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Haptic Technology

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Abstract: *This study gives a broad overview of haptic technologies for social touch research. In psychology and neuroscience, social contact has received a lot of attention. It is now feasible to make attending in social touch from a particular distance or with the artificial social agents, research into the technology mediated social contract has been motivated by social touch research, and the point of research has been found very effecting that are quite similar to through social touch.*

Haptics is the research of how to interact with computer applications through touch (tactile) sensation and control. Haptic device gives users a tactile experience in computer-generated environments, making touchable virtual objects appear real and tangible. This method applies pressures, vibrations, and/or movements to the client in order to connect them to a virtual environment through their tactile. The creation of virtual objects items that only appear in computer simulations as well as the locally and remotely control of machinery and apparatus might benefit from this mechanical stimulation.

Numerous sectors have previously demonstrated the versatility of haptic technology. Technology has made the possibility that to get truly investigated that how human sense of touch functions by enabling the production of precisely controlled virtual objects. This method might be used to train people for occupations requiring hand-eye coordination, such operating on spacecraft or performing surgery. This kind of input may be used to observe and engage with nanomaterials, and also simulate electrons atom orbits and the feel of abdomen tissue during operation or a laparoscopy training exercise.

Keywords: *Haptic technology, Sensation, Virtual reality.*

I. INTRODUCTION

The world haptic is basically invented from the Greek word called "haptikos", which means the sense of touch, and "haptesthai", which meant to touch or make a connection. Humans and machines or combination of both can make the touching process possible. In the recent study the human touch and the force feedback which haptic has begun together biochemicals, psychology, neurology engineering and computer science. Touch is to exchange of the information and the energies between real and virtual environment with respect to user. Active touches the name of given to this type of contact. Haptic technology is tactile feedback to replicate touch by undergoing stress. Aur moment to the respective user.

Human haptics is the use of tactile and kinaesthetic senses for detecting and manipulation. On interacting with an item, skin is subjected to forces. These forces transmit the information and influence how the physical world is perceived. the several mechanical, sensor and motor are basically intellectual components of human textile system are included. The bodily parts that function according on brain response are included in the mechanical components. Nervous system receptors, which are part of the sense organs, react to physical stimuli by activating and sending information to the brain.

Mechanical devices that come into touch with people physically in order to exchange information are included in machine haptics. Haptics' primary purposes are to measure forces on any area of the body and to identify the information these forces are signalling. Haptics rendering and visual rendering, which show the data in the virtual world to the user, are the two key requirements. Software for haptic rendering usage of an algorithm to detect the coordinates of point of connection and the forces that act on the respective user and the virtual space.

II. LITERATURE SURVEY

The use of haptic devices, haptic technology is a new learning strategy that allows users to experience motion and haptic data in a virtual world. The basic principles of haptic technology and how it functions were covered in this article, along with an outline of the most popular haptic devices and key technologies employed in haptic technology. As a result of our investigation and analysis author discovered that the haptic usage in education and learning has a broad variety of educational and teaching levels, subjects, and formats. The actuator including solenoid actuators, piezo-actuators, electroactive polymers, ultrasonic actuators, and MR fluids, are the main subject.[1]

The study of haptics and motions has advanced recently thanks to the advancement of software and hardware that replicates touch or enables users to communicate with and "feel" three-dimensional virtual objects through gestures. Such tools are essential in the educational process. Learners may be better able to understand concepts about varied chemical sciences if model suggested depending on gestures or tactile innovation are being used in chemistry education, for instance. An overview of a gesture-based educational system for molecule visualisation and modelling of chemical experiments.[2]

In mentioned article, haptic technologies for social touch research are given a general review. Social interaction has drawn a lot of interesting psychology and in the field of neuroscience. The upcoming new technology has made it greatly successful to socialize from a distance or with artificial agents. Social contact studies have served a catalyst for the study of Technology mediated social interaction, and this field of study has invented affective that are comparable to those of real social touch. A review of this recent state of social touch development Research and advice for next Research and application round out the paper.[3]

Recent technologies advance has led to development of several haptic device designs, electrical devices that transfer information in both the user and system and enable the respective user to utilise things in the virtual space while getting tactile feedback. Sensors and feedback control mechanism are helpful in the design and the production of haptic devices. Gaming, tally operations, medical operations, reality and virtual reality equipment's are just a few of the users for haptic technology. This paper for discuss the importance of Aquatic limitations proceeding discussing the usage of textile devices and electronic field based on the designs and functioning. [4]

Touch is one of the most essential sensory inputs during surgery. However, there is little research on haptics (also known as kinaesthetic and tactile input), which is used in clinical education. This basic comprehension is constrained by the difficulty in expressing haptic feedback, recording, and playback. This chapter focuses on using haptics to enhance robotized and remote treatments as well as medical staff training. It provides an overview of the various haptic feedback systems that are accessible and details how haptic guidance could aid in the development of surgical competence. In relation to medical operations, a comprehensive analysis of the available haptic interfaces is given.[5]

A. Analysis of Literature Survey

- 1) Many technologies have been developed for creation of virtual environment with computers and software.
- 2) The transformation of active in the virtual reality in the form of variable haptics is ready to transform to major industrial processes, namely product design and development it and industrial training.
- 3) Integration of haptics into consumer products which causes demand for haptic technology.
- 4) It increases the safety and risks of the user with accuracy and precision are high in medical practice.

III.WORKING

Virtual and mixed reality technology are fooled by virtual and mixed reality technologies into feeling that the surroundings and things inside them are actually right in front of us with various mechanisms, haptic technology attempts to recreate the tactile experience. one of them communicates information to and from the user by employing touch as a feedback device we typically don't pause to verify how amazing our sense of touch truly is since we are a visually office species. Only by physically feeling anything can we know its hardness, shape, temperature, texture, and weight.

It's likely that user already use haptic technology in you daily life, even if you are unaware of it. Vibration is frequently used in touch-screen cell phones as a feedback method. Because touchscreens are simply flat glass plates, unlike keypads, the vibration feature of the phone is employed to mimic the tactile sense of buttons. The three basic types of haptic devices are graspable, wearable, and touchable. Think of joysticks when you hear the word "graspable." One obvious use is when operating robots so that a human operator can sense how much resistance the robot is encountering.

Consider surgical robots, which enable surgeons to do operations from afar or to move instruments in constrained areas with their hands. It has been demonstrated in several studies that adding haptic feedback to the control of these robots improves precision, reduces tissue injury, and shortens procedure times. Those with haptic feedback also enable medical professionals to train on patients who only exist in virtual reality while experiencing realistic cutting and suturing. Defusing explosives or rescuing people from collapsed houses would both benefit by having a feeling of what the robot under your control is doing Even Disney has researched haptic telepresence robots for secure interactions between humans and machines.

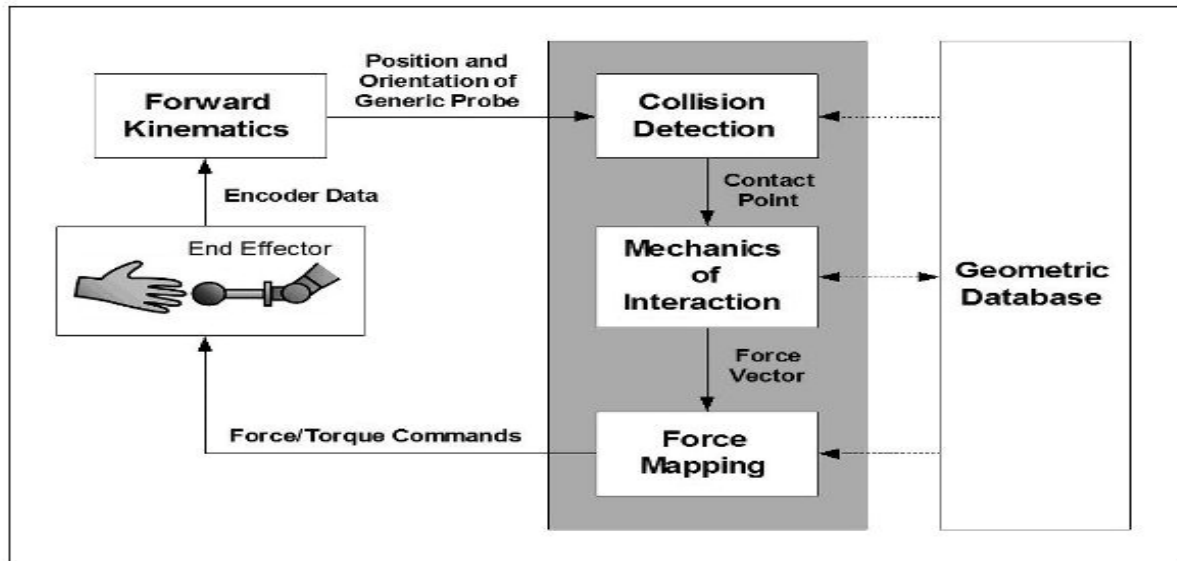


Fig.1 Architecture Diagram

IV. CONCLUSIONS

Two of the most fundamental ways we learn about and interact with our environment are through touch and physical interaction. We think that haptic technology, which is employed in many other areas, is the best approach to engage with a virtual world. The haptic device performs as an input and output device, detecting physical motions of the user as an input and producing lifelike touch experiences as an output, both of which are timed with display events. As technology and computing power improve, haptic devices and effects advance and become more lifelike. Thanks to this technology, it is now possible to touch, feel, and manipulate virtual objects. It is necessary to lower the cost of this technology and simplify and simplify use of haptic devices.

The only option that offers a range of interaction that virtual reality cannot is haptic technology. As of right now, touch access technology is significant. However, this technology completely reversed with this tendency. Haptic Technology contributes to a rational future. Respective user of vr technology may replicate touch and take use of input and output. large potential for uses in both important sectors and relaxing activities. It is necessary to mass produce haptic devices to make them lighter, simpler, and easier to operate.

V. ACKNOWLEDGMENT

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REFERENCES

- [1] Sreelakshmi, M.; Subash, T. Haptic Technology: A comprehensive review on its applications and future prospects. Mater. Today Proc. 2017
- [2] Sun, X.; Andersson, K.; Sellgren, U. Towards a Methodology for Multidisciplinary Design Optimization of Haptic Devices. In Proceedings of the ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Boston, MA, USA, 2–5 August 2015
- [3] Sutherland, G.R.; Maddahi, Y.; Gan, L.S.; Lama, S.; Zareinia, K. Robotics in the neurosurgical treatment of glioma. Surg. Neurol. Int. 2015.
- [4] Huisman, Gijs. "Social touch technology: A survey of haptic technology for social touch." IEEE transactions on haptics 10.3, 2017
- [5] Fayez, R., Mohamad Eid, Mauricio Orozco, and Abdulmotaleb El Saddik. "Haptic applications meta-language." In 2006 Tenth IEEE International Symposium on Distributed Simulation and Real-Time Applications, pp. 261-264. IEEE, 2006.
- [6] Bordegoni, Monica, Giorgio Colombo, and Luca Formentini. "Haptic technologies for the conceptual and validation phases of product design." Computers & Graphics 30, no. 3 , 2019
- [7] Hamza-Lup, F. G., Bergeron, K., & Newton, D. (2019, April). Haptic systems in user interfaces: state of the art survey. In Proceedings of the 2019 ACM Southeast Conference. 2019
- [8] Yu, Wai, Katri Kangas, and Stephen Brewster. "Web-based haptic applications for blind people to create virtual graphs." 11th Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, 2018. HAPTICS 2003. Proceedings. IEEE, 2018.
- [9] Biswas, Shantonu, and Yon Visell. "Haptic perception, mechanics, and material technologies for virtual reality." Advanced Functional Materials 31.39 Kapoor, Shalini, et al. "Haptics–Touchfeedback technology widening the horizon of medicine." Journal of clinical and diagnostic research: JCDR 8.3, 2018
- [10] Wei, Side, Gang Ren, and Eamonn O'Neill. "Haptic and audio displays for augmented reality tourism applications." In 2014 IEEE Haptics Symposium (HAPTICS), pp. 485-488. IEEE, 2020



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