

Learning About the Online Learner (Statement of Interest)

Rafi Nachmias

Tel Aviv University
School of Education
Ramat Aviv 69978, Israel
Tel: +972-3-6406532

nachmias@post.tau.ac.il

Arnon Hershkovitz

Tel Aviv University
School of Education
Ramat Aviv 69978, Israel
Tel: +972-3-6407801

arnonher@post.tau.ac.il

ABSTRACT

Our main focus is to establish and implement a research framework, both theoretically and empirically, for employing Web mining techniques on Web-based learning environments, in order to detect teaching and learning behaviors in such systems.

Categories and Subject Descriptors

K.3.1 [Computer and Education]: Computer Uses in Education – *distance learning*. H.2.8 [Database Management]: Database Applications – *data mining*.

General Terms

Algorithms, Measurement, Human Factors.

Keywords

Web Usage Mining, Web-Based Learning, User Tracking, Learner Behavior.

1. WEB MINING IN EDUCATION

Integration of Web-based learning environments (WBLEs) into educational processes has been rapidly increasing during the last decade. The models of implementation are varied and include, among others: websites supporting face-to-face courses, asynchronous on-line instruction, and virtual learning communities focusing on communication among participants. (For an overview on WWW in education see [1]). While implementing these models, data on the user's behavior constantly accumulate in the servers' Web logs. Our major challenge in this field is to develop and apply Web usage mining techniques in order to analyze this data and to map patterns of learning in WBLEs. We especially want to explain the variability in usage parameters (e.g., time-on-task, pace of learning, type and order of pages viewed, and emotional and motivational behavior), examining instructional factors and personal learner parameters. Finally, we seek for ways to use this information to improve Web-based learning.

2. RESEARCH FRAMEWORK

Since 1998, our research group at the Knowledge Technology Lab in Tel Aviv University, has been investigating various aspects of Web-based learning, employing Web mining techniques (particularly Web usage mining). Our research framework defines four levels of interest: (a) *global system-level view*: evaluating the usage of the system by all its users after a defined period of time; (b) *system-level usage patterns*: examining changes in system usage over time or over structure; (c) *global learner-level view*: analyzing the overall activity of a particular user, looking for differences among learners based on personal parameters; and (d)

learner behavior patterns: investigating a particular learner's explicit activity throughout the learning process.

3. PREVIOUS AND CURRENT RESEARCH

We briefly mention here some of the studies carried out in our lab. Investigating content usage by university students in Web-supported learning [2], we have shown significant individual differences in viewing content items presented on course Websites. In another study, a model for evaluating the cost-effectiveness of blended learning using on-line Web log data is currently under development and validation [4]. In another research [3], we developed and used a model for page usage in a course hierarchy: every time a student views a page, a (virtual) dot is added to the page. A significant decrease has been found in page views in three directions: as a course progresses, as a lesson progresses, and as a topic deepens. In a current research [5], we are trying to map different online learning behaviors, referring to a comprehensive set of variables. Then, we will try to connect those patterns to both cognitive and affective factors, some of which will be measured throughout the learning process. We hope this will give us an insight into the learner's personal characteristics during the online learning process; this would allow us in the future to evolve a learner/user profile by using the mined online data.

These studies are part of our main effort to develop a more comprehensive understanding of the effects of learner characteristics on learning behavior.

4. REFERENCES

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