
SOI Based Video Recommender Systems: Interaction Design Issues and Collective Intelligence

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Recommender Systems

- Recommender Systems provide recommendations for items to be of use to a user:
 - they help users to cope with information overload
 - they have become one of the most powerful and popular tools in electronic commerce

Recommender Systems

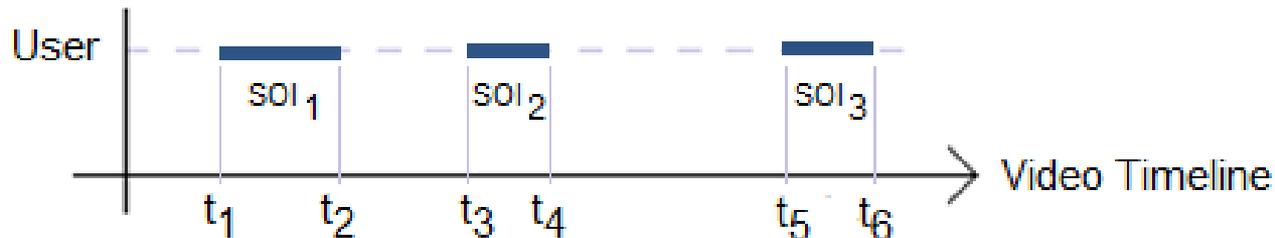
- Recommendations are generally made by:
 - collaborative filtering
 - content-based filtering
 - hybrid approaches
- Most of the typical approaches need significant extensions to produce better recommendations
 - On video recommendation domain, one of these extensions is based on Segments of Interest (SOI)

Recommender Systems

- Our preview work [7]:
 - Enhancing the Accuracy of Ratings Predictions of Video Recommender System by Segments of Interest, In *Proc. WebMedia 2013* (2013) (to appear)
- For this work, our intention is:
 - to stress and discuss :
 - interaction design issues about SOI marking
 - the relation between SOI and collective intelligence

Segments of Interest (SOI)

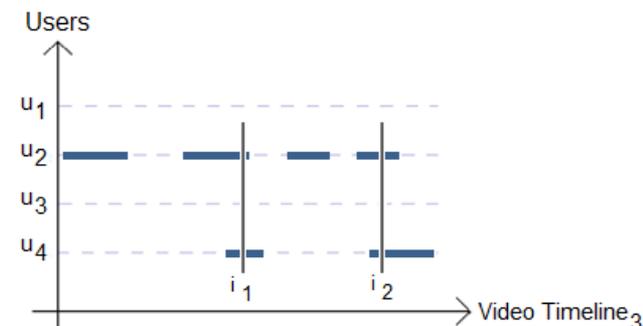
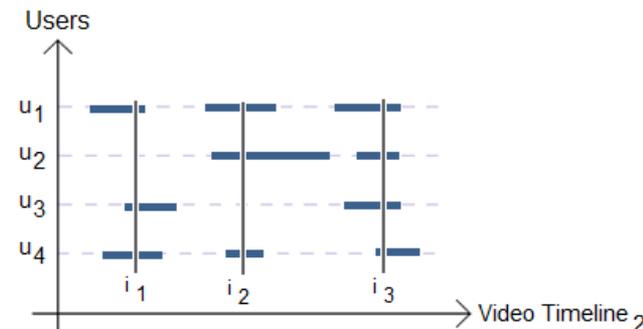
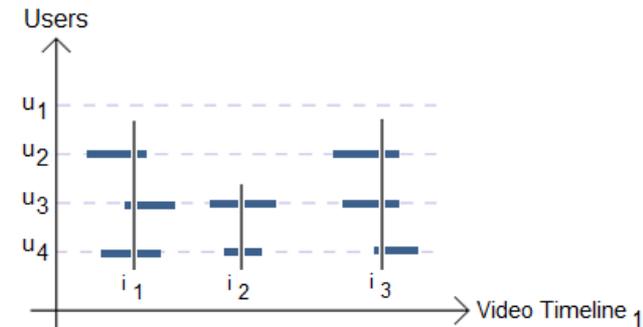
- A SOI is a segment on video that the user liked more or is interested
- Users tend to like particular segments of the video more than the rest [3] and, therefore, they can mark their segments of interest on video



SOIs marked by a user in a video

Recommender Systems and SOIs

- In our work [7]
 - we showed that SOIs from a community of users can be used to find similar people, i.e. people with similar interests about video
 - we showed that this similarity based on SOI can be used to enhance the accuracy of ratings predictions of video recommender systems



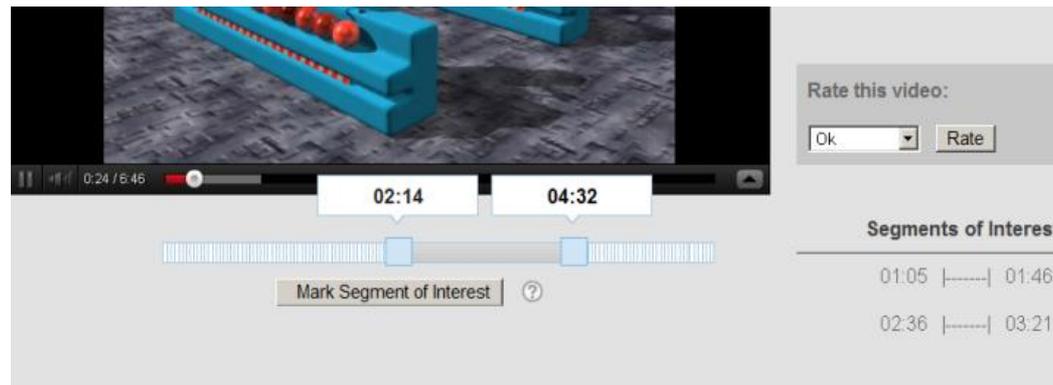
Intersections of SOIs in a set of videos

Marking SOI

- The user interface of the system that have the recommender engine must provide specific components for marking SOIs
- We have proposed 2 approaches for this purpose:
 - Buttons with predefined time slices
 - Sliders that allow users to mark the beginning and the end of each SOI

Marking SOI

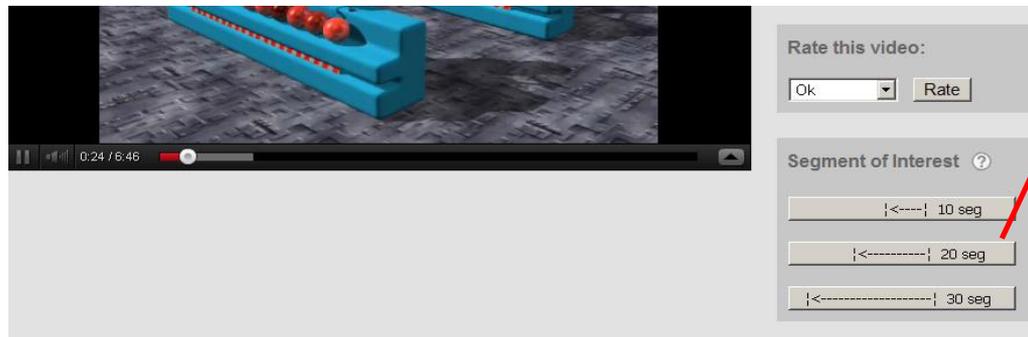
- **Approach #1:**
 - Sliders that allow users to mark the beginning and the end of each SOI
- An example of usage in our developed system [7]:



Partial view of the system's screen containing sliders

Marking SOI

- **Approach #2:**
 - Buttons with predefined time slices
- A suggestion of usage in our developed system [7]:



Buttons can be in a remote control or remote device

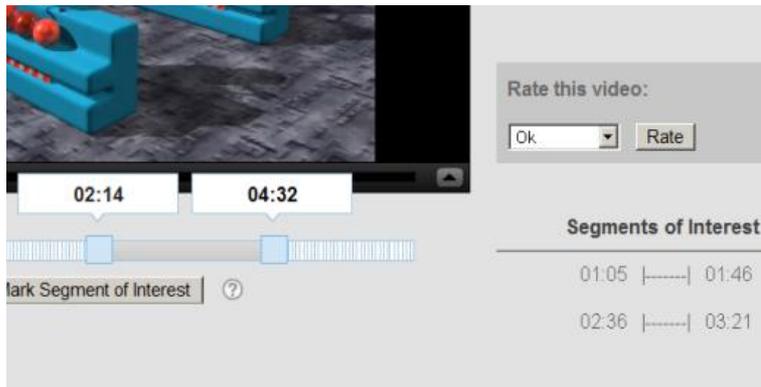
Partial view of the system's screen containing buttons with predefined time slices

Marking SOI

- Both approach has advantages and disadvantages

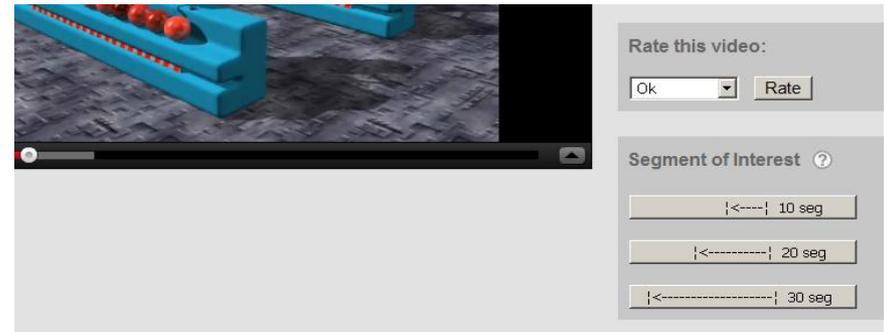
Approach #1:

Sliders that allow users to mark the beginning and the end of each SOI



Approach #2:

Buttons with predefined time slices



The Developed System and the Experimental Evaluation

- In our previous work [7] we developed a video website with a recommender engine as a web application, that uses YouTube as video provider
- For performing an experimental evaluation of our recommender system approach, we have used educational videos of a given subject
 - we have created a catalog containing 50 educational videos up to 20 minutes of duration from YouTube
- Users were free to choose, watch and rate videos and to mark their SOIs on videos

Experimental Evaluation

- The developed system, the experimental evaluation and the results is described in our work [7].

Some information:

- For the experiment, the system was used for 3 groups of students (students of Comp Science, age of 20 years)
- The subjects were free to browse, to choose and to rate videos on the catalog and free to mark their SOIs
- A dataset was built with the use of the system and contains: 88 user profiles 764 video ratings and 269 SOIs

Experimental Evaluation

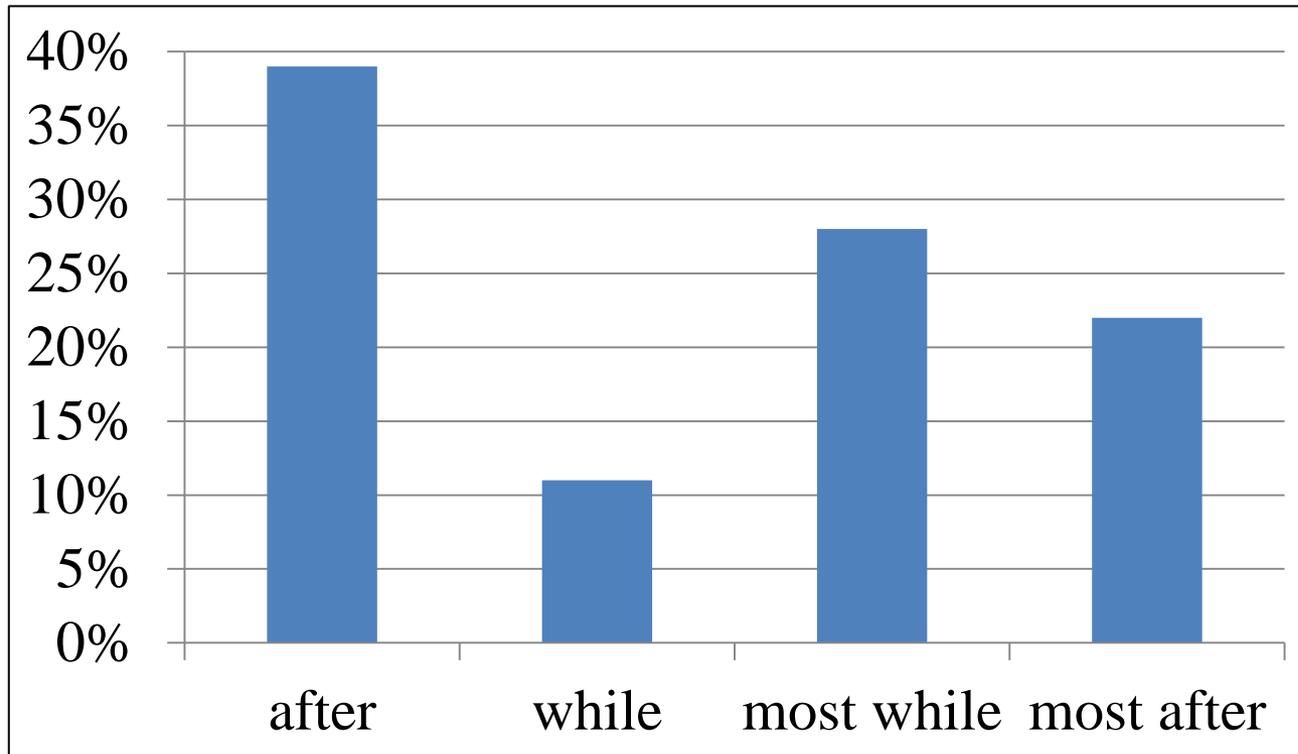
- Focus of our previous work [7]:
 - compare different recommender system strategies
- Results

Experimental Evaluation

- In this work, our intention is #1)
 - to stress and discuss interaction design issues related to our SOI video recommender system
- We have used a questionnaire to understand the user's experience related to marking SOI on our system, to know about their collaboration habits on the Web, and about their habits related to watching video on the Web
 - we have asked the subjects of the previous experiment to answer a questionnaire (anonymously) available on the Web
 - Results are described here. It is important to state that only 18 of 88 users have answered the questionnaire

Experimental Evaluation

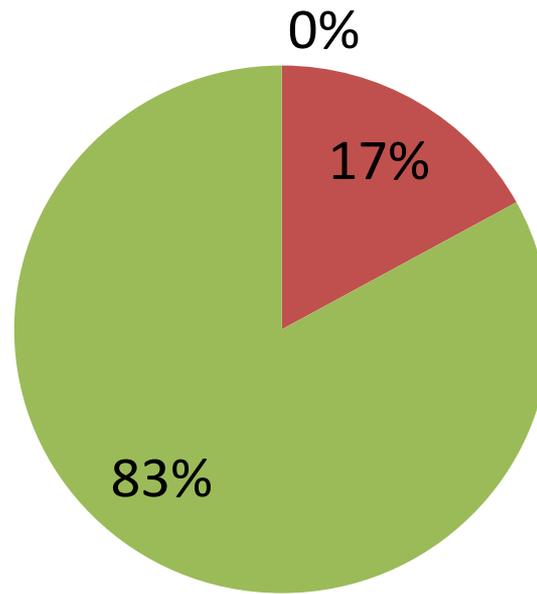
- Question #1: Did you mark segments of interest in what moments?



Experimental Evaluation

- Question #2: How often do you watch videos on Web?

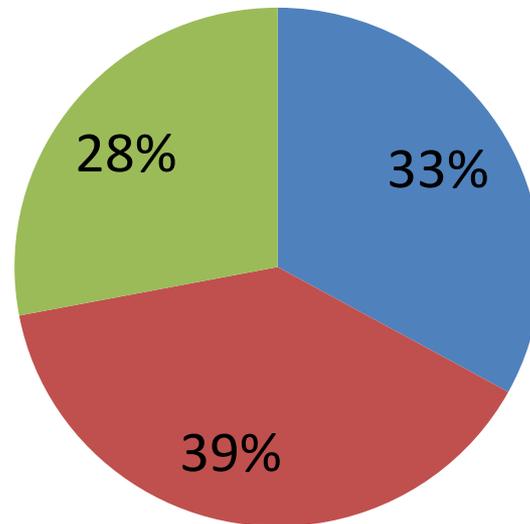
■ I do not watch ■ I rarely watch ■ I watch frequently



Experimental Evaluation

- Question #3: Do you often collaborate with some information on the Web (such as 'add a comment', 'submit a link to a friend' or give a "like")?

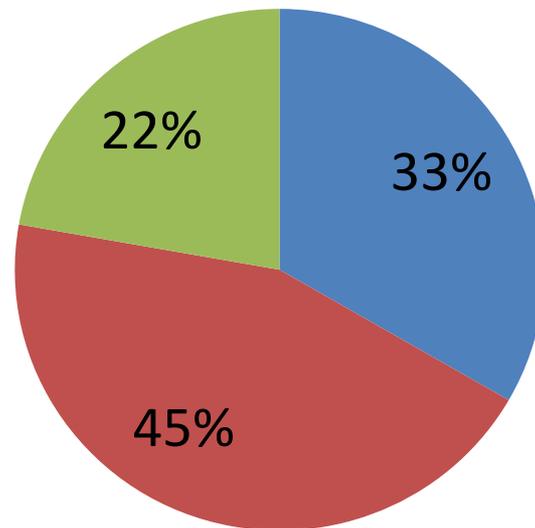
■ no ■ yes, rarely ■ yes, frequently



Experimental Evaluation

- Question #4: Do you usually use somehow the information collaboratively added by others on websites?

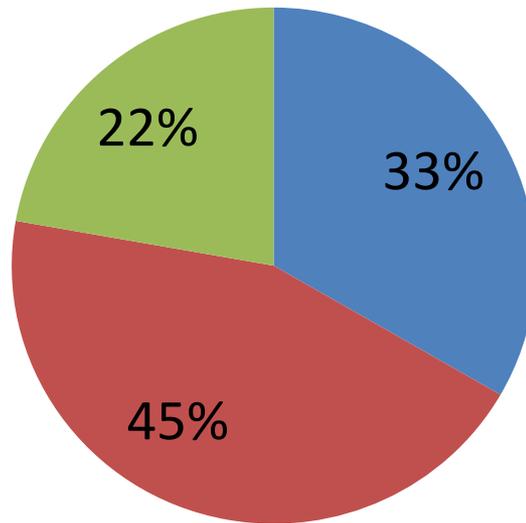
■ no ■ yes, sometimes ■ yes, frequently



Experimental Evaluation

- Question #5: Would you like to share your segments of interest with other people?

■ yes, always ■ yes, but with my permission ■ no



Analysis of the questionnaire's results

- Results
 - most of users prefer to mark SOIs after watching videos
 - subjects frequently watch videos on the Web and use collaboration mechanisms to obtain information
 - however, very few subjects effectively collaborated with others (to provide information)
 - most of them stated that they would like to share their SOIs

SOI and Collective Intelligence

- In this work, our intention is #2)
 - Discuss the relation between SOI and collective intelligence

Collective Intelligence

- The science of collective intelligence assumes that individual intelligences are summed and shared across society
 - Social media tools, such as, forums, blogs, wikis and social networks are collaborative systems that enable users to share their knowledge, skills and other information
 - As a result, they are becoming important sources of collective intelligence [4]

Collective Intelligence

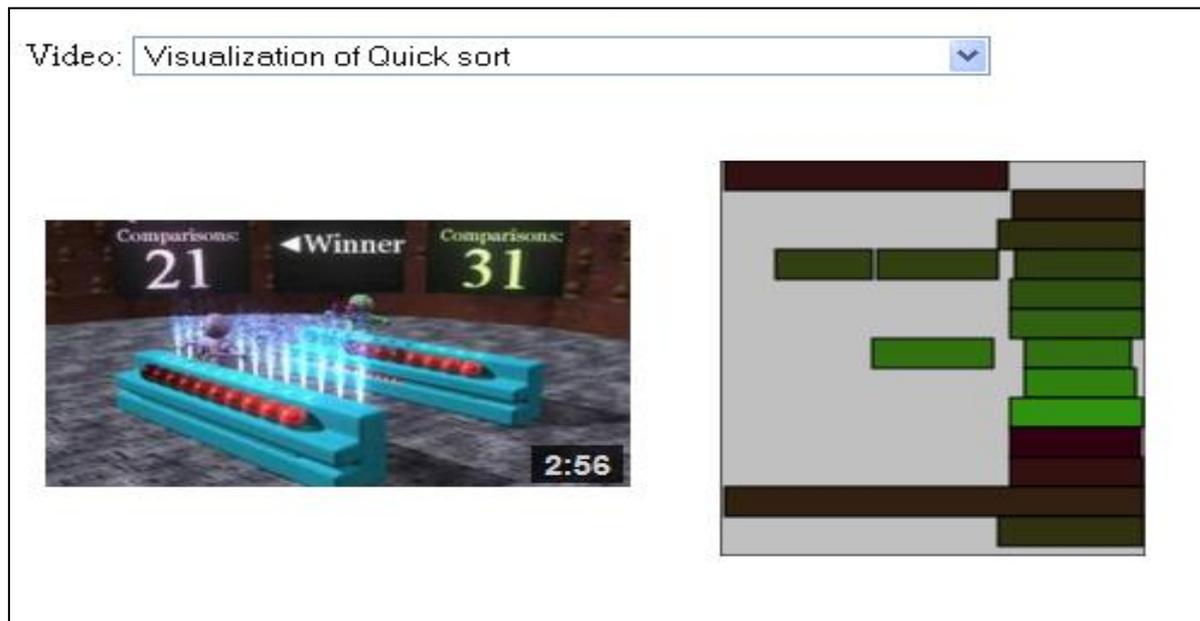
- Collective intelligence led to the rise of a new business model, known as crowdsourcing
 - This term describes a model that takes advantage of several creative solutions that people can propose [9]
- Crowdsourcing's Taxonomy: [8, 9]
 - Explicit (e.g. Wikipedia)
 - implicit (e.g. Google)

SOI and Collective Intelligence

- SOI can be used implicitly as source of information and knowledge about a user community
 - For instance, a cluster of SOIs in an educational environment
- In this sense, SOI can be seen as a source of collective intelligence

SOI Data Visualization

- To discover clusters of SOIs we have implemented a data visualization display, based on a tradition interval data visualization technique [6], in the developed system



Data visualization of SOI by users on a video

SOI Data Visualization

- It was another example that shows why SOI can be seen as a source of collective intelligence
- Information and knowledge that emerged from a community that had marked SOI can be used on consensus decision-making and to bring improvements to society

Conclusions

- Segments of interest (SOI) can be marked by different ways
- Designers of SOI based recommender systems must be aware that the approach chosen to allow users to mark SOIs may be directly related of the success or failure of the system and its recommendations

Conclusions

- We have evaluated the use of SOI concerning collaboration and user's habits about consuming video on the Web.
- We also discussed why SOI could be seen as a source of collective intelligence
 - Information and knowledge emerged from a community that had marked SOIs can be used on consensus decision-making and to bring improvements to society.
 - We implement data visualization over the developed system to illustrate how SOI can be such a source of collective intelligence

References

- [3] Chakoo, N., Gupta, R., Hiremath, J. Towards Better Content Visibility in Video Recommender Systems, In *Proc. IEEE FCST 2008*.
- [4] Chaves, A. P., Steinmacher, I., Vieira, V. Social Networks and Collective Intelligence Applied to Public Transportation Systems: A Survey. In *Proc. SBSC 2011*.
- [6] D'Enza, A. I. Interval Data Visualization - An advanced course on Knowledge Extraction by Interval Data Analysis.
<http://www.novauniversitas.it/System/2458/Alfonso%20Iodice.pdf>
- [7] Dias, A., Wives, L., Roesler, V. Enhancing the Accuracy of Ratings Predictions of Video Recommender System by Segments of Interest, In *Proc. WebMedia 2013* (to appear)
- [8] Doan, A; Ramarkrishnan, R; Halevy, A. Crowdsourcing Systems on the World Wide Web, *Communications of the ACM* 54, 4 (2011), 86–96.
- [9] J. Howe. The rise of crowdsourcing. *Wired Magazine*, 14, 6 (2006).

Thank you!

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