

METHOD AND SYSTEM FOR ELICITING, EXPERIENCING, AND SUSTAINING SENSATIONS OF SOCIAL TOUCH IN A VIRTUAL REALITY ENVIRONMENT

FIELD OF INVENTION

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The present invention relates to use of Virtual Reality to evoke, develop, and experience pseudo-haptic touch sensations in people. This method does not require the use of additional haptic devices, sensors, and external stimuli such as, human touch or stimuli tools (stick, brush, feather). The invention enables a user to experience another person's touch in virtual reality without any real-life contact or haptics.

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BACKGROUND

The basic method for the person to develop sense of touch in virtual reality ("VR") involves the receiver, i.e., the person who wants to evoke and experience touch, and the initiator - the person performing the touchpoints onto the avatar of the receiver.

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It consists of pseudo-haptic (Phantom Touch) development sessions between the touch initiator and the user (receiver/client) in virtual reality. The touch initiator performs the method onto the receiver's virtual avatar to evoke the pseudo-haptic touch sensations. In short, the method consists of performing a specific series of touch points onto the receiver's avatar, in a certain order and manner, after which the person (receiver) matures their sense of interpersonal touch in VR.

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How the touching of the avatar's body parts is relayed to and interpreted by the receiving user as a "sensation of touch" has yet to be fully researched by medical and non-medical professionals. It is sufficient for discussion of this inventive method not to explain what happens in the person's brain that makes a person feel Phantom Touch. It is similar to phantom pain with amputees, as its mechanism is still not completely understood.

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DISCUSSION OF PRIOR ART

US Patent No. 10,636,220 B2 describes a merged reality scene capture system which generates a transport stream based on video data received from a plurality of capture devices. The transport stream includes a respective video data stream for each capture device, each respective video data stream representing surfaces of a real-world object as the surfaces appear from a vantage point of the capture device. Based on the transport

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stream, the system generates entity description data representative of the real-world object. The system also generates entity description data representative of a virtual object to be included within a 3D space of a merged reality scene along with the real-world object. Based on the entity description data, the system generates an entity description frame
5 representative of a state of the objects within the 3D space. The system provides the entity description frame to a plurality of 3D rendering engines associated with a content provider system.

One of the related topics to virtual reality and pseudo-haptic touch/Phantom Touch is
10 "phantom limb pain" in amputees. Phantom limb pain is a condition where amputees experience discomfort or pain in the area of their missing limb. Even though Phantom Touch in VR and the Phantom limb condition may be related, there are no products or patents which offer pseudo-haptic touch in VR to relieve patients from pain.

15 Some of the earlier works on development of pseudo-haptic touch includes the work of Botvinick & Cohen – The Rubber Hand Illusion (RHI), where a person's real hand was substituted with a rubber one. In their experiment, the person's real and fake rubber hand received brush stimuli, with consistent stroking the participants stated that they experienced sensations of touch on their fake hand.

20 "The Phenomenology Of Virtual Reality And Phantom Sensations" written by Alexander Heinzl and Tincuta Heinzl explain the complexity of the virtual pseudo-haptic touch phenomenon (or Phantom Touch) and the difficulty to recreate in individuals in VR. The work provides some potential ideas on what elements could influence the development of
25 Phantom Touch, such as telepresence, immersion, virtual environments, and virtual embodiments (or avatars). Although the research observes the possibilities of how the pseudo-haptic touch (or Phantom Touch) can be developed, no clear conclusions are presented on how it could be done.

30 A study published in 2020 titled "The Experience of Social Touch in Multi-User Virtual Reality" (DOI:/10.1145/3385956.3418944) looked at social pseudo-haptic touch between two participants (or users) where both would initiate virtual touch in a virtual environment. Although this work is very closely linked to the invention to be patented, the authors of the study did not provide a method or technique for their participants to evoke and mature
35 sensations of touch in virtual reality. In other words, the study primarily looked whether their extremely controlled experiment measures would develop any sensations in people.

Similar work includes the study titled "Communications in Virtual Environment Improve Interpersonal Impression", which also looked at pseudo-haptic touch interaction between participants – but this work has also not provided a technique for the partakers to experience touch sensations in VR.

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The inventor had been working on a method described initially as "The Head-to-Toe Method" which is a technique to be used in Virtual Reality (VR) as a means to evoke, develop and experience pseudo-haptic touch sensations in people. The first findings of this technique were presented by Sasha Alexdottir at the ISMAR Conference in Singapore in October 2022.

10 Reference to the paper presented could be found at:
<https://ieeexplore.ieee.org/document/9974405>.

The same findings would be published by Springer - <https://www.springer.com/> in early 2024.

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Other findings regarding Phantom Touch in VR include the study titled "Phantom touch illusion, an unexpected phenomenological effect of tactile gating in the absence of tactile stimulation". This study was inspired by the work presented by Sasha Alexdottir at ISMAR 2022 ("Phantom Touch phenomenon as a manifestation of the Visual-Auditory-Tactile Synaesthesia and its impact on the users in virtual reality"). The work observes the effect of participants touching their virtual hands with a virtual stick – most people experienced sensations of tingling, as well as pressure, warmth and other. This research has achieved some similar sensation results compared to their inspired work (that was presented at ISMAR 2022) – although the authors have not created any specific method for participants to develop their sense of touch. Moreover, the aim of their study did not involve invention of a method to evoke Phantom Touch sensations.

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In a related study titled "Embodied Telepresent Connection (ETC): Exploring Virtual Social Touch Through Pseudohaptics", researchers claimed that they created Embodied Telepresent Connection (ETC), which supposedly can generate feelings of touch in VR, but the inventors did not explicitly explain how the system works and what specific steps or methods should be used to elicit sensations of touch in VR.

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Other work which has similar aspects to the ones presented in the invention includes the usage of a 'virtual mirror' to experience pseudo – haptic touch/ Phantom Touch. Publications such as "The contribution of real-time mirror reflections of motor actions on virtual body

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ownership in an immersive virtual environment”, “Sensorimotor experience in virtual reality enhances sense of agency associated with an avatar”, and “Avatar and Sense of Embodiment: Studying the Relative Preference Between Appearance, Control and Point of View” explore the idea of using virtual mirrors to heighten immersion for their participants –
5 making their sense of embodiment, ownership, and agency higher with their avatar. In development of the invented method, virtual mirrors are also implemented to develop the sensations of touch in people.

PROBLEM TO BE SOLVED

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While there are VR applications for games, entertainment (particularly video games), education (such as medical or military training) and business (such as virtual meetings), the inventor has been experimenting with use of VR for experiencing social touch in the virtual environments and worlds – where one user can feel touch sensations of another user.

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This technique of sensing touch in VR does not involve any implementation of haptic devices or external influence, such as: real life touch from another person onto the receiver, tools of stimuli (stick, brush, feather), or additional hardware for stimulation (thermal vests, vibrotactile gloves, to name a few). This invention allows people to feel touch in VR for social purpose,
20 relaxation, video game immersion, social care and related fields which use VR technology – permitting touch sensations to a user with a basic VR set up, excluding complex haptic technology and wear.

As described in the Prior Art section of the application – few studies have looked into
25 developing a working method for evoking, developing, sustaining, and experiencing pseudo-haptic (Phantom Touch) in virtual reality. This invention provides a working method for people to have sensations of touch in VR, as well as a basic set up of the system and enclosures in order for the invented method to function accordingly.

30 The method was created by studying users who already experience pseudo-haptic touch in VR via questionnaire – the results were then compared to research on the human nerve functionality, such as the Cortical Homunculus (Penfield and Boldrey, 1937), and E.H. Weber’s “Two-Point Discrimination Test”, as well as his other work on tactile senses (E. H. Weber, 1996). The questionnaire findings regarding the most sensitive areas where users felt pseudo-haptic touch on the body closely related to the discoveries made by Penfield, Boldrey, and
35 Weber. This gave inspiration for the invented method – the touchpoints which should be

stimulated on the virtual avatar, the movements, and sequence in which the method should be performed.

SUMMARY OF INVENTION

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A first object of the Invention is a system using Virtual Reality (VR) to evoke, develop, and experience pseudo-haptic touch sensations in people, without the use of additional haptic devices, sensors, and external stimuli, the system with a computer server and a VR application software for 3D VR interactive environment, comprising:-

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- a. a customised VR Platform with music and sound effects, with a VR Headset for a touch initiator and a VR headset for a touch receiver; wherein the touch initiator and the touch receiver are each in a separate and distinct physical enclosed space; and the touch receiver selects a touch initiator avatar in the VR environment for the touch initiator;

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- and the touch receiver selects and uses a touch receiver avatar in the VR environment; and

- b. a virtual Mirror in the VR environment for the touch initiator and the touch receiver

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characterised in that the touch initiator uses the touch initiator avatar to perform a series of moves onto the limbs and the body of the avatar of touch receiver, and the touch receiver develops the pseudo-haptic touch sensations (Phantom Touch) in the limbs and the body through the interaction between the avatar of the touch initiator and the touch receiver in the VR environment, enabling the touch receiver to experience sensation of touch arising from the touching of the touch receiver's avatar by the touch initiator's avatar in virtual reality without any real-life contact or haptics.

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Preferably an account is created and set up for each touch initiator and each touch receiver in the system and the system allows additional touch initiators and additional touch receivers to use the system and for maintenance of data of each touch initiator and each touch receiver.

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Preferably the system additionally has these functions:-.

- (a) Allows users to move between virtual environments.

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- (b) Enables other users to join virtual environments.

- (c) Allows selection of avatars from a plurality of avatars by touch initiators and touch receivers.

(d) Play music and sounds effects.

Preferably the system requires a distinct physical enclosed space for the touch initiator and a distinct physical enclosed space for the touch receiver in separate locations, be it in the same
5 floor, or same building or even in separate geographical locations.

A second object of the invention is a method using a customised Virtual Reality (VR) Platform and VR to evoke, develop, and experience pseudo-haptic touch sensations in a touch receiver who is to receive said touch sensations, without additional haptic devices, sensors, and
10 external stimuli such as, human touch or stimuli tools, from a touch initiator who initiates the touching actions to enable the touch receiver to experience the pseudo-haptic touch sensations, without additional haptic devices, sensors, and external stimuli such as, human touch or stimuli tools, the method comprising the steps of :-

15 a. wearing a VR Headset by the touch initiator to select a touch initiator avatar in a VR environment; and to select a touch receiver avatar in the VR environment; wherein the touch initiator and the touch receiver, also wearing a VR Headset each in a separate and distinct physical enclosed space, and the touch initiator uses a touch initiator avatar in the VR environment to perform unilaterally a sequence of touching specific touch points of the
20 touch receiver's avatar;

b. beginning a touching sequence by the touch initiator by touching the head of the touch receiver's avatar with both hands open and moving in opposite motions, then to the cheeks, then to the necks, then to the chest, then to the stomach, to the shoulders, to the left arm
25 down the left shoulder to the left wrist, and repeating the sequence to the right arm, down the right shoulder to the right wrist, then to each hand/palm, and then to each leg and the back wherein by the touch initiator using the touch initiator avatar to perform a series of touches onto the head, limbs and body of the avatar of touch receiver, the touch receiver develops pseudo-haptic touch sensations (Phantom Touch) in the limbs and body through
30 the interaction between the avatar of the touch initiator and touch receiver in the VR environment, enabling the touch receiver to experience sensation of touch arising from the touching of the touch receiver's avatar by the touch initiator's avatar in virtual reality without any real-life contact or haptics.

35 Preferably the method further comprising raising either arm of the receiver to a 90-degree angle, opening both palms of the touch initiator (one placed in top of the arm, and the other

under), stroking from the shoulder down the arm reaching the wrist at a slow synchronous and steady speed, repeating the same to the opposite arm.

5 Preferably the touch initiator performs the touching on the body parts of the avatar of the touch receiver which is being stimulated or touched, including but not limited to stroking in a single direction, stroking in opposite directions, and stroking in circular motion.

10 Preferably the touch initiator performs with a single hand, or both hands simultaneously in a synchronous motion, depending on which virtual body parts is being stimulated or touched.

Preferably the hand gestures of the touch Initiator on virtual body parts which are being touched or stimulated include but not limited to open palm or a pointed finger.

15 Preferably the touch frequency at which the Initiator performs the touch on the avatar body of the touch receiver is a frequency of approximately 15-20 strokes per body part.

20 Preferably the touch frequency of approximately 15-20 strokes per body part at which the Initiator performs the touch on the avatar body of the touch receiver is reduced or extended depending on the reaction of the touch receiver.

Preferably, the sequence of touching specific touch points of the touch receiver to feel sensation of touch is from the head, to the face, to the neck, then upper chest, then stomach, then to the shoulders and to the arms and the palms and then to each leg and back.

25 Preferably if in the real world the touch receiver does not have a limb or has a missing body part, but the avatar of the touch receiver has these missing body parts then the method may be performed on these body parts of the touch receiver's avatar even if the touch receiver in the real world does not have these body parts.

30 Preferably if in the real world the touch receiver does not have a limb or has a missing body part and the avatar of the touch receiver does not have these missing body parts, the missing body part of the receiving user's avatar may be ignored when performing the touch.

35 Preferably the method is modified in case where some body parts do not experience sensation of touch by alternatively using a substitute/secondary method where; an index finger moving from the top of the Touch Receiver's head in a singular motion to the middle of their forehead, down the nose and proceeding the original method touching cheeks, neck, chest, stomach,

and the shoulders. Then proceed to the substitute/secondary method which consists of touching the arms with both palms open (one placed on top of the arm, and the other under) and stroke together from the shoulder down the arm (reaching the wrist). This method should be repeated for the other arm. Following the arms, the palms will be touched in a substitute
5 manner by having the initiator put both their palms in an open position and stroke up and down from the forearms of the receiver to the tip of their fingers. Following the palms, the initiator will stroke with their palm open from the top of the thigh down to the ankle in a singular motion – repeating this secondary/substitute method on the other leg.

10 Preferably the method is performed in front of the virtual mirror in virtual reality so the touch initiator and the touch receiver see a third person perspective or/and virtual mirror image and where the avatar of the touch receiver stands at a distance of an arm length from the virtual mirror and the other distance can be adjusted depending on the preferences of the touch receiver.

15 Preferably the virtual mirror is disabled and the avatar of the touch receiver is positioned in front of the touch Initiator if the touch receiver does not feel the touch or the touch sensation is not strong.

20 BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an illustration of the VR system and VR Platform and enclosed space used for the implementation of the method.

25 Fig. 2 is an illustration of how the invention used in a medical/healthcare setting would look like with regards to the enclosures, system, and avatar positioning.

Fig. 3 is an illustration of how the invention used in an amputee phantom pain treatment would look like with regards to the enclosures, system, and avatar positioning.

30 Fig. 4 is an illustration of the enclosures and VR platform where the virtual mirror is disabled for the touch receiver.

Fig. 5 is an Illustration of the touch points for developing, sustaining, and experiencing touch
35 in virtual reality.

- Fig. 6 is an Illustration of the touch points for developing, sustaining, and experiencing touch in virtual reality on the palms.
- Fig. 7 is an Illustration of the order (indicated by numbers) and the manner (indicated by arrows) in which the initiator should touch the receiver in order to develop, sustain, and experience social touch.
- Fig. 8 is an Illustration of the order (indicated by numbers) and the manner (indicated by arrows) in which the initiator should touch the receiver in order to develop, sustain, and experience social touch on the palms.
- Fig. 9 is an illustration of the order (indicated by numbers) and the manner (indicated by arrows) for the substitute/secondary method for pseudo-haptic/Phantom Touch development.
- Fig. 10 is an illustration of the order (indicated by number) and the manner (indicated by arrows) for the substitute/secondary method for pseudo-haptic/Phantom Touch development on the palms/forearms

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

- Some definitions used in the invention are now defined for a better understanding of the inventive method.
- Definitions
- The person receiving and experiencing touch is referred to as touch receiver or client.
- The person who wants to develop touch sensation in VR is referred to as touch receiver.
- The terms “pseudo-haptic touch” and “Phantom Touch” are used interchangeably.
- The VR Platform refers to the VR System, an enclosed space (room) for the touch initiator with a VR headset in place and another enclosed space (room) for the touch receiver with a VR headset in place. Both the touch initiator and touch receiver when wearing and using their VR headsets would find their virtual avatars projected in a virtual environment. The virtual space also preferably has Virtual Mirrors which can be enabled and disabled for both the touch initiator and the touch receiver. The VR System would also provide music to both the touch receiver and touch initiator.

While the VR environment enables both touch initiator and touch receiver to experience themselves in the VR environment, the touch initiator and touch receiver must be located in two different enclosed rooms separate from each other so that their interactions with each other in the VR environment could not be experienced actually by each party, each in their enclosed environment. The physical enclosed space for the touch initiator and the physical enclosed space for the touch receiver are in separate locations, be it in the same floor, or same building or different geographical locations.

The invention requires three elements for a person to evoke, develop, sustain, and experience touch in virtual reality (also known as pseudo-haptic touch or Phantom Touch). An illustration of the enclosures and the VR setup/system showing the three necessary elements for the invented method is shown in Fig. 1. These three elements are - real life set up (physical enclosure), VR set up (or platform/system), and the Method (to be performed by the touch initiator).

Pseudo-haptic touch sensations can be implemented in any field which uses VR technology. This may include social gaming, mental health, therapy, wellbeing, relaxation, aid in phantom limb pain, social care (elderly care), adult entertainment, as well as other activities. Regardless of where and which field were to implement the invention, the three elements would remain the same in order for a user to evoke, develop, experience, and sustain pseudo-haptic touch sensations in VR. In any implementation, for a person to evoke, develop, sustain, and experience touch in virtual reality (or pseudo-haptic touch/Phantom Touch) would require the receiver/client (the person who wants to develop touch sensation in VR), and the touch initiator (the person who aids in developing touch sensation via the method).

It is important to note that the touch initiator remains the same throughout the development process for the client unless the client chooses otherwise. After the client evokes and develops Phantom Touch to a necessary degree, the individual who acted as the initiator will no longer be required for the client's further pseudo-haptic touch experience (as the client will then be able to implement their newly formed sensation in practice, for example in social gaming e.g. with other players).

The touch sensation proposed in this method involves carrying out in a sequential manner, touching points in the head, face, neck, shoulders, chest, arms, hands, upper legs, and lower legs and back of the avatar. These touching points may or may not correspond to areas of the human body such as acupressure points or acupuncture nodes. Nonetheless, this method

enables a person to evoke, develop, sustain, and experience touch in virtual reality and for the touch receiver to eventually experience a sense of touch.

5 The touch points also may correspond to the lymph nodes and lymphatic vessels of the lymphatic system of the human body. Nonetheless, this method enables a person to evoke, develop, sustain, and experience touch in virtual reality and for the touch receiver to eventually experience a sense of touch.

The Industrial Application of the invented method is vast and may be applied in several fields.
10 Following are described some possible embodiments (applications) of the method:-

1. Hospital care – in instances where a patient is bedbound or must be isolated, the invented method will aid him/her in reconnecting with their family and friends, creating a comforting atmosphere which will help in the patient's recovery. The virtual touch
15 sensations can help the patient battle loneliness and stress and improve their time in the hospital.

2. Pain reduction during treatment – in situations where a patient is receiving a painful treatment and Phantom Touch sensations during the procedure can reduce stress and discomfort, as well as provide a distraction via the invented stimuli. An example of this is
20 shown in Fig. 2.

3. Mental Health – where the client is receiving virtual touch during the mental health sessions to help in relaxation and provide comfort.

4. Phantom Limb pain – the invention may be used to support amputees in a virtual environment by reducing 'pain' in the missing limb. This would include caressing/touching
25 the missing limb of the amputee to aid in the pains. An example of this is shown in Fig. 3.

5. Virtual Social Gaming – this may include any multiuser virtual games where one player can touch the avatar of another user. The method for experiencing sensations of touch can be applied in social virtual games in which the users can be further immersed into
30 the game, as well as aid building stronger connections with other players.

It is important to note that the avatar positioning (as shown in Fig. 2 and 3) may change depending on the client's preference. For example, if the touch receiver is bedbound in real life, the avatar positioning may not always be identical on the VR platform. Regardless of
35 whether the touch receiver is sitting, lying down, or their real life and VR positioning are different, the invented method should be carried out in the manner as described herein.

It is pointed out initially that we have chosen to use in the following description of preferred embodiments and including significant characteristic features of the invention and as illustrated in the accompanying drawings using special terms and terminology with the intention of illustrating the inventive concept more clearly.

- 5 However, it will be noted that the expressions chosen here shall not be seen as limited solely to the chosen terms used in the description, but that each term chosen shall be interpreted as also including all technical equivalents that function in the same or at least essentially the same way so as to achieve the same or essentially the same intention and/or technical effect.

Description of System

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A Real life set up and enclosures would now be described with reference to the three necessary elements for the invented method.

- 15 This refers to how the touch initiator and the touch receiver should be located in real life in order for the invention to work in the most efficient and effective manner. Each individual must have the VR headset and controllers (unless one, or both persons choose control free or finger tracking method to move/interact in the virtual space). The touch initiator and touch receiver must be located in separate enclosures/rooms with the VR system installed on their VR headsets – the physical enclosures could be located anywhere physically, as both persons
- 20 would connect virtually (hear and see each other in the virtual environment). The physical enclosed space for the touch initiator and the physical enclosed space for the touch receiver are in separate locations, be it in the same floor, or same building or even different countries. The aim of the having separate physical enclosures is to make sure the two users do not hear each other, and have no interference from either party, unless necessary - e.g., for another
- 25 person (not the touch initiator, e.g. nurse or doctor) to perform medical treatment or tests onto the touch receiver if the invention were to be implemented in the medical field, e.g. for Pain reduction treatment).

The basics of the enclosure set up would be as follows:

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- An enclosed space (room) for the touch initiator – with a VR headset in place.
- An enclosed space (room) for the touch receiver – with a VR headset in place.
- 35 • The enclosure must be appropriately insulated from distracting noise or disturbances (passerby's, obstructing furniture) for both the touch initiator and the touch receiver.

- In some industrial applications of the invention, having sufficient noise insulation and absence of disturbances may not always be feasible (medical care, rehabilitation care, pain reduction during treatment etc.) – in which case the enclosure should try to minimise such hindrances as much as possible.

System/Platform set up

This refers to the VR software/platform with a server where the touch receiver develops their pseudo-haptic touch sensations (Phantom Touch), and where the touch initiator performs the invented method onto the touch receiver/client. Regardless of the fields where this invention may be implemented (as outlined previously, including but not limited to - medical care, social care, gaming, or other), the platform basis should remain the same. It is important to note that the platform for pseudo-haptic touch development may also be the same platform for the client's use after the completion of pseudo-haptic touch development program. The system may vary depending on the industrial application, meaning there will be differences in the user interface, virtual environments, avatars, but nevertheless, the basis for experiencing touch sensations remains the same for all future systems.

A description of the system, platform and VR software set up is provided herein:

1. An application/platform and computer server which has 3D virtual interactive environments, either created on an independent custom-made platform, for the workings of this method.
2. The platform on a VR headset which is in an environment with at least two partitioned enclosures which allows voice transmission between Touch Initiator and Touch Receiver (located in each partitioned enclosure and separated from each other with the partition).
3. Feature to play music and sounds effects.
4. An Accounts Set Up module to provide for an account for every user – for purposes of adding other users and for maintenance of user data.
5. Allows users to move between virtual environments.
6. System which enables other users to join virtual environments.
7. A platform which has an avatar selection for users to choose from.
8. Virtual mirrors in the virtual environments, which can be enabled and disabled.

Description of Preferred Embodiment implementing the Method using System

A description of how a preferred embodiment of the method using the system is implemented is made with reference to the Drawings. It is to be understood, however, that the present invention may be embodied in various forms. Therefore, specific details disclosed herein are not to be interpreted as limiting, but rather as a basis for the claims and as a representative basis for teaching one skilled in the art to employ the present invention in virtually any appropriately detailed system, structure or manner.

The invention comprises of a method for eliciting, experiencing, and sustaining sensations of social touch in a virtual reality environment where: one user (their virtual avatar) is performing virtual touch in the virtual space onto another user (their virtual avatar), where one user is the initiator of touch (Touch Initiator), and the other ("Touch Receiver" or "Receiver") is the receiver. The terms "Touch Initiator" and "Initiator" is used herein interchangeably, and also for "Touch Receiver" and "Receiver".

The Receiver is the one developing and experiencing sensations of touch in the virtual environment, the sensations which the receiving user may be feeling include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. The method of evoking the sense of touch in virtual reality comprises the touch initiator interacting with specific touch points onto the receiver's avatar - the touchpoints have a specific order and manner of performing them for the receiver to experience sensations of touch in real life and perceive the illusion of pseudo – haptic touch as real. This method of eliciting, sustaining, and experiencing social touch in virtual reality may be used in fields which use or implement virtual reality technology, this may include but is not limited to gaming, social care, medical care, rehabilitation, virtual Metaverse, and research.

The basic method for the person to develop sense of touch in virtual reality involves the Touch Receiver, i.e., the person who wants to evoke and experience touch, and the Touch Initiator - the person performing the touchpoints onto the avatar of the receiver.

As outlined in the above sections, the Real-life and Platform set-up must meet the requirements described previously in order to successfully implement the method. Fig. 1 is an illustration of the basic system consisting of a platform/VR software and enclosures used for the implementation of the method. The three necessary elements for the inventive method and inventive system to work is shown.

The VR system **(1)** and enclosure for the implementation of the method consists of the following:

1. An application/platform which has 3D virtual interactive environments **(2)(3)**, either
5 created on an independent custom-made platform, or by the owners of the platform.
2. The platform allows voice transmission between users.
3. Audio system to play music and sounds effects.
4. A computer system which has accounts for every user – for purposes of adding other
users (not strictly for the touch initiator and receiver).
- 10 5. VR software to allow users to move between virtual environments.
6. VR System which enables other users to join the initiator and receiver.
7. A platform which has an avatar selection for each user to choose from.
8. Virtual mirrors **(12)** in the virtual environments, which can be enabled and disabled.
9. Two enclosures consisting of two separate rooms - one for touch initiator **(5)** and one
15 for touch receiver **(9)** with a VR headset **(7) (11)** in each enclosure with the system installed
on the VR device.
10. User Accounts for the Touch Initiator, the Touch Receiver, as well as other users who
may be present on the platform (where applicable) wherein the user account information
would contain login details and usernames.

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Once the real life set up has been completed between the two parties, the Touch Receiver
(10) and the Touch Initiator **(6)** must both enter the agreed virtual environment **(2)** at the same
instance, with the avatars **(4)**, **(8)** chosen by the receiver. In the VR environment **(3)**, both
parties must turn on the virtual mirror **(12)** where the avatars of both parties are at an arm's
25 length away from the virtual mirror. It is important to note that, in instances where the touch
receiver/client finds that the virtual mirror **(12)** decreases their pseudo-haptic touch sensations
or they find it distracting, the virtual mirror **(12)** should be disabled in the virtual environment,
and instead the touch receiver **(8)** and touch initiator **(4)** should stand in the middle of the
virtual room **(3)**, or any space comfortable for the touch receiver **(8)** in the virtual environment
30 **(3)**. An example of this is shown in Fig. 4.

With reference to Fig. 2, the embodiment of this inventive method is in Hospital care. An
instance of Hospital Care embodiment is where a patient is bedbound or must be isolated, the
invented method will aid him/her in reconnecting with their family and friends, creating a
35 comforting atmosphere which will help in the patient's recovery. The virtual touch sensations
can help the patient battle loneliness and stress and improve their time in the hospital.

Pain reduction during treatment – in situations where a patient is receiving a painful treatment, Phantom Touch sensations during the procedure can reduce stress and discomfort, as well as provide a distraction via the invented stimuli. An example of this is shown in Fig. 2 and Fig. 3.

3. Several uses of this invention are possible in Hospital Care:-

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Mental Health – where the client is receiving virtual touch during the mental health sessions to help in relaxation and provide comfort.

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Phantom Limb pain – the invention may be used to support amputees in a virtual environment by reducing 'pain' in the missing limb. This would include caressing/touching the missing limb of the amputee to aid in the pains. An example of this is shown in Fig. 3.

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Fig. 4 describes a situation where the virtual mirror for the touch initiator and touch receiver is not used.

A description of the steps and touchpoints used in the method is provided herein with reference to Fig. 5 to Fig. 8.

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Fig. 5 is an Illustration of the touch points for developing, sustaining, and experiencing touch in virtual reality. The spheric outlines indicating which areas of the virtual body need to be touched by the touch initiator.

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Fig. 6 is an Illustration of the touch points for developing, sustaining, and experiencing touch in virtual reality on the palms. The spheric outlines indicating which areas of the virtual hands need to be touched by the touch initiator.

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Fig. 7 is an Illustration of the order (indicated by numbers) and the manner (indicated by arrows) in which the initiator should touch the receiver's virtual avatar in order to develop, sustain, and experience social touch.

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Fig. 8 is an Illustration of the order (indicated by numbers) and the manner (indicated by arrows) in which the initiator should touch the receiver's virtual avatar in order to develop, sustain, and experience social touch on the palms.

After the virtual set up has been completed, the initiator of touch will perform the uniliteral method consisting of touching specific areas onto the receiver's virtual body as shown in Fig. 5 and 6.

- 5 Referring to Fig. 7 and 8, the touching would be carried out in a specific order (indicated by numbers) and manner/motion (indicated by arrows).

The initiator will begin by touching the top of the **head** of the receiver's avatar - both hands open and moving in opposite motion (hands moving away from each other from the middle of the head). This is shown in Fig. 7, indicated by number **(14)**.
10

After caressing the **head (14)** for about 15-20 strokes at a slow, steady, and synchronous speed, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing, or, experience some sensations/weak sensation or strong
15 sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **cheeks (15)**. This is shown in Fig. 7, indicated by number 15. With both hands open, the receiver will stroke from the middle of the face and down to the mouth/chin
20 of the avatar for about 15-20 strokes at a slow, steady, and synchronous speed. After caressing the **cheeks (15)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations.
25 Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **neck (16)**. This is shown in Fig. 7, indicated by number 16. With one pointed finger, the receiver will circle the middle of the **neck (16)** in either clockwise or anticlockwise manner for about 15-20 strokes at a slow and steady speed. After caressing the **neck (16)**, the initiator must ask if the receiver feels any sensations of touch – the
30 responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **chest (17)**. This is shown in Fig. 7, indicated by number 17. With an open palm, the receiver will circle the middle of the **chest (17)** in either clockwise or anticlockwise
35 manner for about 15-20 strokes at a slow and steady speed. After caressing the **chest (17)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be

either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the

5 **stomach (18)**. This is shown in Fig. 7, indicated by number 18. With an open palm, the receiver will circle the middle of the stomach in either clockwise or anticlockwise manner for about 15-20 strokes at a slow and steady speed. After caressing the **stomach (18)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a

10 description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **shoulders (19)**. This is shown in Fig. 7, indicated by number 19. With both palms open, the initiator should stand behind the receiver and stroke in opposing directions - from the **neck**

15 **(16)** down to the **shoulders (19)**. This should be repeated for 15-20 strokes at a slow, steady, and synchronous speed. After caressing the **shoulders (19)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing,

20 tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – **left or right arm (20)**. This is shown in Fig. 7, indicated by number 20. The receiver should **raise either of their arms (20)** to a 90-degree angle, then the initiator must stroke with an open palm from the **shoulder (19)** **down the arm (20) reaching the wrist** for about 15-20 strokes at a slow and steady speed.

25 After caressing the **arm (20)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to the **opposite**

30 **arm which has not been touched yet in exactly the same manner as the previous arm**. This is shown in Fig. 7, indicated by number 20. **After caressing the other arm (20)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence,

35 pressure, brushing, tickling, electrifying, vibrations.

Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **palms (21)**. This is shown in Fig. 7, indicated by number 21 and Fig. 8. The receiver should **put the palms (21) in front of them (arms bent to a 90-degree angle, enough for them to see their palms (21) in first person perspective)**, after
5 which the initiator shall put their hand in a pointing position and **stroke the centre of the palm (25)** in a circular motion for about 15-20 strokes at a slow and steady speed. This is shown in Fig. 8, indicated by number 25. Then, the initiator must stroke **each finger (26)** from the centre of the palm in sequential order (either thumb, index finger, middle finger, ring finger, pinkie, or vice versa). This is shown in Fig. 8, indicated by number 26. The receiver should repeat the
10 sequential order for about 15-20 strokes at a slow and steady speed. After caressing the **palm (25) and fingers (26)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of
15 whether there are sensations or not, the initiator should proceed to **the other palm (21), repeating exactly the same procedure as for the other**. This is shown in Fig. 8. After caressing the other **palm (21)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include
20 but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations.

Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **thigh (22)** (either left or right). This is shown in Fig. 7, indicated by number 22. With an open palm, the initiator will stroke from the top of the **thigh (22) and
25 down to the knee**, for about 15-20 strokes at a slow and steady speed. After caressing the **thigh (22)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of
30 whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **calve (23) on the same side at the thigh that has just been touched**. This is shown in Fig. 7, indicated by number 23. With an open palm, the initiator will stroke from the **knee down to the ankle** for about 15-20 strokes at a slow and steady speed. After caressing the **calve (23)**, the initiator must ask if the receiver feels any sensations of touch –
35 the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations.

Regardless of whether there are sensations or not, the initiator should proceed to repeating the same procedure on the **other side of the leg, for both the thigh (22) and the calve (23)**. This is shown in Fig. 7, indicated by number 22 and 23. Lastly, the initiator will stand behind the receiver, and with both palms open, stroke up and down the **back (24)** at a slow, steady, and synchronous speed for about 15 – 20 strokes. This is shown in Fig. 7, indicated by number 24. After caressing the **back (24)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations.

This concludes the basic outline of the method for developing and experiencing touch in virtual reality – after the final touch point (the back), both parties may take off the VR headsets.

In order for the receiver to develop the sense of touch in virtual reality, there should be approximately five of these sessions, each time repeating the described steps in the method. It is important to note that: in the method outlined above both persons are in a standing position both in real life and in VR, although, in instances where the receiver is either sitting or lying down in real life, the avatar in VR should match their position in the virtual environment - the real life set up and VR avatar position should be adjusted accordingly.

Substitute/secondary method for pseudo-haptic/Phantom Touch development

Although the primary method described earlier works for the majority of those who wish to evoke, develop, and sustain pseudo-haptic sensations, there may be instances where some areas of the body experience none or less pseudo-haptic sensations than desired by the client. In such a case, a substitute/secondary method to evoke pseudo-haptic touch sensations is proposed.

The sequence in which the touch initiator performs the movements remains the same, as well as most of the touchpoints onto the Touch receiver's/client's virtual avatar. It is important to specify that the substitute/secondary movements, hand gestures, and touch points are not relevant to every virtual body part which has been outlined in the previous section – only certain areas of the virtual body have a substitute/secondary method. The areas where there is an alternative method are shown in Fig. 9 and 10.

Furthermore, the Real life set up and the VR platform set up remain the same for the substitute/secondary method. The substitute/secondary method is as follows: in an event that the Touch receiver does not experience touch sensations on their **head (14)** from the primary method (by being touched the top of the head of their virtual head - both hands open and moving in opposite motion) – the touch initiator instead should have their hand in a pointing position and move their index finger from the top of the Touch receiver's **head (14)** in a singular motion to the middle of their **forehead (27)** and down to their **nose (28)**. This is shown in Fig. 9, indicated by numbers 14, 27 and 28. After caressing this area for about 15-20 strokes at a slow and steady speed, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing, or, experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to the **cheeks (15), neck (16), chest (17), stomach (18), shoulders (19), in exactly the same manner as has been described in the primary method**. This is shown in Fig. 7, indicated by numbers 15, 16, 17, 18 and 19.

The next body part which contains a substitute/secondary method are the **arms (20)** - in an event that the Touch receiver does not experience touch sensations on their left or right arm (or both) from the primary method (by raising either of their arms to a 90-degree angle, after which the initiator strokes with an open palm from the shoulder down the receiver's arm (reaching the wrist)), the alternative method should be employed. Regardless of whether one, or both arms did not experience sensations of touch from the primary method, both arms in the alternative method should be treated the same by the initiator. In other words, both arms must follow either the primary method or the secondary method – not having one arm practice the primary method and the other the secondary method. The substitute method is as follows: The receiver should raise either of their arm to a 90-degree angle, then the initiator with **both palms open (one placed on top of the arm, and the other under)** stroke **together** from the shoulder down the arm (reaching the wrist) for about 15-20 strokes at a slow, synchronous, and steady speed. This is shown in Fig. 9, by number 20. After caressing the **arm (20)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to the opposite arm which has not been touched yet in **exactly the same manner as the previous arm**. After caressing the other arm, the initiator must ask if the receiver feels any sensations of touch – the responses would be either:

feel nothing or experience some sensations/weak sensation or strong sensations, which may be described as tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations.

Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **palms (21)**. In the event that the touch receiver does not experience sensations as described in the primary method, the following actions should be taken in the alternative method: the receiver should put the palms in front of them (arms bent to a 90-degree angle, enough for them to see their palms in first person perspective), after which the initiator shall put both their palms in an **open position and stroke up and down from the forearms (29) of the receiver to the tip of their fingers (26)**. This is shown in Fig. 9, by the numbers 21, 26 and 29. This should be done for about 15-20 strokes at a slow, synchronous, and steady speed. After caressing the palm and fingers the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations.

Regardless of whether there are sensations or not, the initiator should proceed to the following touch point on the avatar – the **thigh (22)** (either left or right). In an event that the receiver does not experience sensations on their thigh/thighs (22), calve/calves (23), or lower legs altogether (22) (23), the following alternative method should be implemented: with an open palm, the initiator will stroke from the **top of the thigh (22) all the way down to the ankle (30)**, for about 15-20 strokes at a slow and steady speed. This is shown in Fig. 9, indicated by numbers 22, 23 and 30. After caressing the **whole leg (22 – 23 – 30)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but not limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations. Regardless of whether there are sensations or not, the initiator should proceed to touch **the other leg in exactly the same manner as to the previous one**. After caressing the **whole leg (22 – 23 – 30)**, the initiator must ask if the receiver feels any sensations of touch – the responses would be either: feel nothing or experience some sensations/weak sensation or strong sensations, along with a description of the sensation, which can include but it now limited to tingling, heat, presence, pressure, brushing, tickling, electrifying, vibrations.

This concludes the full description of the preferred embodiment (method) and secondary embodiment (method) of evoking, developing, sustaining, and experiencing pseudo-haptic/Phantom Touch in virtual reality.

5

ADVANTAGEOUS EFFECTS OF THE INVENTION

The present invention is an artificially induced VR experience where a person can feel interpersonal touch without any physical interaction or haptic devices. It is a brain trick which allows these phantom sensations to seem real. This invention would make an impact on social virtual environments, where people can hug their friends, family or a loved one. Even when miles apart, individuals connect and bond with one another, creating sensations of touch similar to the ones in real life. The invention has uses in medical care - improving patient's wellbeing, benefiting mental health, elderly care and more.

The present invention makes use of Virtual Reality
Allow a person to feel pseudo-haptic touch sensations .
Does not require use of haptic objects or stimuli externally
The person will feel touched without physical interaction

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CLAIMS

1. A system using Virtual Reality (VR) to evoke, develop, and experience pseudo-haptic touch sensations in people, without the use of additional haptic devices, sensors, and external stimuli, the system with a computer server and a VR application software for 3D VR interactive environment, comprising :-

a. a customised VR Platform with music and sound effects, with a VR Headset for a touch initiator and a VR headset for a touch receiver; wherein the touch initiator and the touch receiver are each in a separate and distinct physical enclosed space; and the touch receiver selects a touch initiator avatar in the VR environment for the touch initiator; and the touch receiver selects and uses a touch receiver avatar in the VR environment; and

b. a virtual Mirror in the VR environment for the touch initiator and the touch receiver

characterised in that the touch initiator uses the touch initiator avatar to perform a series of moves onto the limbs and the body of the avatar of touch receiver, and the touch receiver develops the pseudo-haptic touch sensations (Phantom Touch) in the limbs and the body through the interaction between the avatar of the touch initiator and the touch receiver in the VR environment, enabling the touch receiver to experience sensation of touch arising from the touching of the touch receiver's avatar by the touch initiator's avatar in virtual reality without any real-life contact or haptics.

2. The system as claimed in Claim 1 wherein an account is created and set up for each touch initiator and each touch receiver and to allow additional touch initiators and additional touch receivers to use the system and for maintenance of data of each touch initiator and each touch receiver.

3. The system as claimed in Claim 1 which additionally has these functions:-.

- a. Allows users to move between virtual environments.
- b. Enables other users to join virtual environments.
- c. Allows selection of avatars from a plurality of avatars by touch initiators and touch receivers.
- d. Play music and sounds effects.

4. A system as claimed in Claim 1 wherein the distinct physical enclosed space for the touch initiator and the distinct physical enclosed space for the touch receiver are in separate locations, be it in the same floor, or same building or even in separate geographical locations.
5. A method using a customised Virtual Reality (VR) Platform and VR to evoke, develop, and experience pseudo-haptic touch sensations in a touch receiver who is to receive said touch sensations, without additional haptic devices, sensors, and external stimuli such as, human touch or stimuli tools, from a touch initiator who initiates the touching actions to enable the touch receiver to experience the pseudo-haptic touch sensations, without additional haptic devices, sensors, and external stimuli such as, human touch or stimuli tools, the method comprising the steps of :-
- a. wearing a VR Headset by the touch initiator to select a touch initiator avatar in a VR environment; and to select a touch receiver avatar in the VR environment; wherein the touch initiator and the touch receiver, each in a separate and distinct physical enclosed space, and the touch initiator uses a touch initiator avatar in the VR environment to perform unilaterally a sequence of touching specific touch points of the touch receiver's avatar;
- b. beginning a touching sequence by the touch initiator by touching the head of the touch receiver's avatar with both hands open and moving in opposite motions, then to the cheeks, then to the neck, then to the chest, then to the stomach, to the shoulders, to the left arm down the left shoulder to the left wrist, and repeating the sequence to the right arm, down the right shoulder to the right wrist, then to each hand/palm, and then to each leg and the back, wherein by the touch initiator using the touch initiator avatar to perform a series of touches onto the head, limbs and body of the avatar of touch receiver, the touch receiver develops pseudo-haptic touch sensations (Phantom Touch) in the limbs and body through the interaction between the avatar of the touch initiator and touch receiver in the VR environment, enabling the touch receiver to experience sensation of touch arising from the touching of the touch receiver's avatar by the touch initiator's avatar in virtual reality without any real-life contact or haptics.
6. The method as claimed in Claim 5, further comprising raising either arm of the receiver to a 90-degree angle, opening both palms of the touch initiator (one placed in top of the arm, and the other under), stroking from the shoulder down the arm reaching the wrist at a slow synchronous and steady speed, repeating the same to the opposite arm.

7. The method as claimed in Claim 5 further comprising performing by the touch initiator on the body parts of the avatar of the touch receiver which is being stimulated or touched, including but not limited to stroking in a single direction, stroking in opposite directions, and stroking in circular motion.
- 5
8. The method as claimed in Claim 5 wherein the touch initiator performs with a single hand, or both hands simultaneously in a synchronous motion, depending on which virtual body parts is being stimulated or touched.
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9. The method as claimed in Claim 5 wherein hand gestures of the touch Initiator depend on virtual body parts which are being touched or stimulated include but not limited to open palm or a pointed finger.
10. The method as claimed in Claim 5 wherein the touch frequency at which the Initiator performs the touch on the avatar body of the touch receiver is a frequency of approximately 15-20 strokes per body part.
- 15
11. The method as claimed in Claim 5 wherein the touch frequency of approximately 15-20 strokes per body part at which the Initiator performs the touch on the avatar body of the touch receiver is reduced or extended depending on the reaction of the touch receiver.
- 20
12. The method of claim 5 wherein the sequence of touching specific touch points of the touch receiver to feel sensation of touch is from the head, to the face, to the neck, then upper chest, then stomach, then to the shoulders and to the arms and the palms and then to each leg and back.
- 25
13. The method of claim 5 wherein the method is used if in the real world the touch receiver does not have a limb or has a missing body part, but the avatar of the touch receiver has these missing body parts and the method may be performed on these body parts of the touch receiver's avatar even if the touch receiver in the real world does not have these body parts.
- 30
14. The method of claim 5 which the method is used if in the real world the touch receiver does not have a limb or has a missing body part and the avatar of the touch receiver does not have these missing body parts, the missing body part of the receiving user's avatar may be ignored when performing the touch.
- 35

15. Preferably the method is modified in case where some body parts do not experience sensation of touch by alternatively using a substitute/secondary method where; an index finger moving from the top of the Touch Receiver's head in a singular motion to the middle of their forehead, down the nose and proceeding the original method touching cheeks, neck, chest, stomach, and the shoulders. Then proceed to the substitute/secondary method which consists of touching the arms with both palms open (one placed on top of the arm, and the other under) and stroke together from the shoulder down the arm (reaching the wrist). This method should be repeated for the other arm. Following the arms, the palms will be touched in a substitute manner by having the initiator put both their palms in an open position and stroke up and down from the forearms of the receiver to the tip of their fingers. Following the palms, the initiator will stroke with their palm open from the top of the thigh down to the ankle in a singular motion – repeating this secondary/substitute method on the other leg.
16. The method as claimed in any of claim 5 to Claim 15 wherein the method is performed in front of the virtual mirror in virtual reality so the touch initiator and the touch receiver is seen in a third person perspective or/and virtual mirror image and where the avatar of the touch receiver stands at a distance of an arm length from the virtual mirror and the other distance can be adjusted depending on the preferences of the touch receiver.
17. The method as claimed in any of Claim 5 to Claim 15 wherein the virtual mirror is disabled and the avatar of the touch receiver is positioned in front of the touch Initiator if the touch receiver does not feel the touch or the touch sensation is not strong.