

Facilitating Learning on the Web

Martin GREGOR *

*Slovak University of Technology in Bratislava
Faculty of Informatics and Information Technologies
Ilkovičova 2, 842 16 Bratislava, Slovakia
greczsky@gmail.com*

Today, we have many opportunities to learn something new. One of the most preferred ways of learning is Web, where we gain information through reading articles on the Web. This type of learning is a part of life-long learning, which can be supported by computers and technology [6]. One of the analyzed problems is inaccuracy of user knowledge modeling, which can support learning on the Web. Web browsing requires user interaction (obviously). User interaction can be observed and measured as feedback from a user. This type of feedback, which does not require any additional effort from user, is called implicit feedback. Typical implicit interactions on the Web are for example clicks, text selections, moves, scrolls, time spent on page. From implicit feedback we can deduce what user reads and what he learns.

Feedback collection and evaluation is one of approaches used to user modeling. The basis of every personalized educational system is user model [5], specifically user knowledge model and collection of implicit and explicit feedback [1]. System stores information about knowledge of a user in his/her model. The most important thing for personalization of educational system is the precision of user knowledge model that is used for personalization. Inaccuracy of user knowledge model is a main problem of educational systems. Information in user knowledge model is deduced from interaction data originating in implicit and explicit feedback.

We can deduce information from implicit feedback on two levels [2]. The lower level is information deduction from one elemental interaction of user. The higher and better level is information deduction from combination of some interactions which user did. Implicit feedback is easily obtainable and trustworthy but it is sometimes really difficult to deduce information about user [2]. The second type of feedback is explicit feedback which requires additional effort from user, for example answering the questions, providing some ratings. On the other hand, we can consider untrustworthiness caused by wrong motivated user intent among disadvantages. Advantage of explicit feedback is possibility to check correctness of implicit feedback.

Our aim is to propose and evaluate a method of user knowledge modeling on the web. In this work we focus on the area of term learning on the Web (this covers wide

* Supervisor: Marián Šimko, Institute of Informatics and Software Engineering

range of application, e.g., technical vocabulary acquisition, foreign language learning, etc.). Our solution extends existing model and method of user behavior monitoring [4] and collects and evaluates implicit feedback from generic implicit indicator inspired by the work of [3]. Our main idea is to monitor a number of mouse entries (“mouseenters”) to an area of interest of a web document. We use this number to predict what user reads and what user learns. In addition, we proposed a collection of specific implicit indicators for domain of term learning as well as method for their processing into the user model. These two implicit indicators are translation of term by user and term exploration by user.

The main contribution of our approach is term-based user knowledge modeling based on a number of mouseenters to an area of a document. The number of mouseenters to document areas is a novel implicit feedback indicator which we have proposed as a result of our research including several small experiments. The preliminary results show that this indicator outperforms state-of-the-art indicators utilized for predicting user’s reading behavior.

To date, we have implemented our method as a JavaScript library. In addition, we have already done a preliminary experiment to evaluate partial hypotheses of our approach. Our future work covers conducting a more complex experiment to evaluate the stated high-level hypotheses.

Extended version was published in Proc. of the 10th Student Research Conference in Informatics and Information Technologies (IIT.SRC 2014), STU Bratislava, 143-148.

Acknowledgement. This work was partially supported by the Cultural and Educational Grant Agency of the Slovak Republic, grant No. 009STU-4/2014.

References

- [1] Brusilovsky, P.: Methods and techniques of adaptive hypermedia. *User Modeling and User-Adapted Interaction*, 1996, vol. 6, no. 2-3, pp. 87–129.
- [2] Claypool, M., Le, P., Wased, M., Brown, D.: Implicit interest indicators. In: *Proc. of the 6th int. conf. on Intelligent user interfaces*. IUI ’01, New York, NY, USA, ACM, 2001, pp. 33–40.
- [3] Hauger, D., Paramythis, A., Weibelzahl, S.: Using Browser Interaction Data to Determine Page Reading Behavior. In: *User Modeling, Adaption and Personalization*. Volume 6787 of Lecture Notes in Computer Science. Springer Berlin Heidelberg, 2011, pp. 147–158.
- [4] Horváth, R., Simko, M.: Enriching the Web for Vocabulary Learning. In: *Proc. of 8th European Conf. on Technology Enhanced Learning, EC-TEL*, 2013, pp. 609–610.
- [5] Tozman, R.: Learning in the Semantic Web. *eLearn*, 2012, vol. 2012, no. 3.
- [6] Trilling, B., Fadel, C., for 21st Century Skills., P.: *21st century skills: learning for life in our times*. Jossey-Bass, San Francisco, 2009.