BlickBrowser → GazeTK/Blinker

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OpenSource Framework for Gaze-Based Interaction for the Web

Motivation

Eye-gaze can be used as an alternative to traditional interaction methods with computer systems. This is in particular interesting for people who are not able to use their hands to interact with a computer or in situations in which using the hands is not an option.

A prominent user group are handicapped people. But there are also people to whom using their hands for interacting with the computer is not convenient, e.g. medical doctors during surgeries, pilots or drivers during demanding maneuvers, or in private life, e.g. while kneading dough during baking.

In addition to being a surrogate for mouse interactions, gaze may also be used as a complementary modality in addition to traditional modalities.

While eye-tracking systems are entering the consumer market at the moment, software and applications for gaze-based interaction are typically tied to a particular eye-tracking system.

What is GazeTK / Blinker?

The aim of the OpenSource project GazeTK is to provide a framework for gaze-based interaction with desktop applications. The project has been initiated at CITEC in the beginning of 2015, starting with the Master Thesis of Dimitri Heil.

The GazeTK framework consists of several components:
- **Device Connectors** provide the bridge between proprietary eye-tracking APIs and the GazeTK framework.
- **Blinker** is a web-browser extension that provides basic gaze-based interaction techniques for browsing the web.
- **BlinkUI** is a user-space API for web developers, which can be used to create gaze-enabled websites.

Supported Eye-Tracking Systems (July 2015):

- SMI RED-m
- The EyeTribe
- MyGaze
- ... many more to come

What is it good for?

While basic gaze-based interactions are already working, at the time being we consider GazeTK / Blinker as a prototype for enthusiasts.

In our opinion, GazeTK / Blinker has the potential to accelerate research in the area of gaze-based interaction:
- by providing a common API **supporting different eye-tracking** systems, without being vendor-specific.
- by offering a simple **user-space API for web applications**, which allows interaction designers with little to none programming skills to think about and make use of gaze-based interaction.

We envision, e.g., that new algorithms for gaze-based interaction may be implemented on top of or as part of GazeTK and are made available as part of the GazeTK OpenSource distribution. This would simplify the evaluation and validation of scientific achievements in this domain and at the same time support the dissemination of the results to interaction designers.

Up to 1,500.- EUR for contributing to the project!

This project has been selected to be supported by the **CITEC Month of Open Research (CITEC MORe)**.

If you are an international student from outside Germany, you may apply for participation. If accepted you may receive up to 1,500.- EUR for your contribution to the project. Further details on this initiative are on the website linked below.

Example contributions are:
- support for more eye-tracking devices
- implementation of support for Chrome or other browsers

Deadline for application: August 21, 2015!
Link for further information and application:
- **https://cit-ec.de/more**

Blinker: Gaze-based Browsing

BlickBrowser has been superseded by Blinker since submission to the SMI Programming Contest. It is an extension for Mozilla Firefox which connects to a GazeTK device connector to provide eye movement data for gaze-based interaction in real-time to the browser.

Some of its features that are applicable for any web page are described below:

Auto-Scrolling
Whenever the user gazes in a defined upper or lower area (visualized by the blue area in the image to the right), scrollable webpages are automatically scrolled to follow the reading direction.
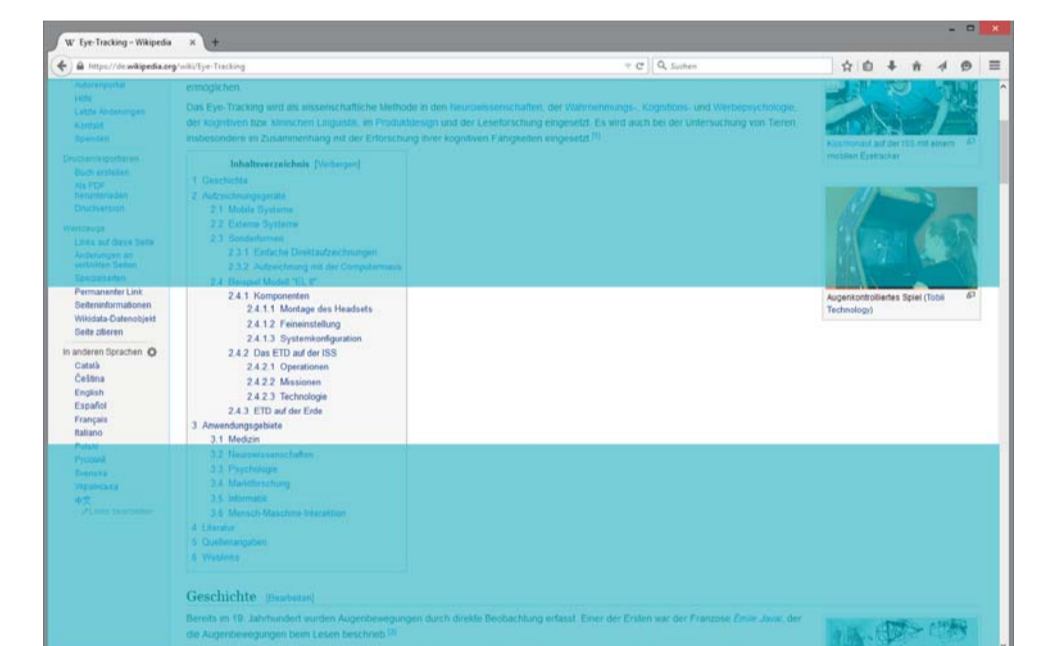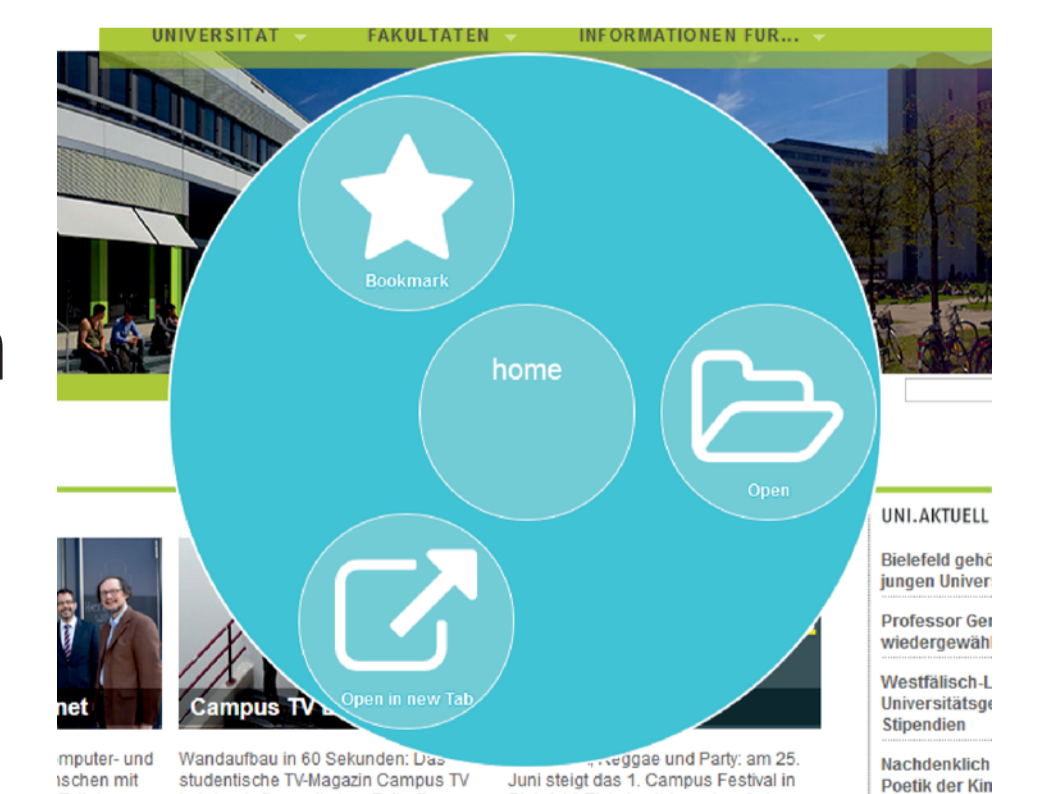
Gaze-enabled Main Menu
Gazing on the title area opens a menu supporting the most important functions required during web browsing with UI elements suitable for easy gaze selection.
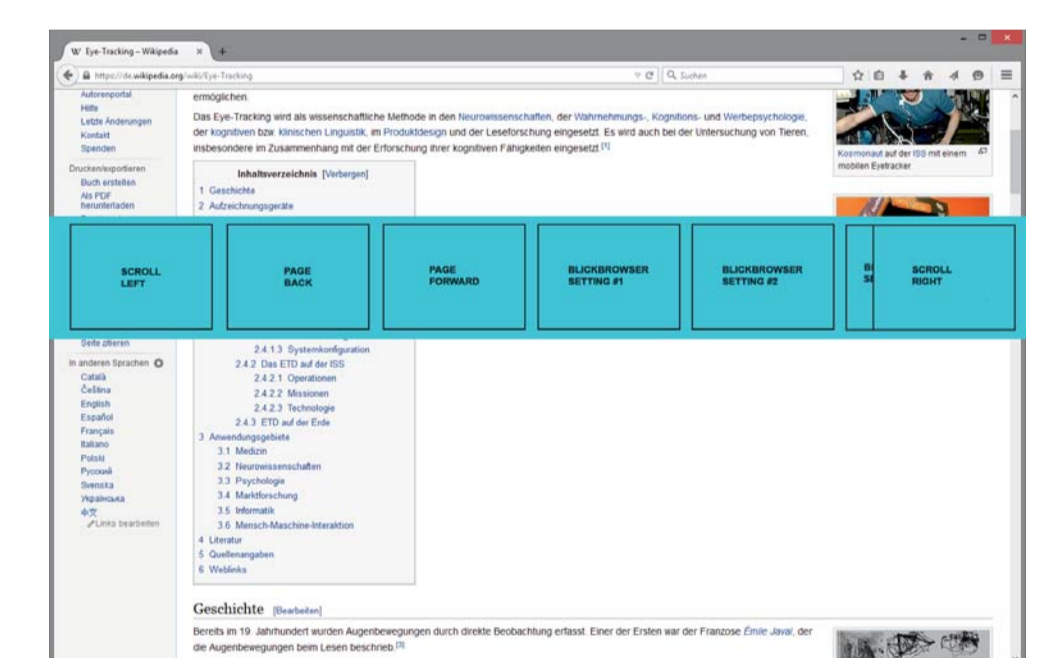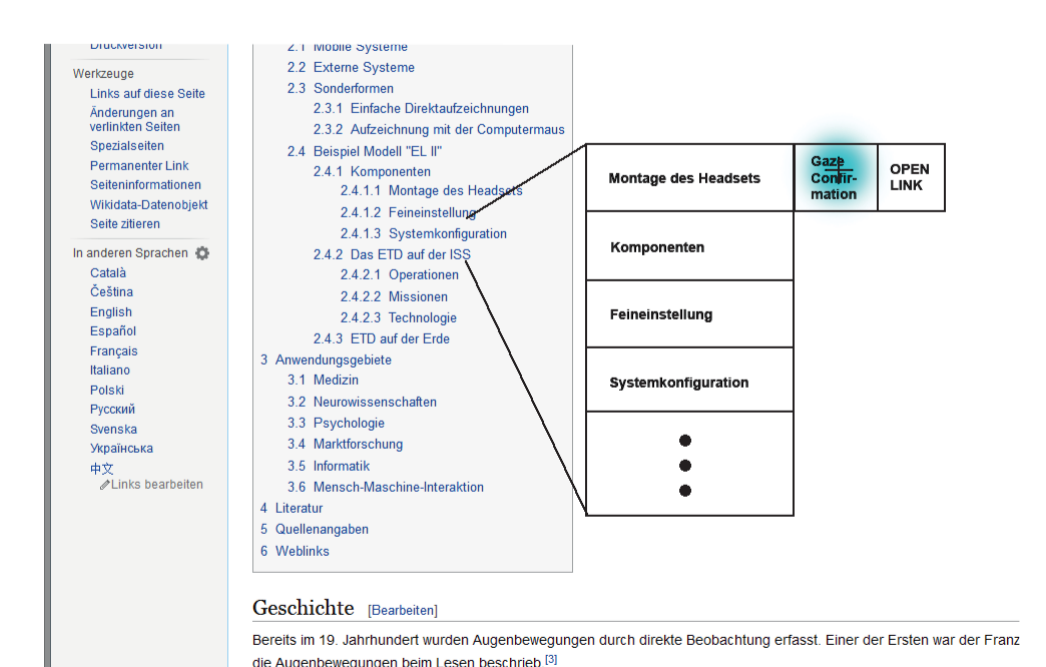
Gaze-enabled Page Menu
Blinker offers a page-specific menu supporting page-specific user functions with a pie menu for easier selection.

Smart Gaze-Zoom for Link Selection
All hyperlinks within an area around the current fixation are extracted and presented in a convenient way (e.g. larger) for gaze-based selection.

In addition to these examples, blinker supports gaze-gestures, hot areas for triggering actions, client-based calibration and many more features.

More Information about GazeTK/Blinker:
- **https://opensource.cit-ec.de/projects/gazetk**