

Emotional Video Album: getting emotions into the picture

Eva Oliveira

LaSIGE, University of Lisbon
FCUL, 1749-016 Lisbon, Portugal, and
IPCA, 4750-117 Arcozelo BCL, Portugal
+351 217500533

eoliveira@ipca.pt

Teresa Chambel

LaSIGE, University of Lisbon
FCUL, 1749-016 Lisbon
Portugal
+351 217500533

tc@di.fc.ul.pt

ABSTRACT

Emotions are essential to human beings, influencing their health, their cognition and creativity. One of the greatest strengths of video is its power to generate attitudes and emotions as no other medium can, and it is also an excellent tool for displaying affective information [1, 10]. Video is becoming more and more pervasive in our lives. Technological developments and the trends for media convergence are turning it into a dominant medium. Nowadays, we access video on the web, we capture and transmit it with our mobile phones, and we keep the ones we treasure the most. In this paper, we present the Emotional Video Album, where users collect and interact with videos, based on videos' affective contents and properties, and in accordance with their own emotional profiles, choices or states.

1. INTRODUCTION

Emotion studies have been done over the last few years, since it became proved that they are fundamental in cognitive and creative processes. In fact, understanding emotions is crucial to understanding motivation, attention or aesthetic phenomena. There is an increasing awareness in the HCI community of the important role of emotion in human computer interactions and interface design, and new mechanisms for the development of interfaces that register and respond to emotions have been studied [6,11,14,15]. Gathering emotional information from users can contribute to create emotional context in applications interfaces. Rosalind Picard in [18] defends that systems that ignore the emotional component of human life are inevitably inferior and incomplete, and she states that systems that provide a proper and useful social and emotional interaction are not science fiction but a science fact.

In this paper, we explore the emotional dimension in the collection and interaction with videos in the Emotional Video Album. First we review the motivations and foundations of work in HCI and video that take emotions into account, then we present the Emotional Video Album.

2. EMOTION IN HCI

An emotional interface is defined by the HUMAINE project as an interface that keeps user engagement through the capacity of perceiving user's emotion, to

adapt to it, to react to it and to initiate it [12]. Donald Norman in his Emotional Design book and paper [16,17] claims that attractive things work better. Interactive systems should be engaging enough to be pleasurable and that positive states of mind make people more receptive to new ideas or even interruptions, arousing curiosity and engagement, while negative emotions make problems look bigger than they are and people more focused, favoring concentration upon detail. He also identifies three different levels of brain mechanisms related with cognition and emotion: visceral, behavioral and reflective, that should be taken into account, and raise different design requirements. Scherer [20] also dissects about the aesthetic emotions explaining that these kinds of emotions are goal and need independent but can be changed over time, and that attractive or aversive stimulus can generate positive or negative feelings.

It is now consensual that emotions influence human-computer interaction, because aesthetic pleasure, engagement and fun are regulated by the human emotional system and are as important as usability or functionality in the interface design [16,21]. The growing interest in understanding how emotions can be explored in HCI motivated the recent creation of an interdisciplinary special interest group (SIG) [6] in this field.

3. VIDEO AND EMOTION

Video is a very rich media type, combining diverse symbol systems, such as pictures, texts, music and narration, often engaging the viewer cognitively and emotionally, and having a great potential in the promotion of emotional experiences. It has been used in different contexts: as a way to capture and show real events; to create and visualize scenarios not observable in reality; to inform; to tell stories and entertain; to learn; and to capture and share our collective culture and personal history.

Video can represent emotions and also be an emotion inductor. The work of Alice Isen [13] attested this potential, when she and her colleagues experimented the effect of positive affect in her patients, inducted by ten-minute comedy films. S. Bardzell [2] preliminary results suggest that emotional responses even to short

amateur videos are both intense and complex. Other experiments [1,3,10] showed that video's greatest strength is the power to generate attitudes and emotions, not only because it is an excellent medium to display emotions but also due to its elicitor characteristics.

Some research developments in video indexing and processing are already taking emotions into account. In [14,15], Money and Agius explored the use of sensors for human physiological responses and expressive face recognition techniques to detect user emotions while watching videos. These emotions were intended to produce affective video summaries. Physiological responses were a potential valuable resource, but facial expressions could not be discerned frequently enough to be considered a reliable source of information. In [24] video scenes are retrieved by their emotional content, by an interactive genetic algorithm. Videos are automatically classified with low-level descriptors like shot duration, average color histogram, average brightness, average edge histogram, and gradual change rate. The retrieval process is done by an iterative process that creates new populations of videos by crossover and searching most similar solutions in the video database, based on human evaluations of scene types: action, excitement, suspense, quietness, relaxation, and happiness. Detail-on-demand video was explored by [7] to provide a hyperlink structure of the video content, by summarizing it in short segments, with different levels of detail. This concept could be used to summarize and access emotional content, although it was not explored in this context.

4. EMOTIONAL VIDEO ALBUM

The Emotional Video Album is being designed to explore the affective dimensions of videos in accordance with user emotional profiles, choices or states. These dimensions are reflected in the way we watch our videos and the way we organize, search and interact with them. They are also reflected in the way we chose to organize the videos around the photographic album metaphor, where we collect personal and favorite photos, and with which we tend to develop an affective connection. The video album has two main goals:

- 1) To explore video access mechanisms
- 2) To present the interface

based on videos' emotional content and user emotions.

For this, we need to address the following dimensions: Emotional classification of contents; Emotional content-based access; and Interface design matched with emotions.

4.1 Content Classification

There is a multitude of definitions and models trying to define emotions, but there is no common accepted definition. Everyone knows what an emotion is, until asked to give a definition [9]. Dimensional theorists defend that two or more dimensions can define

emotions, like the dimension of valence (positive/negative) or arousal (calm/excited) [19]. Others admit a set of basic emotions, like the Ekman's [8] six basic emotions of anger, disgust, fear, happiness, sadness and surprise. The psychologist, Klaus Scherer [20] defined emotional descriptors, and presented the Geneva Affect Label Coder (GALC) with a thirty-six affective categories, which allows to explore ways of gathering emotional user profiles and classification of content.

In the Emotional Video Album, we take these dimensions and categories into account, in order to classify video *content*, and *user* emotions.

Videos and *video scenes* can be classified and indexed from two perspectives:

- 1) by the *objective emotion* that is conveyed, e.g. a video or a scene showing happy people;
- 2) by the *subjective emotion* that it induces on the user, for e.g. sadness, because the user relates that specific kind of situations with a sad event in her life.

Classification can be done either *manually*, or with the aid of some *automatic* process: through video processing techniques [24] and emotion recognition methods [11] while the user is watching the video. In a first stage, we are exploring manual approaches, where the user identifies the emotions, but intend to experiment with the other approaches, later on.

4.2 Content-Based Access

In the emotional content-based access dimension, we are designing different methods to access and watch the videos, at the levels of the whole video album, and the individual videos, building on our previous experience [3,4,10] with video-based hypermedia spaces.

1) *Emotional album views* are created by the indexation of emotional descriptors of the videos, in accordance with different user selections. For example, we may visualize the videos organized by dominant emotions, or we may search for videos emotionally related with a given one, or search for the videos having a specific dominant emotion or valence.

2) At the *individual video level*, the video can be presented with an emotional timeline, representing the video's emotions along time, either from a more objective or more subjective perspective. Users can use this information to gain more awareness of the emotions involved, and of how different the two perspectives are, and also to access scenes based on their dominant emotions. Video summaries [7] can also be provided, to present videos in chosen emotional perspectives and preferences, or in response to emotional user states.

4.3 Interface Design Matched with Emotions

To match the interface design with emotions, we are exploring emotional design [17, 23] and design for fun [21, 5, 22] guidelines and insights from previous work.

Fun is associated with positive affects, and has been addressed in design. One example is the work of Ben Schneiderman in [21]. When he claims that users should be engaged with fun features, he is pushing affect and emotions to fun features, which he considered to be: alluring metaphors, compelling content, attractive graphics, appealing animations and satisfying sounds. Chang et al. [5] have explored animation cartoon techniques to conceive user interfaces more engaging with its audience and more easy to understand, because cartoons are theatrically based and engage by its illusion. Thomas and Calder [22] have described how smooth interface changes technique, borrowed from cartoons, improved the visual feedback of a direct manipulation interface and how this kind of effect could bring the sense of substance to interface elements. These techniques give fun properties to interactive interface elements, stimulating user positive emotions. According to Norman [17], rounded shapes, smooth and symmetrical objects, and rhythmic beats, are some of the interface characteristics that also induce positive states; while sudden, unexpected loud sounds or bright lights, darkness, looming and sharp objects, empty and flat terrain, induce negative emotional states.

In the Emotional Video Album, we intend to explore the photo album metaphor, with which we tend to develop an affective connection, in flavors that reflect different contents or user moods, extended with the new interactive access features, in ways that enrich our affective relation with videos.

5. ACKNOWLEDGMENTS

This work was partially supported by LaSIGE through the FCT Pluriannual Funding Programme.

6. REFERENCES

- [1] Ashby F., Valentin V., and Turken U., Jan 2002. The effects of positive affect and arousal on working memory and executive attention. *Emotional Cognition: From Brain to Behaviour*.
- [2] Bardzell S., 2008. Understanding Emotional Responses to Navigating Among Amateur Videos: First Results. *Emotion in HCI: Joint Proceedings of the 2005, 2006, and 2007 International Workshops.*, 172-174.
- [3] Bidarra, J., Chambel, T., and Guimarães, N. 2000. Enhancing Learner-Centered Design of Hypermedia Artefacts Through Cognitive and Affective Indicators. In *Proceedings of EdMedia' 2000, Montreal, Quebec, Canada, June*.
- [4] Chambel, T. and Guimarães, N. 2002. Context perception in video-based hypermedia spaces. In *Proceedings of the Thirteenth ACM Conference on Hypertext and Hypermedia, College Park, Maryland, USA, June 11-15, pp. 85-94*.
- [5] Chang B., and Ungar D., 1993. Animation: from cartoons to the user interface. *Proceedings of the 6th annual ACM symposium on User Interface Software and Technology*.
- [6] Crane, E. A., Shami, N. S., and Peter, C. 2007. Let's get emotional: emotion research in human computer interaction. In *ACM CHI '07 Extended Abstracts on Human Factors in Computing Systems. San Jose, CA, USA, April 28 - May 03. pp.2101-2104*.
- [7] Doherty J., Girgensohn A., Helfman J., Shipman F., and Wilcox L., Nov 2003. Detail-on demand hypervideo. *Multimedia '03: Proceedings of the eleventh ACM international conference on Multimedia*.
- [8] Ekman, P. 1992. Are there basic emotions? *Psychological Review*, 99(3):550-553.
- [9] Fehr, B. and Russell, J., Jan 1984. Concept of emotion viewed from a prototype perspective. *Journal of experimental psychology: General*. pp. 464-486.
- [10] Guimarães, N., Chambel, T., Bidarra, J., "From Cognitive Maps to Hypervideo: Supporting Flexible and Rich Learner-Centred Environments", *IMEJ Journal*, 2(2), October 2000. <http://imej.wfu.edu/articles/2000/2/>
- [11] Herbon A., Oehme A., and Zentsch E., Jan 2006. Emotions in ambient intelligence—an experiment on how to measure affective states. zmm.s.tu-berlin.de.
- [12] Humaine, Sep 2007. D3k “pre-completion report on blueprint volume” workpackage 3 deliverable.
- [13] Isen A. M., Daubman K. A., and Nowicki G. P., 1987. Positive affect facilitates creative problem solving. *Journal of personality and social psychology*, 52:1122–31.
- [14] Money A.G., Agius H., 2008. Are Affective Video Summaries Feasible? *Emotion in HCI: Joint Proceedings of the 2005, 2006, and 2007 International Workshops*, page 142-149.
- [15] Money A.G., Agius H., 2008. Video Playing With Our Emotions. *Emotion in HCI: Joint Proceedings of the 2005, 2006, and 2007 International Workshops*, page 168-171.
- [16] Norman, D. A. 2002. Emotion and Design: attractive things work better. *Interactions* 9, 4 (Jul. 2002), 36-42. <http://doi.acm.org/10.1145/543434.543435>.
- [17] Norman, D. A. 2004. *Emotional Design: why we love (or hate) everyday things*. New York: Basic Books.
- [18] Picard R., Wexelblat A., and Nass C., Apr 2002. Future interfaces: social and emotional. *CHI '02: extended abstracts on Human factors in computing systems*.
- [19] Russell J., 1980. A circumflex model of affect. *Journal of Personality and Social Psychology*, 39:1161–1178.
- [20] Scherer KR., 2005. What are emotions? and how can they be measured? *Social Science Information*, 44(4):695.
- [21] Shneiderman, B. Designing for fun: How to make user interfaces more fun. *ACM Interactions* 11, 5 (Sep.-Oct. 2004), 48-50.
- [22] Thomas B., Calder P., Jan 2001. Applying cartoon animation techniques to graphical user interfaces. *ACM Transactions on Computer-Human Interaction*.
- [23] Tractinsky, N., 2004. Towards the Study of Aesthetics in Information Technology, 25th Annual International Conference on Information Systems, Washington, DC, December 12-15, pp. 771-780.
- [24] Yoo H. and Cho S., 2007. Video scene retrieval with interactive genetic algorithm, *Multimedia Tools and Applications*, 34, September. pp. 317-336.