

Foot Mouse

Degree programme : BSc in Micro- and Medical Technology | Specialisation : Medical technology
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Not all situations allow the hands to operate a mouse, therefore a mouse controlled by a foot would serve as an alternative. This bachelor study focuses on the developement of a foot-mouse prototype fully integrated in shoe and how it competes with regular hand mice.

Motivation

With the digitalization moving forward, computers are used in a variety of work environments where hygiene is the top priority such as hospitals, dental offices and the food industry.

The use of a conventional hand mice is a possible source of contamination. With a foot mouse, the interaction with a computer is possible while using the hands for another task and reducing the risk of contamination.

A foot mouse could also be used to increase productivity as the hands do not need to move away from an important task to control a mouse.

Lastly, people with a disability or a temporary injury, who cannot use their hands, could profit from the foot mouse.

Goals

The goal is to develop and test a prototype of a mouse that is controlled by a foot. It is fully integrated in the sole of a shoe worn in an office environment. The prototype must have similar functionality as wireless hand mice. Additional features that shall be incorporated include an activation feedback for the left and right buttons, and an activation system to prevent unwanted input.

Methods

Different methods are investigated and compared. A first simple prototype was realized based on a disas-

sembled optical mouse. The left click is realised using an adjustable strap being engaged by lifting the front of the foot.

Further studies include experiments with a pressure sensitive trackpoint and a movement sensor controlled by an Arduino compatible microcontroller. Using a mouse accuracy test program, the limit performance of the foot mouse is evaluated and compared with traditional pointing devices.

Results

The results show, that it is possible to operate a computer using a foot mouse. An individual time for training is necessary.

Although the performance is significantly slower than hand mice, an accurate movement and a reliable click system was achieved.

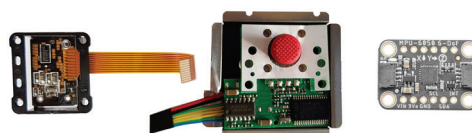
Optimizing the fit of the shoe and the quality of the sensor will further improve speed, reliability and make utilization of such a foot mouse less tiring.



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Foot mouse on a right foot



3 different sensor technologies: Optical sensor (left), Trackpoint, (middle) and Movement sensor (right)