

Wearable Two-hands Operation Mouse

Field of Invention

[0001] The present invention relates to wearable two-hands operation mouse for use by Duchenne muscular dystrophy patients.

Background

[0002] Duchenne muscular dystrophy (DMD) is a muscular disorder that is characterized by decreasing leg and arm muscle masses and progressive loss of muscle function. Most DMD patients become wheel-chair bound and are then dependent on others by the second decade of life. Later symptoms include abnormal bone development that leads to skeletal deformities including curvature of the spine, progressive loss of movement leading eventually to complete paralysis, and increasing difficulty in breathing.

[0003] Computers and video games can help improve quality of lives in DMD patients; in addition, internet access and electronic mail may allow some of these DMD patients to interact with other people. However, most DMD patients are no longer able to use a typical keyboard or input device, let alone, to operate a typical mouse.

[0004] US Patent No. 7,273,324, issued to Mercier, describes an adjustable wearable split keyboard and mouse input device. The device includes two hand modules. Input keys are provided on each module and arranged on finger-like components. The finger-like components are attached to a palm support structure, which has straps for wearing.

[0005] US Publication No. 2006/0250364, filed by Gorbunov, describes an ergonomic left palm operation mouse. In use with a typical right hand mouse operated for positioning a cursor, the left hand operation mouse is used for selection function; this help to move some of the strains and stresses on the right hand to the left palm.

[0006] Despite development in the prior art, it can thus be seen that there exists a need for another wearable two-hands operation mouse that is suitable for a DMD patient.

Summary

[0007] The following presents a simplified summary to provide a basic understanding of the present invention. This summary is not an extensive overview of the invention, and is not intended to identify key features of the invention. Rather, it is to present some of the inventive concepts of this invention in a generalised form as a prelude to the detailed description that is to follow.

[0008] The present invention seeks to provide a wearable two-hands operation mouse to enhance the quality of life of a DMD patient. In one embodiment, the wearable two-hands operation mouse comprises: two parts, a first part is configurable to emulate selection by clicking whilst a second part is configurable for navigating a pointer; wherein the first and second parts are wearable on separate hands of a Duchenne muscular dystrophy (DMD) patient so that the two parts are physically unconnected and are not constrained to operate on a work surface.

[0009] In another embodiment, the first part comprises two or more appendages that are dimensioned to fit over a thumb and/or finger. Each appendage contains a membrane switch. In one embodiment, the membrane switch is operable against a lap of a patient and the second part is similarly operable on the lap so that each hand can assume its relaxed posture depending on the degree of muscular dystrophy of a DMD patient. In another, the membrane switch is operable against a support surface. In yet another, the membrane switch is operable by bending an associated finger.

[0010] In another embodiment, two membrane switches are connected serially by a wire to a connector box. In another, two membrane switches are connected in parallel to a connector box via a respective USB. The connector box comprises a battery and a wireless transmitter. The second mouse part also comprises a battery and a wireless transmitter.

[0011] In yet another embodiment, the first mouse part is configurable for wearing on a left hand whilst the second mouse part is configurable for wearing on a right hand. In another embodiment, the first mouse part is configurable for wearing on a right hand whilst the second mouse part is configurable for wearing on a left hand.

[0012] Advantageously, the wearable two-hands mouse 10 of the present invention does not require a flat or defined working surface that is associated with a conventional mouse. The two-hands mouse is wearable on both hands of a DMD patient so that the hands are supported on one's lap and they are in their natural relaxed postures, instead of being stretched out on a table surface. Alternatively, the DMD patient can activate the mouse 10 against a surface, such as a handrest of a wheelchair or furniture on which the patient sits. In addition, the two parts 10a, 10b of the two-hands mouse 10 are separate units that are not physically constrained, thus allowing each hand to assume a posture independent of the other. With the present invention, a user does not need to grip a mouse device with a hand; instead, the functions of a conventional mouse are separately operable with both hands; in addition, the mouse clicks are configurable with a thumb and finger or any two fingers depending on agility and deformity of one's hand.

Brief Description of the Drawings

[0013] This invention will be described by way of non-limiting embodiments of the present invention, with reference to the accompanying drawings, in which:

[0014] FIGs. 1A and 1B illustrate a wearable two-hands mouse, with hands in supinate position, in accordance with an embodiment of the present invention;

[0015] FIG. 2 illustrates position of the wearable two-hands mouse shown in FIG. 1 on a lap of a user;

[0016] FIG. 3 illustrates functions of the wearable two-hands mouse shown in FIG. 1 in the form of a block diagram;

[0017] FIG. 4 illustrates another two-hands mouse with left hand clicking operable with a thumb in accordance with another embodiment of the present invention; and

[0018] FIG. 5 illustrates yet another two-hands mouse with left hand part integrated in a hand glove in accordance with another embodiment of the present invention.

Detailed Description

[0019] One or more specific and alternative embodiments of the present invention will now be described with reference to the attached drawings. It shall be apparent to one skilled in the art, however, that this invention may be practised without such specific details. Some of the details may not be described at length so as not to obscure the invention. For ease of reference, common reference numerals or series of numerals will be used throughout the figures when referring to the same or similar features common to the figures.

[0020] FIGs. 1A and 1B show a wearable two-hands operation mouse 10 according to an embodiment of the present invention. As shown in FIGs. 1A and 1B, the two-hands operation mouse 10 is made up of two parts, a first part 10a is wearable on the left hand whilst a second part 10b is wearable on the right hand. FIG. 2 shows the two-hands operation mouse 10 in use on a DMD patient's lap. FIG. 3 shows functionalities of the first and second mouse parts in the form of block diagrams. As shown in FIGs. 1A, 1B, 2 and 3, the left hand part 10a includes a connector box 12 that is wearable on a back of one's wrist with an aid of an adjustable band 14. Connected to the connector box 12 are two wires 16. Each of the wire 16 is in turn connected to each of two finger gloves 18, 19. Each finger glove 18,19 is dimensioned to fit over on a thumb or finger for wearing it on the thumb or finger. Each finger glove 18,19 contains a membrane switch 20, which is operable with the ball of the relevant thumb or finger when the left hand is in a prone position. In an embodiment, the wires 16 are connected in parallel by Universal

Serial Bus (USB) to the connector box 12 via a left hand sensory electronic circuit 26. As shown in FIG. 3, the connector box 12 contains a battery 22 and wireless transmitter 24. In another embodiment, the membrane switches 20 in the two finger gloves are interconnected serially by a wire 16a and the connector box has only one wire 16 connection.

[0021] Again referring to FIGs. 1A, 1B, 2 and 3, the right hand part 10b is made up of a navigation body 32, which houses an optical sensor 30. The navigation body 32 is wearable on the palm of the right hand with an aid of another adjustable band 14a. As shown in FIG. 3, the navigation body 32 also houses a battery 22a and a wireless transmitter 24a. The wireless transmitter 24, 24a are communicable with a wireless receiver 40, which is connected to a computer or gaming device 50.

[0022] In use, the optical sensor 30 is used to navigate a mouse pointer whilst the membrane switches 20 in the finger gloves 18,19 are operable to make a selection by clicking. For example, the membrane switches 20 are configured to emulate separate right and left hand buttons of a conventional mouse. In contrast, the wearable two-hands mouse 10 of the present invention does not require a flat or defined working surface that is associated with a conventional mouse. As shown in FIG. 2, the two-hands mouse 10 is wearable on both hands of a DMD patient so that the hands are supported on one's lap and they are in their natural relaxed postures, instead of being stretched out on a table surface. Instead of activating the wearable mouse 10 against one's lap, the DMD patient can activate the mouse 10 against a surface, such as a handrest of a wheelchair or furniture on which the patient sits. In addition, the two parts 10a, 10b of the two-hands mouse 10 are separate units that are not physically constrained, thus allowing each hand to assume a posture independent of the other. The posture of each hand depends on the degree of deformity of the respective hand. With the present invention, a user does not need to grip a mouse device with a hand; instead, the functionalities of a conventional mouse are separately operable with both hands; in addition, the mouse clicks are configurable with a thumb and finger or any two fingers depending on agility and deformity of one's hand.

[0023] FIG. 4 shows a left hand part 100a of a wearable two-hands mouse 100 according to another embodiment of the present invention. As shown in FIG. 4, the left hand part 100a is made up of two finger gloves 118, 119, each having a membrane switch 120. Instead of pressing the membrane switch 120 against a support surface, be it a lap of a patient or a surface of a chair on which a patient sits, as in the earlier embodiment, the patient activates a membrane switch 120 by pressing it against one's thumb.

[0024] FIG. 5 shows a left hand part 200a of a wearable two-hands mouse 200 according to another embodiment of the present invention. Comparing the two-hands mouse 200 with that of the earlier embodiment, the left hand part 200a is made up of a glove 210 that is wearable on the left hand. In one embodiment, the glove 210 has three appendages corresponding to the thumb and two fingers. This embodiment is advantageous when deformity of one's hand does not allow a DMD patient to use a five-appendages glove. Accordingly, an associated connector box 212 is attached to the glove and wearable on a back of the left hand. In another embodiment, the glove 210 has two to five appendages.

[0025] In the above embodiments, the left hand part of the two-hands mouse is configured for clicking selection whilst the right hand part is configured for navigation. It is possible that the functionalities of the two parts are configured interchangeably, depending on preference of a DMD patient.

[0026] While specific embodiments have been described and illustrated, it is understood that many changes, modifications, variations and combinations thereof could be made to the present invention without departing from the scope of the invention. For example, the two-hands mouse is shown to communicate wirelessly with a computer or gaming device; in an embodiment, such communication may be via a wire or optical cable. In another example, the right hand navigation body may be worn around the wrist instead of the palm. In yet another example, the membrane switches 20, 120 are not depressed against one's lap or surface of a wheelchair but are activated by bending a respective thumb and/or finger.

CLAIMS:

1. A wearable two-hands operation mouse comprising:

a first part emulating selection by clicking, wherein the first part comprises two finger gloves each with a membrane switch that emulates either a left-hand or right-hand click selection, a connector box, a first battery, a first wireless transmitter, and one or two wires, wherein the one or two wires connect the finger gloves to the connector box, wherein the first battery and first wireless transmitter are disposed within the connector box, and wherein the two finger gloves are worn on two fingers of one hand of a user, and the connector box is configured to be wearable on the back of the one hand's wrist;

a second part for navigating a pointer, wherein the second part comprises a navigation body, an optical sensor, a second battery and a second wireless transmitter, where the optical sensor, second battery and second wireless transmitter are disposed in the navigation body, wherein the navigation body is worn on the balm of the other hand of the user with an adjustable band so as to move the pointer by moving the other hand of the user over a surface;

so that the first part and the second part are physically unconnected and are not constrained to operate on a work surface; wherein, when the first part and second part are activated the user, the signals are transmitted wirelessly to a wireless receiver that is electronically coupled to a computer or gaming device.

2. A wearable two-hands operation mouse according to claim 1, wherein the membrane switch is operable against a lap of the user and the second part is similarly operable on the lap so that each hand can assume its relaxed posture depending on the degree of muscular dystrophy of a DMD patient.

3. A wearable two-hands operation mouse according to claim 1, wherein the membrane switch is operable against a support surface.

4. A wearable two-hands operation mouse according to claim 1, wherein the membrane switch is operable by bending an associated finger.

5. A wearable two-hands operation mouse according to claim 1, wherein the two membrane switches are connected serially to the connector box.
6. A wearable two-hands operation mouse according to claim 1, wherein the two membrane switches are connected in parallel to the connector box.