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# Fixed-gaze head movement detection for triggering commands

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## Abstract

In the field of human-computer interaction, mobile eye-tracking devices (carried on a pair of glasses) can be used to interact with an object remotely, in mobility, while keeping both hands free to perform the main activity. This process allows us to interact with objects beyond our reach and sometimes it can be faster than a traditional interaction. On the other hand, as the main task of the eyes is to observe the environment, it becomes difficult to differentiate a simple observation of an object in the scene from the will to interact with it (Midas touch). To solve this problem, solutions have been proposed in the literature, such as the use of voluntary eye movements, the use of smooth pursuit, or coupling the eye-tracking with a secondary device. In this context, our study focuses on the analysis of voluntary head movement when the user's eyes are fixed on the object of interest to trigger various commands. In order to evaluate the appropriateness of this approach in realistic situation and to evaluate its performance, we have conducted a test of the detection of 6 different fixed-gaze head movements on 40 people: head shaking (right, left), nodding (up, down) and tilting (right, left). During this test, we asked the participants to learn quickly these six movements, then to trigger various commands using these movements. The success rate is 70%, but this rate depends on the individuals and the gestures performed. As these movements are rarely used during the observation of an object, the problem of Midas touch can be avoided, while keeping both hands free.

**Keywords:** eye tracking, human computer interaction, fixed gaze head movements

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