

Video as Memorabilia: User Needs for Collaborative Automatic Mobile Video Production

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ABSTRACT

Digital memorabilia, such as video remixes, can increase the value of attending music events. Remixes can be made using video clips recorded by attendees during the event; however, producing them is a laborious task. In this paper we study the prospects of automatic video remixing and present the results of a study on users' perceptions and attitudes towards collaborative automatic mobile video production. The three findings are as follows: People assess automatic video remix memorabilia as fairly equal to amateur-made manual ones, even if the manually-created video remixes are better in overall quality; as a remixing actor, a computer can be perceived to be more trustworthy than a human remixer; and, the quality of the video remix and the publication forum of the remix outcome plays a significant role when people are deciding whether or not they need public acknowledgement for their contribution. We conclude by discussing the design implications for collaborative automatic mobile video production.

Author Keywords

Mobile video; CSCW; live music; memorabilia; authorship; crowdsourced media

ACM Classification Keywords

H.5.1 [Information Interfaces And Presentation]: Multimedia Information Systems - Evaluation/methodology;

General Terms

Design

INTRODUCTION

Live music events are one of the most important sources of revenue for artists. Many people invest considerable time, effort, and money to attend live performances. Different types of artist memorabilia from concerts provide added value for music consumers. Technology facilitates this process; nowadays it has become common for the audience to capture video clips and photos with smartphones during live music performances. This trend produces a pool of underutilized material that could become part of video

remixes that combine material from several points-of-view to create novel memorabilia, thus enhancing the experience. However, producing multi-camera video remixes is laborious due to material handling and the number of people involved. Previous research shows that automating the editing process can ease the burden of remixing [13], but this requires human-produced video material to edit. Users must also be willing to hand over their personally-recorded footage to the automatic system.

This study aims to provide design insights to the CHI community for building collaborative video production tools. We believe the insights can be valuable also to video or photography services for large-scale events in general. Through our earlier study with an automatic video remixer [13], three issues emerged. It was unknown how potential users would perceive automatic video remixing systems in terms of *personal value*, *need for control* and *public acknowledgement*. By *personal value*, we mean how useful people perceive the mobile video remixes as memorabilia. Previous research has shown the importance of visual media for reliving an event [1,7]. Also more broadly, mobile media plays a major role in attendees' active construction of a shared experience at large-scale events like music festivals [6]. By *need for control* we mean the level of control that people desire when contributing personal video content to be remixed by an automatic video remixing system. Previous research has shown that too much automation with too little user control may affect the perceived usefulness of the system [11] and cause withdrawal [12]. By *public acknowledgement*, we mean peoples' attitudes about being publicly acknowledged if their clips were used in the remix. Previous research has shown that in remixing culture, acknowledgement plays a significant role in the negotiation of rights to use material [4, 10, 9].

METHODS

We arranged a two-day field trial at Provinssirock music festival in Finland during summer 2010. We collaborated with two of the performing rock bands and recruited 51 festival attendees to take mobile video clips during two concerts. A real-world trial was conducted to ascertain user attitudes based on experiences in the context for which the system was designed. We recruited 22 users via the bands' Facebook sites and 29 on-site. All recruits were young adults, no minors. The participants were given Nokia smartphones for the task. They formed groups of three to

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five people and were instructed to record video clips during the concerts. They were told that, after the festival, all the video clips would be used as material for video remixes produced by the Nokia's automatic video remixer system (AVRS); their material also would be made available for video remixing using a web-based video editor called Jay-cut [5]. After the event, we encouraged the participants over email to create video remixes. All together, four automatic and six user-generated video remixes were made. After receiving the artists' permission, we published eight of them on YouTube (two automatic and six manual) to give them visibility.

We invited the participants to complete a web-based questionnaire, which also included links to five of the YouTube remixes (two automatic and three manual). The questionnaire asked: How do people perceive automatic remixes as memorabilia? How do people perceive the sharing of personal video with an AVRS compared to the music artist or an unknown peer as the editor? What kind of attitudes do people have about receiving public acknowledgment for contributing their videos? We compared the automatic system with the two human actors (Artist and Peer) to ascertain if there were dimensions other than human vs. automation in terms of how people perceive the remixing actors. "Artist" here includes all representatives of the artist (e.g. the record company).

The automatic video remixing system

The AVRS utilizes context data from multiple sensors, including a compass, GPS, and an accelerometer. The availability of these sensors is becoming increasingly common on mobile devices. The multiple modalities of context data, which is obtained from these sensors, is stored as time-stamped data while the video recording is in progress. AVRS is critical to generate memorabilia for events. Since the initial version [13], the AVRS was improved to include interesting happenings and information from the live music event, thus adding to the video remix's value as memorabilia. This information is enabled by analysis of context data jointly with the recorded videos, contributed by the users attending the event [3]. This data is used to determine interesting occurrences, perspectives and high quality media segments; which are then included in the video remix [2, 3]. The higher the number of video clips contributed and the greater the number of users contributing clips, the higher the probability of capturing interesting occurrences from the event. Such capturing has the capacity to fill in the experience gap of an individual's video recordings providing added value to the experience. Such added value signifies the high importance one must assign to designing the AVRS in a way that reassures that users' content and identities will be used properly and respectfully.

Questionnaire

The questionnaire contained open-ended and order-ranking questions on a Likert scale (1='strongly disagree', 5='strongly agree'). In the analysis, the scale was simpli-

fied by combining the 'strongly agree' and 'agree', and 'strongly disagree' and 'disagree' into two categories, resulting in a one- to three-point scale (1='disagree', 2='not agree or disagree', 3='agree'). The questionnaire was pre-tested with eight researchers.

In the first section, the respondents gave their subjective assessments about automatic and manual *remixes as memorabilia*. They were asked to watch the five remixes: Auto1 and Auto2, and Manual1, Manual2, and Manual3. (Man# and Auto# in the paper). They were then asked to respond to the claim: "This remix works very well as memorabilia from the concert". They were also asked for a rationale in an open-ended field and to put the remixes in order based on their overall quality. The labels of Auto1 and Man1 did not indicate whether they were manual or automatic but this information was visible in the other remixes. However, we found that the labeling did not influence the ratings significantly.

In the second section, we concentrated on how much people want to *have control over their video clips*. We presented claims concerning sharing video clips to other actors to be remixed (Actors: the artist, an unknown concert attendee, the AVRS). We presented three claims related to each actor. The claims were as follows: If the [actor] is the one who makes the public remix, I'm willing to share my clips 1) immediately after recording a video clip, 2) after viewing the video clips, and 3) after watching the final video remix.

In the third section, we asked about people's *willingness to receive public acknowledgment* if their clips were used as part of a video remix. We presented two claims and an open-ended question about willingness to get one's name published as part of the video remix. The claims were again presented three times, separately concerning each actor. In the open-ended question, we asked about their reasons for wanting or not wanting acknowledgement.

RESULTS AND DISCUSSION

The questionnaire was sent to 43 participants of the field study via email. 19 responded (ten males and nine females for a response rate of 44%). Since we did not want to force people to respond, N varied for the different survey items.

Automatic remixes as memorabilia

The results of rating automatic and manual remixes show that the best of the manual ones were perceived as better than the automatic ones overall (Table 1). Man2 and Auto2 were significantly different (Mann-Whitney, $p=.036$). The remixes separated into two groups, Man3 and Man2 being significantly better in overall quality than the rest (unadjusted for multiple comparisons).

However, when the participants were asked to rate the same video remixes based on their value as memorabilia, the remixes were rated much closer to each other (Table 1, the next page). Man1 had a median of 2 and all others were 3

Rank: Please, order the remixes based on overall quality.						
Claim: This remix works very well as a memorabilia from the concert.						
Remix	Rank	Claim	Rank	Claim	Rank	Claim
	Median		Mode		N	
Man3	5	3	5	3	16	12
Man2	4	3	4	3	16	11
Auto2	3	3	3	3	16	11
Auto1	2	3	2	3	16	11
Man1	1.5	2	1	3	16	11

Table1. Rank: Order based on overall quality. (1=worst, 5=best); Claim: Personal memorabilia value. (1=disagree, 3=agree)

(scale 1= disagree to 3 = agree). A significant difference was found only between Man1 and Man3 (Mann-Whitney, $p=.038$). The results indicate that, although the automatic remixes were not perceived to be as good as the best manual ones, they were still perceived to be good memorabilia.

In the open-ended questions, some of the respondents described the automatic remixes as a bit convoluted and bumpy. However, many also described the automatic remixes as representing the overall atmosphere well. They also noted familiar angles of view:

“I was in the front of the stage. There the atmosphere was different than at the back: jumping, raging...Because the picture was shaky in places and the cuts were fast, this remix was able to capture my concert feeling.”

The need for control of clips

We sought to study if users’ need for control of their clips depended upon the actor with whom the clips were to be shared. As such, we compared control variable scores of the three actors (Table 3). Significant differences were found between AVRS and Peer (Mann-Whitney, $p=.029$) as well as between Artist and Peer (Mann-Whitney, $p=.038$). Interestingly, this finding implies that respondents preferred to hand over clips to the AVRS over an unknown peer. It might also be that in the case of the artist and the AVRS as the actor, the users did not feel a need for control because they trusted these entities more than an unfamiliar person. Trust itself always involves risk [8], and is crucial in systems of distributed agency like our collaborative video remixing where labor is allocated to external actors. It might be that the participants feel that the risk involved in their clips being used in an unpleasant way is greater

Claims: If the [actor] is the one who makes the public remix, I’m willing to share my clips 1) immediately after taking a video clip, 2) after checking the video clips, and 3) after watching the final remix.				
Actor	Median	Mode	Reliability	N
Artist	5.5	4	$\alpha=.823$, 1.comp. 74%	18
Peer	7.5	9	$\alpha=.718$, 1.comp. 66%	18
AVRS	6.0	6	$\alpha=.729$, 1.comp. 65%	18

Table3. Need for control of clips (3=low, 9=high). Sum variable from three claims: 1), 2) and 3). Cronbach’s α and PCA’s 1. component as reliability measure for sum variable.

with a peer as an actor compared to the AVRS or artist. They might perceive the AVRS as “deterministic” and incapable of “abusing” the material, and trust that AVRS will not violate their impression management goals. Also in a long run, trust on the system may change depending on the type and frequency of possible faults. Fault in this case would occur if a user was associated with a published video remix that is not in line with the public profile she is building.

Attitudes for public acknowledgement

Based on medians and modes (Table 4), we can see that most of the participants do not want to get public acknowledgement when the AVRS makes the remix. However, most of them did want to receive authorship if the artist made a video remix. We believe this finding might indicate that the respondents perceive the AVRS as a black box. The artist, on the other hand, represents something that the participants probably want to be associated with. Nonetheless, the differences between the actors were not statistically significant (Mann-Whitney, $p<0.05$). Based on median and mode values, the respondents were less likely to want to see the final video remix before deciding whether to be acknowledged in the case of the AVRS than in the cases of peer and artist as actors. In this case also, the differences were not statistically significant.

The open-ended question on whether and why the participants ($N=16$) would like to be publicly mentioned as the authors of the final mix (regardless of who made the remix) showed that half expected acknowledgement. More importantly, acknowledgement expectations were divided among conditional and definite opinions. Only a few participants expressed an unconditional desire for acknowledgment or desire for publicity (“definitely yes”). The people who expressed a conditional need for acknowledgement would like to provide their consent after their evaluation of their own or the final content. There were several reasons for not wanting an acknowledgement. For example, one participant said that because of professional reasons he does not want his name to appear on the Internet. Many respondents indicated skepticism towards the technical quality of the recording, their own capacity, or the quality of the final video remix. Identification concerns were evident because the

Claim: If the remix made by [actor] includes my video clips, I want my name to be mentioned in the remix.			
Actor	Median	Mode	N
Artist	3	3	18
Peer	2	2	18
AVRS	2	1	18
Claim: If the remix is made by [actor], it is important for me to see the complete remix before I decide if I want my name to be published as part of the remix.			
Artist	2.5	3	18
Peer	3	3	18
AVRS	2	2	18

Table4. Attitudes on acknowledgement (1=disagree, 3=agree)

people did not want to be associated with dubious publications nor with dubious forums. One respondent mentioned consideration of fair use, the need for awareness of commercial or any other type of use that was previously unknown. No one explicitly expressed a need for individual parts of the video remix to be attributed to them.

CONCLUSIONS AND IMPLICATIONS FOR DESIGN

Based on the results about how people perceive collaborative automated mobile video production in live music context, we draw the following conclusions:

For memorabilia, remixes do not have to be perfect

The overall quality of the automatic remixes did not match the quality of the best manual remixes. However, the automatic video remixes were perceived to be as good as memorabilia as the manual ones. This finding indicates that the video remix does not have to be superb in order to trigger memories from the music event. One way to provide that emotional response is to offer varied perspectives of the event through different camera angles. This technique allows people to relate to the video because they see views from places they themselves had occupied during the show.

Proper control helps to hand over the clips

People need significantly less control of their personal clips when sharing them with an AVRS, as compared to other concert attendees with whom they are not familiar. We believe that this result indicates that the automatic remixing system was seen as trustworthy with regards to sharing one's personal video clips to be used in creating a public video remix. With an AVRS, a user veto may not be required before publishing the automatic video remix. However, users should not be hurried into handing over their video clips to the system either; they should have a chance to preview their clips. Only the clips that are explicitly chosen should be included for remixing.

No to automatic acknowledgement

Novice users are uncertain about the outcome and thus unlikely to want to be acknowledged without the chance to review the video remix. The willingness to share is largely dependent on the quality and subjective meaningfulness of the final content as well as the reputation of the venue where the final content will be published. It seems that people want to be aware of how they are presented as part of the outcome and want to control it in such a way that matches their impression management goals. Since many of the participants did not expect acknowledgment and many saw it as very conditional, we do not think people should be acknowledged as a default, unless they separately agreed to do so. Users should be informed from the start about the intended use and licensing. However, they should not necessarily be asked for consent for acknowledgement at an early stage, either before recording or after uploading the material. If after production consent is impractical, the decision should be made thoughtfully.

We hope that our study will be a useful reference for designers of video production tools who need to know peoples' perceptions on collaborative video remixing and how to deal with control and acknowledgement issues.

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