of the device capable of sensing finger movements in 3-D space.

✞ **Touchless UI:**

UI in their Redmond headquarters and it involves lots of gestures which allow you to take applications and forward them on to others with simple hand movements. The demos includedthe concept of software understanding business processes and helping you work. So, after readinga document - you could just push it off the side of your screen and the system would know to post it on an intranet.

✞ Touch-less SDK

The Touchless SDK is an open-source SDK for .NET application. It enables developers to create multi-touch-based applications using a webcam for input. Color based markers defined by the user are tracked and their information is published through events to clients of the SDK.

In a nutshell, the Touchless SDK enables touch without touching. Well, Microsoft Office Labs has just released “Touchless,” a webcam-driven multi-touch interface SDK that enables “touch without touching.” Using the SDK lets developers offer users “a new and cheap way of experiencing multi-touch capabilities, without the need of expensive hardware or software. All the user needs are a camera,” to track the multi-colored objects as defined by the developer.

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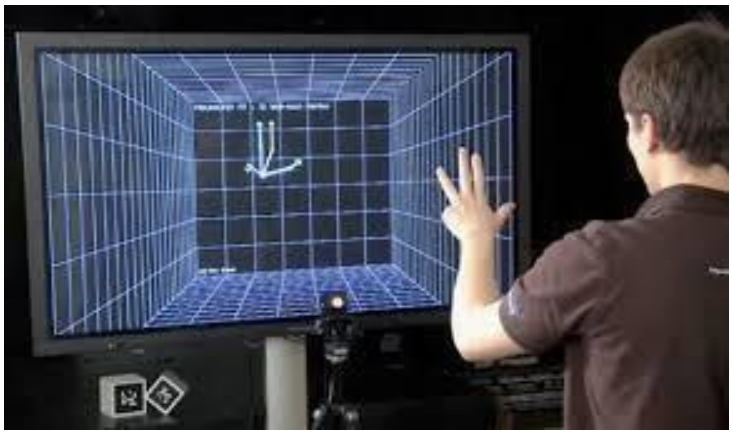


Just about any webcam will work. Using the SDK lets developers offer users “a new and cheap way of experiencing multi- touch capabilities, without the need of expensive hardware or software. All the user needs are a camera,” to track the multi- colored objects as defined by the developer.

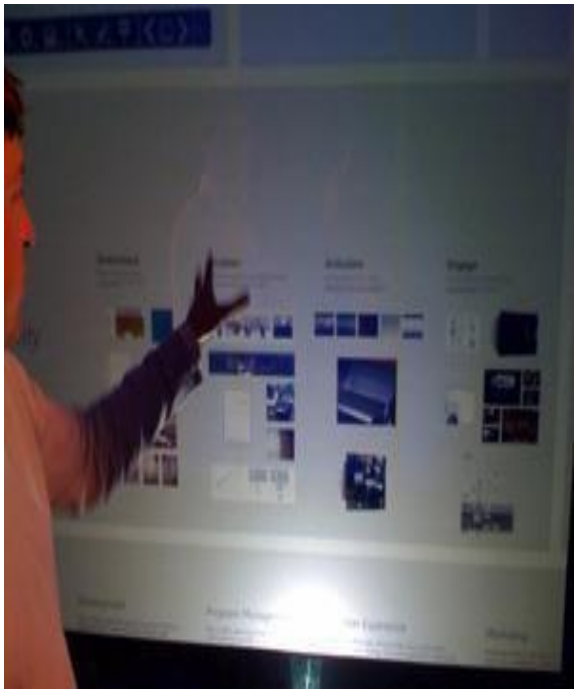
✞ Touch-less demo:

The Touch less Demo is an open-source application that anyone with a webcam can use toexperience multi-touch, no geekiness required.

The demo was created using the Touch less SDK and Windows Forms with C#. There are 4 fun demos: Snake - where you control a snake with a marker, Defender up to 4 player version of a pong-like game, Map - where you can rotate, zoom, and move a map using 2 markers, and draw the marker is used to guess what…. draw! Mike demonstrated Touch less at a recent Office Labs' Productivity Science Fair where it was voted by attendees as "most interesting project." If you wind up using the SDK, one would love to hear what use you make of it!

✞ Touch wall

Touch Wall refers to the touch screen hardware setup itself; the corresponding software to runTouch Wall, which is built on a standard version of Vista, is called Plex. Touch Wall and Plex are superficially similar to Microsoft Surface, a multi-touch table computer that was introducedin 2007 and which recently became commercially available in select **AT&T** stores.



It is a fundamentally simpler mechanical system, and is also significantly cheaper to produce. While Surface retails at around $10,000, the hardware to “turn almost anything into a multi- touch interface” for Touch Wall is just “hundreds of dollars

Touch Wall consists of three infrared lasers that scan a surface. A camera notes when something breaks through the laser line and feeds that information back to the Plex

software. Early prototypes, say Pratley and Sands, were made, simply, on a cardboard screen. A projector was used to show the Plex interface on the cardboard, and the system worked fine. Touch Wall certainly isn't the first multi-touch product we've seen (see iPhone). In addition to Surface, of course, there are a number of early prototypes emerging in this space. But what Microsoft has done with a few hundred dollars' worth of readily available hardware is stunning.

It's also clear that the only real limit on the screen size is the projector, meaning that entire walls can easily be turned into a multi touch user interface. Scrap those white boards in the office, and make every flat surface into a touch display instead. You might even save some money.

MINORITY REPORT INSPIRED TOUCHLESS TECHNOLOGY

i. Tobii Rex

Tobii Rex is an eye-tracking device from Sweden which works with any computer running onWindows 8. The device has a pair of infrared sensors built in that will track the user's eyes.

ii. Elliptic Labs

Elliptic Labs allows you to operate your computer without touching it with the Windows 8Gesture Suite.

iii. Airlifting

Air writing is a technology that allows you to write text messages or compose emails bywriting in the air.

iv. Eyesight

EyeSight is a gesture technology which allows you to navigate through your devices by justpointing at it.

v. MAUZ

MAUZ is a third-party device that turns your iPhone into a trackpad or mouse.

vi. Point Grab

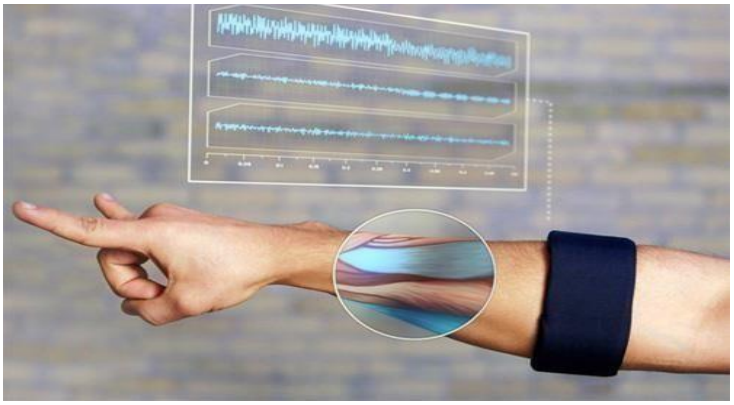
Point Grab is something similar to eyesight, in that it enables users to navigate on theircomputer just by pointing at it.

vii. Leap Motion

Leap Motion is a motion sensor device that recognizes the user's fingers with its infraredLEDs and cameras.

viii. Myoelectric armband

Myoelectric armband or MYO armband is a gadget that allows you to control your otherBluetooth enabled devices using your finger or your hands.



ix. Microsoft Kinect

It detects and recognizes a user's body movement and reproduces it within the videogame that is being played

5. ADVANTAGES

- **Touchless technology brings a number of practical benefits for us**

1. Increased health

By reducing the amount of touching of contaminated surfaces, you can enhance employee health and well-being. Apart from that Useful for physically handicapped people.

2. Energy savings.

Gestures are rich than the Traditional input methods. Touchless technology is more energy efficient, because it cuts off automatically, rather than waiting for human intervention. This reduces energy waste and costs.

3. Productivity and profits

By reducing the likelihood of employee sickness and downtime, touchless technology helps ensure productivity is maintained and profits can be generated.

4. Reduced costs

Replacement is very Easy. No drivers required.

Touchless technology doesn't have to involve expensive electronic equipment. You can use simple, manual strategies, such as sanitary levers, to protect employees from contaminated surfaces. And remember, any costs accrued from implementing touchless technology can be balanced by the reduced risk of health-related costs and fines.

5. Aesthetic appeal

Touchless technology devices come in a range of stylish and discreet designs that can enhance the visual appeal of the restroom.

6. DISADVANTAGES

- **There are also some drawbacks of Touchless technology**

They are sophisticated and very sensitive. Due to many various signals from the environment the sensors can take a gesture in the wrong way.

Their work requires processing of much information. That is why the application may freeze up or operate too slowly because of overloading of the mobile device.

Accuracy and precision depend on size of the icons.

When icons are very small, it may be difficult to activate the same with the help of large fingers. It requires proximity of the user to operate.

User must be within reach of the touchscreen display. Hands and fingers often obscure the screen information while selecting the desired options.

Battery operated touch screen devices consume more power.
It is difficult to operate by visually impaired people.

They can interact based on tactile or braille input. It is very sensitive interface and hence can also be activated due to stray touches.

7. FUTURE ENHANCEMENT

The Future of the Touch Screen Is Touchless

Touchscreen technology has enhanced many of our devices and made transactions more convenient. But the pandemic has made the world afraid of the touchscreen. The obvious natural progression and fix to this issue is a touchless touchscreen.

A new patented technology developed by engineers at the University of Cambridge accomplishes just that. They call this technology "predictive touch". Using a combination of sensor technology and artificial intelligence, it predicts the user's projected target and selects it before the user touches it.

In a public setting, this technology can save us from touching displays and contracting and spreading pathogens. We may not realize it, but we touch many different touchscreens in our everyday transactions. ATMs, self-service checkout at the grocery store, parking meters, and ticketing stations. Even after the pandemic, these touchscreens can save us from contracting a simple cold or flu.

The predictive touch technology was developed by the University of Cambridge in collaboration with Jaguar Land Rover and will make using the screens in your car safer by eliminating the time spent interacting with the screen. Tests show the technology reduced the time needed to interact with the screen by up to 50% keeping the driver's eyes on the road.

8. REFERENCES

✞ Webography:

- Touchless Technology – Wikipedia
- Touchless Technology Technology - GeeksforGeeks
- About | Touchless Technology Innovations (hawkeyeinnovations.com)
- What is Touchless Technology and its application(how2shout.com)
- Working of Touchless Technology Technology. (trendshere.com)

- https://www.geeksforgeeks.org/touchless-touchscreen-technology/
- https://www.colocationamerica.com/blog/touchless-touchscreen-technology
- https://www.quora.com/What-are-the-disadvantages-of-touchless- touchscreen-technology
- https://en.wikipedia.org/wiki/Touchscreen
- https://www.initial.ie/blog/touchless-technology/
- http://lewisshepherd.wordpress.com/2008/10/13/stop-being-sotouchy
- http://www.touchuserinterface.com/2008/09/touchless-touchscreen-that- senses-your.html
- http://technabob.com/blog/2007/03/19/the-touchlesstouchscreen-monitor