Title (tentative): Binocular eye tracking and point of regard in the 3D environment

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Description

Motivation and application domain

Commercial eye trackers have an accuracy of approximately 0.5 degrees. Even if this accuracy is reasonable in monocular tracking, the measurement error between the two eyes sums in binocular tracking, resulting in an unreliable estimate of the point of regard in the three-dimensional space.

The proposed thesis project will focus on developing hardware and software tools for binocular eye tracking, that would provide a robust and reliable estimate of the three-dimensional point of regard.

General objectives and main activities

The objective of the thesis project is to analyze the criticisms of current technologies for binocular eye tracking and to develop possible solutions to increase accuracy, precision and usability of such technologies. The student will design and implement possible enhancements at hardware and/or software level and will test and validate their effectiveness against state-of-the-art technologies. These methodologies will be specifically aimed at increasing the accuracy and precision of the computation of the point of regard in the three-dimensional space, rather than on a flat two-dimensional computer screen. The obtained methodologies will be eventually used in case studies, like the use of the device in natural environments or for the analysis of vergence/version interactions.

Training Objectives (technical/analytical tools, experimental methodologies)

The student will learn to employ different methodologies and instrumentations, including:

- Eye tracking
- Imaging technologies
- Computer vision
- Psychophysics

Place(s) where the thesis work will be carried out: Banks Lab, School of Optometry and Vision Science, University of California at Berkeley, Berkeley, U.S.

Additional information

Maximum number of students: 2

Financial support/scholarship: borse Fondo Giovani per la mobilità finalizzata a ricerca tesi in Paesi extra UE