# Good research paper about leap motion

Business, Company

Leap motionName: Course: Lecturer: Date: Introduction Leap motion device was designed by Holz, who is now twenty-three years old. His new startup in leap motion was dedicated to changing the way people will be interacting with their computers. Michael Buckwald, Holz co-founder built a device the size of a cigarette lighter that contained three tiny cameras inside it. They attached it to a computer, and it turned any Mac or PC into a gesture recognizing device. This idea resembles the one that was designed by Microsoft's Kinect and also far much accurate. They have also created software for third party developers so as to include gesture recognition capability to their applications. It is expected to be used in medical images, robotics and also in games. Moreover, in the future, it will be inbuilt into tablets and laptops (Hodson 82). The leap motion controller is a USB peripheral device that is small in size and is designed to be placed on the physical desktop facing upwards. It uses three infrared LEDs and two monochromatic IR cameras. It observes a hemispherical area and covers a distance of about 3 feet (1 meter). A 3-D pattern of dots of infrared light is generated by LEDs, and 300 frames of reflected data are generated by cameras in one second. It is then sent to the host computer through a USB cable where it is analyzed by leap motion controller software. The analysis is achieved with the use of complex maths. This achievement is done in such a way that it synthesizes 3D data position by comparing 2D frames that are generated by the two cameras (Hodson 83). Teardown revealed two CMOS sensors were peeking up at hand wriggling and finger flailing. However, leap motion is kept scutum on what is inside the little box. Controller's sensors are accurate. Their accuracy is about 0. 01mm, unlike Microsoft's Kinect.

Every shake, pinch and nudge counts. The Airspace home launcher is the app store which is hands free and onscreen leap motion control panel are software. Airspace home has orientation app that display digits in the screen as skeletal hands that are glowing (Weichert 88). Leap motion controller is best thought to be a dome covering the device on which the users' hands are safe behind. However, two feet movement either side or up to two feet above are detected courtesy of ' face rejection' updates. On the other hand, the controller can manage and stick to ten fingers of the two hands than picking any body parts. All apps that support the leap motion controller device can be downloaded for free from the Airspace store, currently there are over two hundred paid and free apps and the iOS Apps store is also in it. So far there are three main types of applications that use leap motion controller namely, apps that allow the user to control their Mac from the device directly. The second is the applications that allow the user to do things playing musical instruments scalp or use it to explore Google Earth. The third application is used in games. This device will be available for Mac OS X 10. 6 and above as well as Windows 7 and 8, but the company making them will potentially integrate this technology with many OEMs (Zubrycki, and Granosik 82). Functions performed by leap motion. This tiny, sleek and light device has immense capabilities, and it only occupies a small space on the user's desk. It has a 150 degrees field of view and a Z-axis for depth and gives the user the ability to move the hands in 3D, just like in the real world. The good thing about it is that leap motion controller works with what is already in place because it does not replace the mouse, the keyboard or the trackpad, just need to plug into the USB port its ready to use. It gives 3D

interaction where one can slice, grab, steer, pull, push and crush things using hands and fingers (Weichert, Bachmann, Rudak, and Fisseler 28). With leap motion controller, one can create a masterpiece out of thin air. The user in this case is the instrument where he or she can drum, strum, draw a sketch and paint using the scalp, fingers easily like when doing with clay or using paint brushes, pencils or drumsticks. With leap motion, the user can explore the world through 3D motion control where he or she can move down, up, right, left, back and forward or fly through space. Leap motion tracks all the ten fingers to the accuracy of 1/100th of a millimeter. It has been found to be more sensitive than the existing motion control technologies. This is the reason it gives the user the capability to paint or draw mini masterpieces inside a cube that is one inch. The leap motion controller can track the users' movements at a rate that is over 200 frames per second. Thus, the screen can keep up with every move made by the user (Zubrycki, and Granosik 229). Leap motion application areas. Leap motion technology has many possible application areas in real life. These uses help to revolutionize how things are done and in the long run bringing much benefits and efficiency to the area of concern. One of the possible application areas of leap motion technology is building and construction industry. In this application, builders and fabricators of complex buildings have immense potential to use this technology to support the user interaction with Computer Aided Design data. Also, there is the application of building information modeling data (BIM), and computer aided engineering. The most notable are for the industry consumer and professional's interaction with the design and fabrication of data. This technology will enable real-time,

collaborative design, multi-user and customization of buildings that can then be more fabricated on demand by making use of direct digital manufacturing. It will be indeed exciting times with the nearly infinite potential (Zubrycki, and Granosik 17). Auto trader's motion controller App have revolutionized shopping for cars, it allows the customers to browse through the listed cars and check the interior and exterior of the vehicles online without touching their computers. The interior exploration puts the user in a virtual seat of the driver, and it also offers a 360° view of the inner side of the car. One can take a virtual walk around the exterior of the car. The exterior and interior views are annotated, therefore, when the user point to a particular part interested in learning about in the car the information will just appear. This technology gives live experience which someone can have in a car dealer showroom. Leap motion can be used in biometrics because it is extremely accurate and can detect unique hand movements that can identify individual users. With the use of biometric authentication systems in some companies, it will become widely accessible and cheaper to use, helping in reducing costs hence increasing company's security levels if the company cannot acquire more complex systems.

It can be used in commercial space companies in the design and fabrication of spacecraft parts. For example SpaceX combines three technologies, Leap Motion controller, Oculus Rift and 3D printing with metal. To do this a standard computer monitor, free-standing projection glass screen, 3D monitor and the Oculus Rift are used, by use of the leap motion controller, the user will be able to twirl and manipulate onscreen the SpaceX Merlin engine, this will transform the digital models to real working metal rocket

parts with a 3D printer. Leap motion is going to revolutionize manufacturing and design businesses in the 21st century. Leap motion can be used in education and special learning tools; this will decrease costs, increase productivity, interaction and easier training, and also increase customer engagement. The use of the technology in this area will range from interpreting, teaching and translating the sign language. It will help improve the skills of the expertise hence increasing productivity in their place of work. This technology will make use of the capabilities of leap controller device that allow the user to sketch, drum, strum, draw, and paint using the scalp and the fingers. This process will resemble drawing using a pencil, drumstick or paint brushes in designing buildings and other structures. The architect ideally can simply design whatever they imagine by just moving their fingers. In the business world, this will make a noticeable in the amount of materials needed by the architects in creating their products and, therefore, saving them the materials and cost. This will bring enormous benefits financially to the designers and state of the art structures for the customers (Weichert et al., 77). This leap motion technology can also be used in robotics because of its flexibility and accuracy in its interaction across the environment. This will transform human abstract gestures into the ephemeral and physical transformation of space by using robots. These robots will be hugely instrumental in the manufacturing industry for moving objects in high precision and accuracy. It can also be used by scientists in their space mission. This possibility is achievable because they will go do the same things human beings are expected to do. Leap motion controller allows for a responsive system that can be used to explore the role that human

beings can serve in this apparent intelligence and how ambience and space are created through their combination, which will in turn affect human beings in a continuous feedback loop. Also, the traditional architecture forms choreograph which is the static movement of the inhabitants in the space, therefore, the human beings in this cybernetic system are also part of the system, this proposes immense potential for an active form of architecture where the behavior takes precedence over the form and the interaction will become a new design medium. With the use of these robots in the manufacturing and other industries, these companies will experience many advantages that come with the technology. The most important of all is the high quality products and that financial profits will go high (Weichert, Frank, Bachmann, Rudak, and Fisseler 128). The developers of leap motion controllers have proposed that leap can be used to drive cars or even fly planes. After the implementation of this technology, pilots and drivers will have many experiences when flying and driving in that case. They will be able to control these machines in a terrifically easy way of using gestures to manipulate the many operations especially in the airplanes, but it will need much training for the users so that they can be efficient and accurate because in case a small mistake occurs, the consequences will be extremely severe. Leap motion can be used to create a new way for presentation. Presentations done properly using this device will, considerably, look more professional compared to the ones done without using it. It will, therefore, become a trend for businesses to use this new technology in their daily operations. Also, it will bring a significant change in the industry which includes efficiency and other many benefits that come with it. Also, mobile

devices can make use of leap motion using on{X} app. Mobile phones for long times have brought a revolutionary change in life. The convenience created by technology and internet is with us all the time. These devices soon will not need to be at the hand all time; one could just set his or her phone down on the desk and still will be able to interact by use of casual hand movements. This on{X} app, combined with leap motion controller, will allow the user to control the android phone or a tablet by gestures. With this ability, they can respond to events that are happening on it just by use of hand gestures. An example is that it will allow the user turn down the volume of the phone just by gestures. They can even turn the phone to silent mode by swiping with the hand when you hear it ring on the desk. It may also be possible to recall a number that had called afterwards by just circling the finger in counterclockwise direction (Zordan, Brian, Majkowska, Chiu, and Fast 992). New York Times have started using leap motion. It may not simulate in the users' hands the feel of the newspaper. It allows the user of New York Times app to wave through the top stories of the day in the newspaper, scrolling and navigating from one story to the next within each article with the use of gestures. This app is free in the leap motion store and can be used in both Mac and Windows devices. Leap motion will bring a new way of controlling electronic devices at the workplace and also at home. A forthcoming integrated hardware and web platform called Ninja Blocks will allow the users easily create action triggers and rules for their devices. When paired with leap motion, it will give a new way of controlling electronic devices. It gives the user the ability to use gestures in doing things like turning on the lights, this done by just gesturing in the direction of the room

you want to light up. This technique can be used by the security officers to control security cameras by use of gestures to move it around; this will help a lot in enhancing security in business premises by use of only few officers. This will help the organization save some cash since it will only be employing few security officers to secure their premises. Leap motion can be used in banks, for example, the interactivefloorin a multifunctional table which combines leap motion and multi-touch which was developed by RichTech system. It allows the user to use hand gestures to operate it. This will revolutionize the banking industry because the bank will be able to offer its services to the customers efficiently. Customers will be able to access their financial records just by using hand gestures and do all the transactions. Leap motion technology can be used in the presentation during business meetings, for example, the use of AirPoint app, this will do away with the use of PowerPoint clicker during the presentation. One will be able to use gestures in navigating presentations, and this will make it more dynamic and collaborative workflows. It will bring much comfort and sense of ease to the business people and will keep the audience engaged (Zordan, Brian, Majkowska, Chiu, and Fast 291). With the integration of leap motion into other devices like keyboards and laptops, for example, the HP Company has created a keyboard with gesture controls with leap motion sensor. This aspect will bring enormous financial benefits to the manufacturers. It is because these devices will be at high demand since many people will be buying them, at least, to enjoy the adventures that come with them. There are some companies already developing tools that will make use of leap motion technology, they include. GetVu, which is using leap motion

tools such as headsets that are powered by android phone and leap motion controller, it will allow the person wearing it to interact with virtual objects. Ethereal is using leap's interface based on gesture. It allows its user to draw and paint in Photoshop without touching a single piece of hardware or even the screen. MotionSavvy is currently building a platform that will enable deaf people to communicate in real time with the people around them; it translates sign language into real time speech. Also, Mirror Training is using robotic arms powered by leap motion that can be used by soldiers in battlefields to disable IEDs, bombs and other threats, these robots also enable safer and faster removal compared to natural hand movements (Zordan, Brian, Majkowska, Chiu, and Fast 28). Impact of the technology Leap motion technology is a tool that will revolutionize and bring vast changes in business operations once it is operational in business premises. Any business or organization that will take a step of integrating this technology into their operations will see noticeable improvements in their employees' satisfaction, and production. This device has shown how far the technology has come from its humble beginnings and how much impact in the business world. Businesses and organizations will realize much efficiency in their daily operations which will at the long run brings them a lot of benefits in many aspects. Limitations of leap motion This new technology also has its shortcomings; one of it is that there are no standard gestures of leap motion. This situation can be confusing. Some actions like grabbing or selecting on-screen objects vary from one app to another app. This inconsistency will inconvenience its users, for example, if a person has been using a certain app for a long time, it will be used to the gestures recognized

by that device. The problem, or rather the inconvenience, comes when the user wants to use another different app. The gestures he or she is used to may not be recognized by the app or may be interpreted wrongly. The leap controller device is not able to recognize a single hand in any gesture. This might be because the two hands are not together. It is difficult to focus the pointer on extremely small buttons. Also, when using leap devices, hand control is clumsy for many apps because fingers are not steady to control the on-screen cursor to the required precision. This outcome will make it difficult to achieve some tasks. It is exceedingly difficult working on touchless apps using fingers compared to scrolling using a mouse to click or drag (Kajita et al., 27). If Microsoft Kinect for Windows is used in a desktop PC, the closest the user can get to the used cameras is 16 inches, unfortunately, and this is when it is put in the singular “ Near Mode." This technical limitation puts the body and head of the user far away from the screen compared to in other devices. So this cannot be an alternative to a mouse on a PC in this case. The future of leap motion The future of leap motion technology is limitless or rather infinite. The next versions of leap motion will accomplish a lot. If this device is released without significant defects or problems, then the next versions of this product that will be created in the future will have a vast array of functions and capabilities. If they will be integrated, in a way, for leap motion device to communicate with other devices, then there will be many more calibrations on the projects. The other improvement is widening the range that can be analyzed by leap motion. When a large zone that can be recognized by the leap device is created, it will be possible for many people to work on one task at the same time simultaneously. With all these

capabilities, leap motion technology has the capability to increase productivity in the business world and workplace at large. This way, it will improve the overall image of any business that will use it successfully. The APIs, gadgets and simple are common ground for connecting them together in an incredible and diverse ways that exist currently. With the growing smart environments of ubiquity, its users will expect control anytime anywhere a role that has been fulfilled by smart phones now and doing a fantastic job. With the many possibilities, leap motion developers will able to create tools then integrate them into a technology that is the control center oriented. This will be a key input of sending commands across the web to the devices in the cloud. There are greater chances that it will be paired with the voice recognition and other inputs, which will create an immersive experience. Recommendations Version 1 of leap motion was first released in the year 2013. Version 2 was released this year 2014. This version retains position and accuracy found in version 1. It can track the actual bones and joints inside each finger of the user, this lead to more benefits compared to the previous versions; one leap motion controller device costs $99. 99. This version makes it easy for developers to build applications that are transformative and consistent with this version. Leap motion technology should be embraced in all fields of concern so that the limitless capabilities of this technology can be utilized in this new era of potential. It is extremely timely for every organization, individuals and all types of businesses to, fully, embrace the technology in the day to day activities. Leap motion will change the manner in which several devices will be controlled in the future.

# Works Cited

Coelho, Joanna C., and Fons J. Verbeek. " Pointing Task Evaluation of Leap Motion Controller in 3D Virtual Environment." Creating the Difference (2014): 78.

Hodson, Hal. " Leap Motion hacks show potential of new gesture tech." New Scientist 218. 2911 (2013): 21.

Khademi, Maryam, Hossein Mousavi Hondori, Alison McKenzie, Lucy Dodakian, Cristina Videira Lopes, and Steven C. Cramer. " Free-hand interaction with leap motion controller for stroke rehabilitation." CHI'14 Extended Abstracts on Human Factors in Computing Systems. ACM, 2014.

Weichert, Frank, Daniel Bachmann, Bartholomäus Rudak, and Denis Fisseler. " Analysis of the accuracy and robustness of the leap motion controller." Sensors (Basel, Switzerland) 13. 5 (2013): 6380.

Zubrycki, Igor, and Grzegorz Granosik. " Using integrated vision systems: three gears and leap motion, to control a 3-finger dexterous gripper." Recent Advances in Automation, Robotics and Measuring Techniques. Springer International Publishing, 2014. 553-564.