Recommendation and Collaboration through Implicit Feedback

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In the field of e-learning, the identification of difficult and/or interesting parts of learning text can be a useful feature for tasks like rewriting learning text, displaying focus or providing adaptive help to student. In our work, we track implicit feedback/interest indicators including scrolling (read wear [1]). Using data collected from many users, we can determine which fragment of the document is the most time-consuming and therefore interesting and/or difficult. As in any method dealing with time-based user tracking, there is a possibility that the user is pursuing different activities during assessed time periods. We try to avoid this by using low-cost webcam and employing physical user tracking – gaze tracking. This way we can exclude time periods when the user is not directly using computer or when he/she is at the computer but working with different application. The gaze detection also increases precision of fragment identification as an additional implicit interest indicator [2].

Collected interest data combined into an attention index can be used in various scenarios:

- *Interesting fragments visualization and summarization*, only fragments with highest attention index are highlighted or selected. Users can quickly scan through document either on first read or on revisit.
- *Adaptive guide to (learning) application*, user's work with web system is evaluated and adaptive hints are provided. If user notices recommended items with his gaze, but does not use them, different advice is provided than when he did not notice recommendations at all. Also explicit feedback questions can be asked the same way. Hints or questions adapted to current situation should make the user respond more easily.
- *Augmented instant message communication*, users are provided with reading positions of their peers in the same document. Students observe who is possibly stuck on the same fragments and cooperation can be encouraged.

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Spring 2011 PeWe Workshop, April 1, 2011, pp. 29–30.

We implement gaze tracking using open source gaze tracker OpenGazer as a standalone C++ and .NET desktop application due to webcam access and required processing power. We collect interest indicators via custom extension of Firefox web browser (Fig. 1). This extension is connected to the gaze tracking via local client-server communication using sockets. In order to save web application's resources, we filter and process collected feedback in the extension, but unprocessed feedback is also stored for offline analysis and review on an independent server.

We have already partially evaluated the gaze tracking alone and incremental parts of the implementation. Currently we are working towards the evaluation of a complete solution via ALEF Adaptive LEarning Framework and possibly on the open Web.

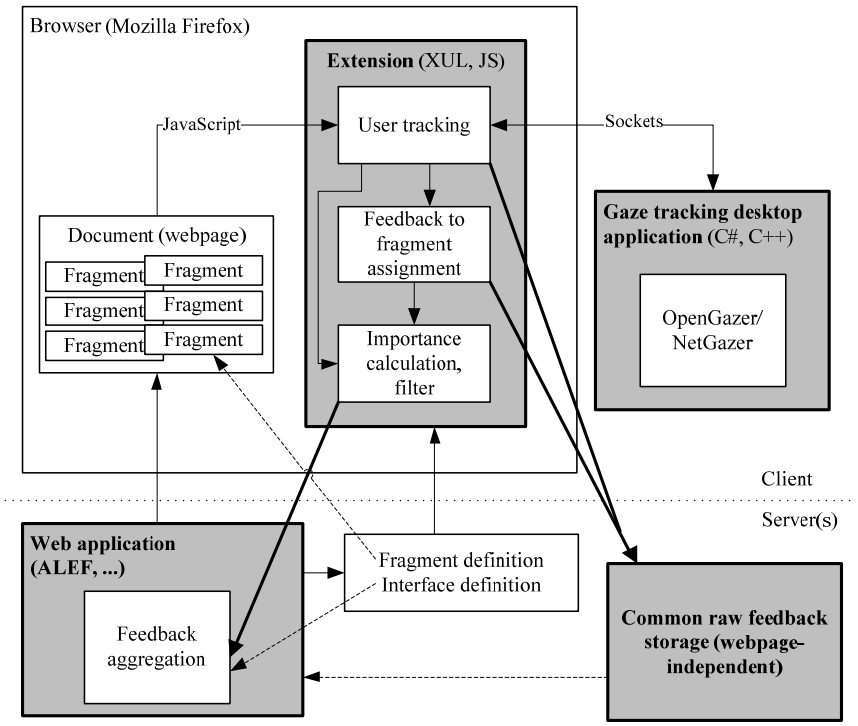

Figure 1. Overview of feedback collection architecture and technologies used.

Acknowledgement. This work was partially supported by the Cultural and Educational Grant Agency of the Slovak Republic, grant No. KEGA 028-025STU-4/2010.

References

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