AN ARRAY OF ELEMENTS
AND
A HUMAN-COMPUTER INTERFACE DEVICE

FIELD OF INVENTION

Various embodiments of the invention relate to an array of elements and to a human-computer interface device. The array may comprise at least four elements to form a grid, wherein each element of the grid may be pivotally coupled to each adjacent element in the grid.

BACKGROUND

Known input devices, such as keyboards, computer mice, gaming pads, and electronic musical instruments, facilitate human-computer interfacing. These input devices are typically capable of controlling the operation of a computer, wherein a user can control the computer by pushing, gripping, and/or moving the input devices.

These known input devices usually comprise a structure having fixed physical properties, such as, shape and/or size. Accordingly, the level of human-computer interaction provided by these known input devices is relatively limited.

A need therefore exists to provide a human-computer interface device and a structure thereof which seeks to address at least one of the abovementioned problems.

SUMMARY

According to one aspect, there is provided a human-computer interface device, comprising: an array of elements, wherein each element is pivotally coupled to an adjacent first element by a first pivotal coupling and to an adjacent second element by a second pivotal coupling, the first pivotal coupling being operable to pivot about an axis which is substantially orthogonal to an axis about which the second pivotal coupling is operable to pivot; and one or more actuators configured to displace one or more elements of the array.

Various embodiments provide an array of elements, wherein each element is pivotally coupled to an adjacent first element by a first pivotal coupling and to an adjacent second element by a second pivotal coupling, the first pivotal coupling being operable to pivot about an axis which is substantially orthogonal to an axis about which the second pivotal coupling is operable to pivot.

In an embodiment, at least four elements may be arranged to form a grid, each element of the grid may be pivotally coupled to each adjacent element in the grid.

IN THE CLAIMS:

1. A human-computer interface device, comprising:
an array of elements, wherein each element is pivotally coupled to an adjacent first element by a first pivotal coupling and to an adjacent second element by a second pivotal coupling, the first pivotal coupling being operable to pivot about an axis which is substantially orthogonal to an axis about which the second pivotal coupling is operable to pivot; and
one or more actuators configured to displace one or more elements of the array.

2. The human-computer interface device as claimed in claim 1, wherein at least four elements are arranged to form a grid, each element of the grid being pivotally coupled to each adjacent element in the grid.

3. The human-computer interface device as claimed in claim 2, wherein the grid has a square shape.

4. The human-computer interface device as claimed in claim 2, wherein the grid has an elongate shape.

5. The human-computer interface device as claimed in claim 1, wherein each first pivotal coupling is operable to pivot about the same axis to prevent each second pivotal coupling from pivoting.

6. The human-computer interface device as claimed in claim 1, wherein adjacent elements are arranged side-by-side.

7. The human-computer interface device as claimed in claim 1, wherein the first pivotal coupling is disposed substantially orthogonal to the second pivotal coupling.

8. The human-computer interface device as claimed in claim 1, wherein at least one pivotal coupling is capable of only one degree of freedom.

9. The human-computer interface device as claimed in claim 1, wherein at least one pivotal coupling comprises at least one hinge.

10. The human-computer interface device as claimed in claim 1, wherein at least one element comprises a substantially planar square shape having pivotal couplings positioned at a side portion thereof.

11. The human-computer interface device as claimed in claim 1, wherein at least one element has at least one beveled side portion.

12. The human-computer interface device as claimed in claim 1, the device comprising a controller configured in use to provide an output signal.

13. The human-computer interface device as claimed in claim 12, the device comprising at least one sensor in communication with the controller, the at least one sensor being operable to detect the relative displacement between at least two elements of the array and provide a corresponding signal to the controller, wherein the controller is operable to provide the output signal in dependence on the corresponding signal.

14. The human-computer interface device as claimed in claim 12, further comprising at least one button disposed on an element of the array, the at least one button being in communication with the controller, wherein the controller is operable to provide the output signal in dependence on activation of the at least one button.

15. The human-computer interface device as claimed in claim 12, further comprising at least one accelerometer for detecting motion of the human-computer interface device, the at least one accelerometer being in communication with the controller,

wherein the controller is operable to provide the output signal in dependence on a signal received from the at least one accelerometer.

16. The human-computer interface device as claimed in claim 12, further comprising an output device in communication with the controller, the output device being configured to receive the output signal and provide an output in dependence thereon.

17. The human-computer interface device as claimed in claim 16, wherein the output comprises a sound and/or tactile feedback.

18. The human-computer interface device as claimed in claim 1, further comprising a host computer interface device for enabling data transfer between the human-computer interface device and the host computer.