

KEYSTONE COST ACTION IC1302, SHORT TERM SCIENTIFIC MISSIONS

SCIENTIFIC REPORT

STSM Topic: Complex Event Processing for recommendation in keyword-based search

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Research stay report of Dr. Ramón Hermoso Traba (COST STSM Reference Number COST-STSM-IC1302-29696) at the Hochschule Hannover (University of Applied Sciences and Arts), Germany, for the period from 22nd to 30th September 2015.

1. Purpose of the STSM

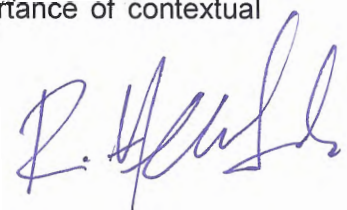
The purpose of this research stay has been to contribute in the field of Context-Aware Recommender Systems working on an environment based-approach able to provide more accurate recommendations having into account the contextual information. We were particularly interested in:

- Event sensing: how to perceive the events occurring in the environment.
- Handle streams of complex events: how to process the perceived event efficiently, in terms of time, energy consumed, etc. This is an important feature, especially when dealing with recommendation in mobile devices.
- Event filtering: how the aforementioned complex event processing might should filter out those events which are not relevant in the recommendation context. This will help the context-aware recommendation algorithms have a lighter input.

2. Description of the work carried out during the stay

The research stay has been divided into three different phases, in which the visitor has intensively collaborated with the host group, under the supervision of Prof. Dr. Jürgen Dunkel. Those phases are detailed as follows:

- We have study and discussed which type of events should be taken into account for recommendation processes, as well as how to capture them in an efficient way. In particular, we have stressed on the importance of contextual



factors relevant for recommendation in mobile devices, such as geo-location, weather, device-to-device messages or mood learning.

In order to accomplish this task we have held open discussions with different members of the group as well as brain storming processes.

- Different meetings have been held too to get a more accurate understating on Complex Event Processing (CEP) techniques. Moreover, in these meetings we have explicitly discussed the potential of these techniques in the field of mobile Context-Aware Recommender Systems.

With that in mind we have proposed an abstract process to feed the recommender system with a continuous flow of events. We have also sketched a rule-based mechanism to transform the row events into contextual information with which the recommender system can reason.

- The last issue we have worked with is a filtering mechanism based on the contextual information obtained from events. We have developed an abstract mechanism that focus on the pre-filtering of items to be recommended by using the contextual information.

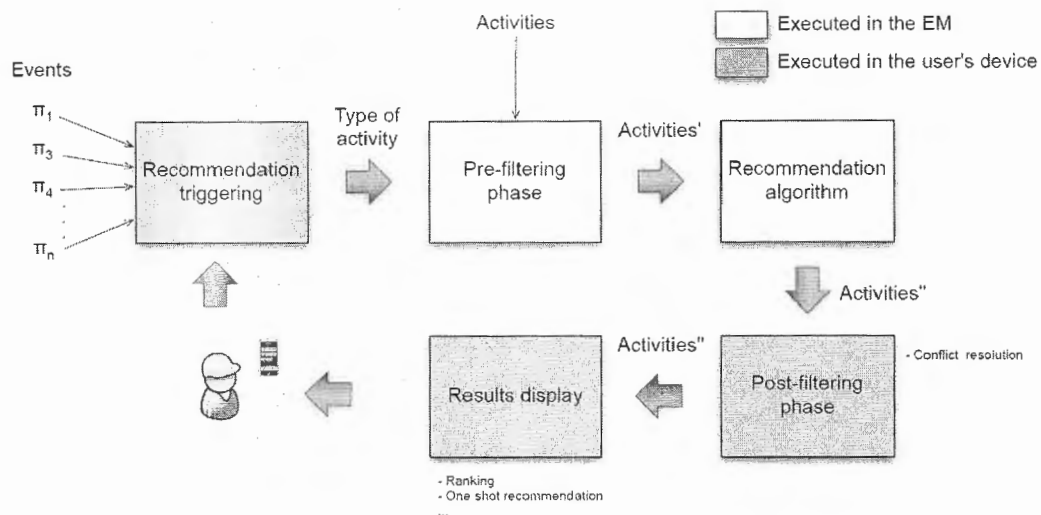


Figure 1. Event-driven information flow in a CARS recommendation process

After the events have been collected by the mobile device and the recommendation process has been triggered (e.g. by means of an explicit query typed by the user) the mechanism uses the adapted contextual information to filter out those items with a very low probability of been selected, i.e. those for which the context of the recommendation is not favorable. The output remainder items from this pre-filtering phase will be the input for the recommendation algorithm (any traditional algorithm might be used here).

There exists the possibility of also using the contextual information for a post-filtering phase. This may be useful in cases in which context must be combined with some private preferences of the user or some sensitive information the user does not want to disclose. This is an important feature we plan to tackle in a near future.

R. Huelsh

3. Results

We plan to continue this joint work and submit a conference paper in a short-term period.

4. Future collaboration with the host institution

The period of the visit was not sufficient to realize all the tasks proposed in the work plan. We will continue the research from the University of Zaragoza with the collaboration and help of Dr. Dunkel.

D. Dunkel