

Raker: Social video search and selection on TV

Angel Perez, Dmytro Izotov, Fabian Körner

User System Interaction – Eindhoven University of Technology (TU/e)

{ A.J.Perez; D.O.Izotov; F.Koerner}@tm.tue.nl

ABSTRACT

We designed and evaluated a system that aims to enhance TV watching experience for a group of people. The design focused on enhancing face-to-face communication for decision making when choosing a movie title to watch together. In this twelve weeks project we followed a user-centered design approach involving a total of thirty-one users. First, we identified user requirements through user research methods and incorporated them into the conceptual design. Next, we developed a detailed design that was implemented in a high fidelity working prototype. Finally we evaluated the prototype for both usability issues of the interface, and social implications of the design. The system showed a good acceptance among the evaluation participants.

INTRODUCTION AND PROBLEM DEFINITION

The Raker project was initiated as a response to a set of ideas proposed by the Connected Planet Group of Philips Consumer Electronics. It was carried out by a multidisciplinary team of five students of the User-System Interaction program at the Technische Universiteit Eindhoven (TU/e) as their required design case assignment. The total allowed time for the completion of the assignment was twelve weeks.

TV in the living room is the traditional media for displaying video content (VC) provided either by TV broadcast, Video-on-demand or VCD/DVD records. Moreover, the variety of video content increases with new Internet technologies, which allow new ways of distributing video (e.g. broadband connected TV boxes).

Within this context we aimed to enhance the users' experience of watching TV together. Particularly, we wanted to support the decision making process of selecting VC within a group of people. Our problem definition was stated as: "Design an interface for a remote-controlled, broadband connected TV for easy and pleasurable selection of video content by a group of users together."

This article describes the user centered design process we followed and our conclusions [11]. We describe the users' requirements gathering and the conceptual design phases, taking two and four week respectively. Also, we present the detailed design and implementation, each taking one week. Finally the evaluation, which lasted for two weeks, is also presented.

USER REQUIREMENTS

The target user group was defined as PC-literate, innovation-aware users. Furthermore, our target users are film lovers, who have a broadband internet connection at home. They use internet video content (movie information, downloads, video streams, etc.) but do not enjoy watching video on their PC. Finally, our users enjoy watching video at home with friends.

After a client meeting, a competitors' product research, and a literature review we formulated a group of general research questions to guide our studies on the users' activities and desires.

The users' requirements were gathered in user studies involving twelve participants matching the target user group. Since the project was framed within a design school assignment, we wanted to explore the possibilities and tradeoffs of several independent methods. The following methods were used:

- Field study
- Group interview
- Focus group
- Task analysis

For the field study, two young couples were observed at their homes around evening time. Furthermore, a group interview was conducted with 3 people, lasting 1 hour. The focus group had 5 participants, discussing for 45 minutes. The group interview and focus group session were recorded on video for later analysis.

Informed by the users study, we identified two possible main directions for the design:

- Focus on search interface for video content, taking into account large amounts of video content and the context of the living room.
- Focus on social interaction and enhancing TV watching experience by means of supporting face-to-face communication for decision making when choosing movie titles.

After considering a space for possible innovation, we decided to focus on the social aspect of interaction between the users while watching video in the living room context. Consequently, the following requirements were identified:

- The system should support a group of people watching VC together.
- The system should support users' awareness of all users' preferences.
- The system should support the process of persuading other users with personal preferences.
- The system should support the process of group decision making (discussion, negotiation, group preference generation etc.).
- The system should allow users to state their personal preferences.

These requirements were integrated into personas and scenarios to model the user and the context of use [1].

CONCEPT DESIGN

We observed from the users' studies problems in the social experience caused by an unsatisfactory selection of the VC (e.g. users reported leaving the room). Therefore by improving the decision making process we aimed to enhance the experience of the users. To give ground to the social aspects of our conceptual design, we studied groupware support systems in the context of decision making. Additionally, to generate ideas we used experience prototyping techniques such as role play, and body storming [2,3,4].

We selected the most promising ideas, and summarized them into eight concept assumptions. In a next step, two group interviews were conducted as pilot evaluations of the eight concept assumptions. We identified which of them should be further evaluated using video prototypes with a new focus group. After the former evaluation, we were able to identify elements to be taken to our conceptual designs. In sum, Raker is a system that supports face-to-face communication when searching, selecting and discussing video content in a social context. To this end the system aims to support social behaviours by supporting visibility, awareness, and accountability [5,6], through the following ways:

- The system provides a structured way to choose video content (VC) consistent with the users strategies for searching and selecting VC (e.g. while in a video rental).
- The system provides a shared visual space where the user's choices or preferences can be displayed to make other members of the group aware of them (e.g. equivalent to showing each other DVD covers or magazines).

Consequently, we developed five alternative conceptual designs; we selected one, and took it to the detailed design phase. It is worthy to note that at this stage of the project we took several important decisions:

- We chose to have a single control device over having multiple controls. The original concept included an

explicit turn taking procedure. However, we neglected the turn taking because it has been reported that users give away their control to one person who serves as a scribe [10].

- We decided to support a two-step procedure for the movie selection as result of users' studies. The original idea based on literature studies implemented a more sophisticated structure. More than two steps were considered too long by the users.
- We dropped the ideas of supporting social interaction by having explicit turn taking and by voting on the movies as well as identification of the users in the system. In addition, we decided not to focus on customization and personalization.

In brief, the system consists of two parts: a TV interface, and an independent control with touch screen display. The person who has the portable device interacts with it through the touch screen; meanwhile other members of the group can see the interaction on the TV screen.

We focused on the following key design elements:

- Control, which can be easily shared by the group
- Shared information space, that would serve as a context and common ground for the discussion
- Group list, temporary storage for intermediate movie choices.

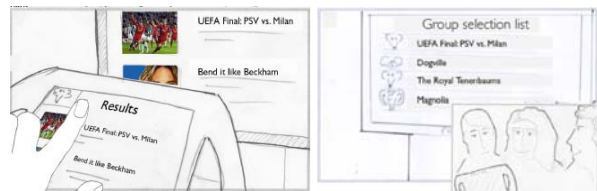


Figure 1. Information mirroring and Group list, images from the storyboard

DETAILED DESIGN AND IMPLEMENTATION

We implemented a working interactive prototype of the system using a touch screen tablet PC running a Flash application. The touch screen was connected to a TV and the flash application controlled the TV display as well. The prototype used one hundred movies in a local database completed with posters, trailers and movie information. The fully interactive prototype allowed smooth interaction during the evaluation.

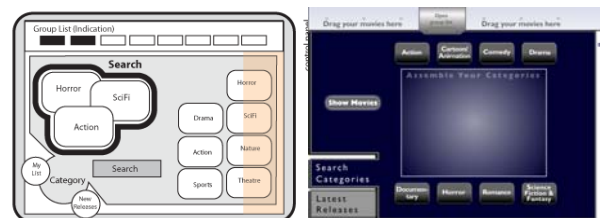


Figure 2. Detailed design and implementation of the search screen.



Figure 3. Working prototype

Raker provided a catalog with eight movie categories. To view the list of movies in a category, the user could drag the category label into the search box (Figure 2). The output of the search was displayed in a scrolling band. In this band every movie was represented by its movie poster. Additionally, the information shown on the portable control was almost fully mirrored on the TV screen (Figure 3). This mirroring provided a context and a common ground for the discussion about the movie titles to every group member. By clicking on the movie the user gained access to a detailed view of the movie. The detailed view offered detailed information about a specific movie title to the users. Detailed information included not only the movie cast and director, but also a text synopsis of the movies and other movie titles by same director, same cast or same genre. Raker offered a group list to store pre-selections made by the users during their discussion for further consideration. The group list was located on top of the screen and could be populated by dragging movies into it (see top Figure 2). The group list could also be accessed at any time to make a final decision.

EVALUATION

Because we were mainly concerned with the social implications of our design proposal, our evaluation focused more on social interaction and users' acceptance, rather than elements such as effectiveness or efficiency. To evaluate our system we applied behavioural sampling [7] and statistical analysis of questionnaires [8]. Additionally we annotated video recordings from the evaluation session to extract relevant users' quotes.

Four groups of two-to-four people (all friends as required by our user target group) participated in the evaluation, for a total of twelve participants. We tested the system in two setups: table-top, with the control interface running on a table-top display, and a portable device with a control interface running on a touch screen tablet PC.

Procedure

Pilot evaluation led us to the following procedure: First, participants were asked to fill in pre-task questionnaires. Next, we gave a brief introduction to the system followed by a training task, to reduce the learning effect of the process. Afterwards the participants were asked to choose a movie to watch while role playing. Hidden profiles were incorporated into the roles to serve as indicators of integration, compromise or avoidance in the case of conflict resolution [9].

After they chose the movie, we asked them to fill in a second (post-task) questionnaire and completed a walkthrough of the task session. In the walkthrough we discussed particular moments of the conflict resolution, aiming to elicit comparative judgment of our system, by means of implicit references.

Statistical analysis of questionnaires

The purpose of the questionnaire was to gather participants' subjective opinion on the system in a social context. The questions focused mainly on the social interaction. Before the test we asked them to evaluate their previous group-watching experience via the pre-test questionnaire. Their previous experience was categorized with two control situations:

- Control situation 1, participant had experience with current TV-based systems (e.g. DVR, EPG)
- Control situation 2, participant had no experience with such TV-based systems.

After completion of the tasks participants were asked to fill in a post-test questionnaire. Whereas the pre-test questionnaire asked about participant's previous experiences, post-questionnaire asked the same questions about their experience with the system. The data from both questionnaires were compared by applying the Wilcoxon Signed Ranks test. The main findings are as follows:

- Compared to both control situations, the system was rated higher regarding group-watching experience.
- Group decision making is facilitated by the system but there is no statistically significant difference in comparison to the control situations.
- The system shows a negative effect on group conversations. However, the effect is not statistically significant.

Qualitative data from video analysis

We annotated the video recordings of the walkthroughs and extracted quotes regarding how the users perceived the system, how they would compare choosing a movie using the system with their previous experience. Also, we extracted quotes regarding the key elements of the design.

First, we wanted to know how the users felt about the procedure of choosing a movie using the Raker system. In

general the users showed a positive response to the system as stated in the following quotes:

"I think it is a good way to pick movies... the only thing I was missing is a title finder..."

"I felt really comfortable with it..."

"I had the feeling that we had a good discussion about the other movies."

"I think it was a good decision." (*Referring to the chosen movie*)

"I think this is a good way to search for movies!" (*After watching a trailer*)

"The information helps... it verifies that you don't have a different movie in your head... you think again what the movie was about..."

Second, we wanted to find out how users would compare choosing a movie using the Raker system with their previous experiences. On the one hand, the process resembled the way they normally choose a movie in a video store, as we expected:

"I think it really resembles the natural way people chose a movie, you know... we use to go to a video store and see what was on and then it was 'o.k. - I like this one I like that one' and then it was just see, who got his way..."

"(With friends at home) we only have a limited scope of options like 4 DVDs, ... in that we usually have a bit of a fight, because you can't play (preview) every movie and then see what is happening inside... I think it is a better experience... it's worth spending 10 more minutes on the one-and-a-half hour movie."

"Yeah, I think at this stage it is similar, because we also have some optional movies in the group list... it's similar, like you have a stack of DVDs and you just choose 3 and decide."

On the other hand, the users perceived an additional social component:

"It depends on how much you are into films. This is the sort of thing I like doing a lot on the internet, and this brings it into a format that makes it much more social activity."

"...the whole approach of watching a movie is different... first movie and see who wants to see it... here it is first social then movie..."

Third, we looked for validation of the design key elements. The portable control was used by the participants together allowing them to interrupt each other, in consequence lessening the influence of one particular user in the selection.

"... It was a good thing (that we had it here), because then everybody both you and me could touch it..."

...isn't it irritating to have someone to interrupt you..

...but for this kind of purpose I think it is fine..." (*In a group of four users, dialog came from two users sitting next to each other and who had the control*)

The group-list supported participants' persuasion strategies because it gave users extra time to delay the final decision:

"That was my tactic. I postponed it and I thought maybe we find another movie and then we can say well we both can make a compromise."

"It's only on the group list then. It's not the definite decision."

Yeah.

It's an optional list, yeah."

(*Users acknowledge each other comment*)

"I feel o.k. ... I knew it, because he was searching for a documentary, and I had already finished my search... and my thing was already in the group list, so I thought... yeah ... take your time no problem."

"I was feeling... yeah ... now it's my turn." (*Response to previous comment*)

Evaluation conclusion

Statistical analysis of questionnaires showed an overall positive response to our system, however only one variable was statistically significant (group-watching experience). We believe the lack of significance is a consequence of the small sample.

The users' satisfaction section of the questionnaire shows a positive tendency regarding our system as a way to enhance the experience of finding and enjoying a movie title. However, we cannot tell if it is a consequence of the users being nice to us. Furthermore just the idea of having thousands of movies available at their living room may have helped compensate for pitfalls of the design.

Qualitative results gave clear directions for improvements and highlighted successful aspects of the system:

- Group-list indeed was used to postpone decisions and as a tool for persuasion. Instead of immediately arguing about a movie, participants opted to put it in the group list to consider later. On the one hand, participants who liked a movie kept hopes to convince others afterwards. On the other hand, participants who did not like the

selection felt satisfied by knowing it was not a final decision.

- The system induced a natural turn taking in one group. This was somehow unexpected when contrasted with the results reported by M. Mantei in the capturing the capture lab experiment [10].

It is worthy to mention that some design solutions that we considered but could not implement reappeared in the form of suggestions from the users. Among those are:

- MyList: a "wish-list" of movies maintained by users
- Movie comparison: one-to-one comparison of movies
- Group history of the previously discussed movies (in previous group meetings)

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