System I4Control®

Contactless control of personal computer

WWW.I4CONTROL.EU
System overview

- Contactless control of PC using eye or head movements
- Intended mainly for motoric handicapped users
  - After injury (e.g. head injury, spinal cord injury originating paraplegia or quadruplegia, amputation of upper members…)
  - After diseases (ALS, cerebral palsy, multiple sclerosis, muscular dystrophy (MD), spinal muscular dystrophy…)
- Simple and intuitive manipulation
- Small and easily portable device, which does not limit the user
- Universal instrument with modular structure
System I4Control®

- Simple and small device for PC control
- Basic idea
  - Placement of a camera right on the person’s head
  - Scanning of eye position independent of system of coordinates (deviations of equilibrium position)
User profile

- Time responses
- Speed of cursor movement
- Calibration type
- Mapping of movements and actions
- Tools for simplification of application control
- Several types of keyboards
- Application look
Calibration

- = relation definition between system and user
- Only once at the beginning when first working with the equipment
- Automatic x manual
Cursor movement

- Deviation of equilibrium position ⇒ eye determines the direction of movement (like a joystick handler)
- Eye movement x head movement
Mouse replacement

- Simple movements
- One click by left mouse button
- Double click by left mouse button
- Right click of mouse
- Drag & drop function
- Scrolling ball
- Triple click
- Quad click
- Dwell time
Simplified control

- Dwell time
- Automatic scanning
Icons on desktop
Writting

- Simple editor for non-formatted text
- Different types of keyboards
- Menu with functions for easier control
Communication

- Special keyboard
  - Frequency
  - Predictable
  - Pictogram (Sound alternative communication)
For children

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[Image of a keyboard layout with colorful keys representing letters and symbols for children.]
Web browser

The camera records and evaluates on-line positions of the user's eye, when the eye is within the stable position it sends over the signal "stop", otherwise the signal "proceed in the same direction" is generated. As long as the eye is outside of the stable position, the system repeats at the time of the same signal which moves the cursor on the screen corresponding to the present position of the eye with respect to the placement of the camera. The cursor can be stopped, of course, the corresponding signal is closing and it emulates click on desktop. Both signals are activated by leaning the eye moved for sufficiently long period (the corresponding time parameter can be set individually to filter out spontaneous blinking).

The main advantages of the system are simple installation and usability, mobility as well as universality of the system, which can be connected to any computer through the USB interface. Last but not least, it also monitors one of the system’s parameters.

Technology is ensured through an exchange of information, which can be achieved using different types of communication media. The input data are provided to a technical system through various peripherals, e.g. a keyboard, mouse, light pen or a touch screen. In comparison to other systems, which require human actions using standard peripherals, we are using a voice recognition system.
Limitations

- Difficult detection of pupil → pre-learned algorithm
- Hang down palpebra = visible small part of eye
- Need to correctly position the user
Certification

- Medical device
- Declaration of conformity CE
The minimum recommended configuration of the PC:

- Pentium III with clock frequency 500 MHz
- 1GB memory
- Operating system Microsoft Windows 2000 or newer
- USB ports
Commercial availability


☐ Producer: Medicton Group Ltd.
Users