

# Recognition of Web user's Behavioural Patterns

Tomáš CHOVAŇÁK\*

*Slovak University of Technology in Bratislava  
Faculty of Informatics and Information Technologies  
Ilkovičova 2, 842 16 Bratislava, Slovakia  
xchovanak@stuba.sk*

User's behavioural patterns represent typical repeating behaviour of website users. Identified behavioural patterns may be used to reveal bottleneck of website, to predict behaviour of many users or revealing their intentions. Existing approaches are mainly focused on finding global behaviour patterns for large groups of users.

Our work conforms to actual trend of Web personalization and focusation on needs of individual users. We don't search only for behaviour patterns common to wide community of website users, but also behaviour patterns common to smaller groups of users with similar interests and individual behaviour patterns of users differing from global behaviour patterns. In proposed method we examine influence of combined usage of these behaviour patterns on next user's action prediction.

Web logs can be considered as transactional datasets where each session represents transaction. Many methods of finding frequent sequence patterns and frequent itemsets were proposed. In our proposed method we focus on task of finding navigation patterns which are better suited for individual users. We transform web session logs dataset into undirected graph with nodes representing individual sites of website and inter-node links weight being specified by number of different attributes.

We extend method defined in [1]. Beyond time connectivity and frequencies of coocurrence of pages in sessions we use contentual similarity inspired by [2] to affect inter-node weights. In first phase which is being executed offline, navigation patterns are extracted. We don't extract navigation patterns from one graph specified for all users, but first we use clustering to find groups of users with similar interests and belonging to same stereotypes. For each group individual graph is being built from input sessions of group member's. Meanwhile also global graph is being built from all input sessions. Lastly different sets of navigation patterns are created for each group of users by combining group graph and global graph with predefined weights and applying graph partitioning algorithm which removes links with weight under specified threshold. The

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\* Supervisor: Ondej Kaššák, Institute of Informatics, Information Systems and Software Engineering

result is set of isolated subgraphs each representing one navigation pattern. We evaluate quality of these navigation patterns by using them to recommend items in second phase which is executed online. LCS (Least Common Subsequence) algorithm is used to classify actual session window with predefined size to one of the found navigation patterns for group actual user belongs to. Prediction list is generated by subtracting items in session window from navigation pattern. Furthermore this list is sorted by degree of connectivity of each item in prediction list.

Proposed model will be evaluated by standard metrics and compared with former WebPUM method and with baseline models using different well-known method for finding frequent itemsets from transaction like Apriori or FP-Growth.

## **References**

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