Movie+: Towards Exploring Social Effects of Emotional Fingerprints for Video Clips and Movies

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ABSTRACT

Collaborative movie viewing with the loved ones increases connectedness and social bonds within family members and friends. Furthermore, with the rapid adoption of personal mobile devices, people often engage in this activity being geographically separated. However, conveying our feelings and emotions about a recently watched movie or a video clip is often limited to a post on social media or a short blurb on an instant messaging app. Drawing on the popular interest in quantified-self, which envisioned one collecting and sharing biophysical information from everyday routines (e.g., workouts), we have designed and developed Movie+, a mobile application, which utilizes personal biophysical data to construct an individual's "emotional fingerprint" while viewing a video clip.

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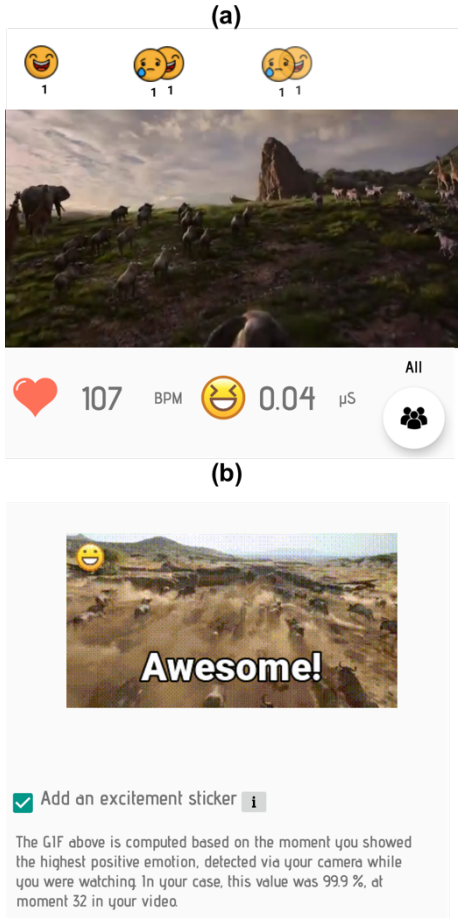

Figure 1: (a) The emotions of previous viewers are displayed on top of the video clip, creating a social experience for the user; (b) computationally-identified "the most exciting scene" moment of the clip for a user based on her emotional feedback. Icons designed by Freepik, Trinh Ho, Vectors Market from Flaticon. Background images CC BY GameSpot Universe Trailers on YouTube.

Movie+ allows the selective sharing of this information through different visualization options, as well as rendering others' emotional fingerprints over the same clip. In this submission, we outline the design rationale and briefly describe our application prototype.

KEYWORDS

Emotional metadata; YouTube video clips; movie viewing; sharing biophysical data.

1 BACKGROUND

The advent of social, mobile, and ubiquitous computing enabled people to fulfill their aspirations to support and maintain social relationships with their loved ones, whether they live geographically close or far away [4]. Researchers (e.g., [1]) argue that the mass adoption of video-mediated communication technologies (e.g., Skype) in domestic environments supported a need and desire to move beyond verbal conversations and focus on sharing activities through digital media. For example, remote movie viewing provides lots of social benefits among family members and friends, such as increased connectedness [5] and feelings of intimacy [7]. However, synchronized video viewing may not be often possible due to various factors such as a frequently traveling parent, or distance-separated couples.

Forghani et al. [4] demonstrated that sharing personal media (family pictures, Facebook posts) during a video call, made the communication more engaging and supported emotional connection between participants. Furthermore, Curmi et al. [2], looked beyond these traditional digital content types and argued that real-time biophysical data (e.g., heart rate) gathered from amateur athletes during a running competition can also increase engagement with the remote audiences. In turn, we would like to understand whether and how personal biophysical data, captured during the movie viewing, can enhance togetherness and feelings of presence in the context of geographically-separated families/couples. To investigate that we have developed Movie+, an Android application that allows creating, storing, and sharing personal emotions captured during video viewing activity.

The novelty of our prototype is that it enables the creation of an individual's "emotional fingerprint" for each video clip (e.g., YouTube video) and allows sharing it with family members and friends. In general, understanding emotions of video clips (e.g., advertisements on TV) is seen as a key challenge in marketing research efforts such as to determine likability of ads (e.g., [6.]). Furthermore, in the future, we envision that experience sharing of movie viewing will be immersive. Few commercial products are already available on the market today, which enable a viewer to see a movie in virtual reality with a co-presence of others (e.g., Plex VR, CINEVR.io). Therefore, we see the value in understanding design opportunities to incorporate more personalized social movie viewing experiences based on an individual's emotions.

We contribute with an interactive prototype, which allows one to capture and share an emotional fingerprint of video clips and movies.

Figure 2: The emoticons we use in our mobile application to represent the five basic emotions: disgust, joy, fear, sadness and surprise. Emojis designed by Freepik from Flaticon.

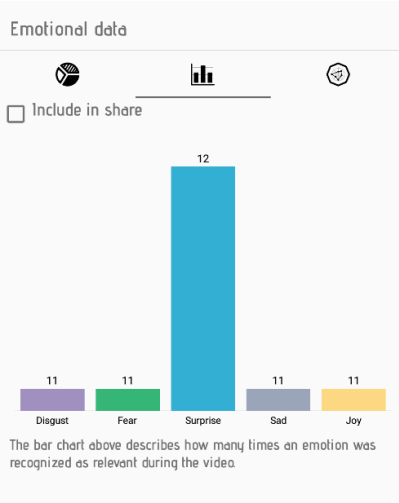

Figure 3: The bar chart illustrates a summary of a user's emotions.

2 MOVIE+ ECOSYSTEM

The software ecosystem of Movie+ comprised from (1) an Android application, which captures and processes biophysical data from companion devices and services; (2) a web-service, which handles retrieval and storage of users' emotional fingerprints.

2.1 Movie+ Android App

The Movie+ app enables the user to watch video clips, generates the user's "emotional fingerprint" of the video, and enables the sharing of a customizable report, which contains several representations of aggregated emotions (see Figures 3-5).

Movie+ offers a social experience to the user: one can watch YouTube video clips and examine, above those clips, the emotions of particular users' or, collectively, all users who previously watched those clips in real-time (Figure 1a). We argue that this modality could provide a close approximation to the actual experience of watching videos together (e.g., with the loved ones).

In order to create an emotional fingerprint, Movie+ combines the emotional information gathered from a user's biophysical signals and from her facial expression. In particular, Movie+ unobtrusively collects the user's heart rate (HR) and the electrodermal activity (EDA) from the Empatica E4 wristband (empatica.com/en-eu/research/e4/) in real-time while she watches a video. In addition to the biophysical data, the app detects a set of basic emotions (see Figure 2) from the user's facial expressions utilizing the Affectiva SDK (affectiva.com/product/emotion-sdk/). Drawing on *Post Content* metaphor offered by Epstein et al. [3], at the end of the playback the Movie+ system generates two types of emotional fingerprints based on the collected data: (1) synthesized summaries in the form of graphs (e.g., Figure 3), illustrating the polarity of the emotions over a clip's timeline (Figure 4) and the user's physiological signals, namely, HR/EDA (Figure 5); and (2) "the most emotional moment" of a clip (Figure 1b). Subsequently, the user can select the one that best represents her own experience and which is worth sharing with others. either privately (e.g., as an instant message) or publicly in the anonymous form (e.g., with our metadata server).

2.2 The Supporting Web-Service

The RESTful metadata service stores users' individual and aggregated emotional fingerprints for each YouTube clip using JSON format. Emotional metadata are linked to a specific user, video, and moment in time, so they can be eventually retrieved and visualized in real-time mode. We additionally implemented Go-bindings for FFmpeg multimedia library to generate a summary (in a form of a GIF) of the most exciting moment of the clip for a given user.

3 CONCLUSIONS AND FUTURE WORK

We presented Movie+, an interactive prototype that allows one to create and share emotional fingerprints of a recently viewed video clip or a movie with family members and friends. We discussed the rationale, the system architecture, and detailed how the fingerprints are captured and collected.

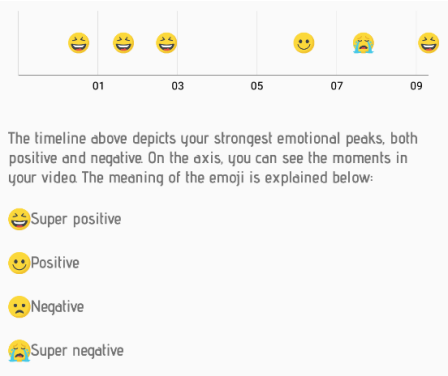

Figure 4: This graph shows the valence component (e.g. the polarity), stemming from the user's facial expression, on the video clip's timeline (represented in seconds). Emojis designed by Vectors Market from Flaticon.

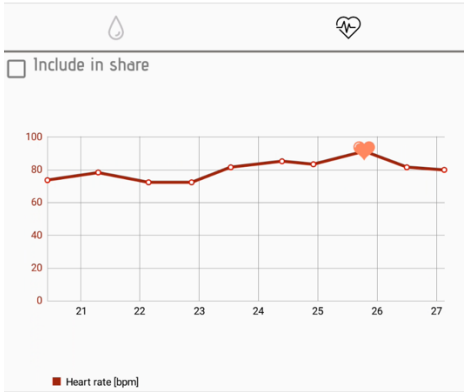

Figure 5: HR of a user during the video clip's timeline (represented in seconds), we use a marker (a heart symbol) to identify the highest value of the HR, representing the most exciting moment of the video clip.

In our future work, we plan to conduct a field study to elicit social dimensions of users' emotional fingerprints for YouTube video clips and movies. We particularly see the value of exploring such effects when video clips are being played on a handheld device (e.g., a tablet) owing to changing video and TV consumption patterns towards mobile devices for young adults in the US[1]. The goal of this qualitative inquiry is to explore what types of *Post Content* [3] are most attractive for users when it comes to sharing among family members and friends. Ultimately, the study will synthesize participants contemplations and reflections on how personal ubiquitous technologies can facilitate these sharing practices in the future when movie viewing experiences will be ubiquitously available in virtual immersive environments.

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REFERENCES

[1] Jed R. Brubaker, Gina Venolia, and John C. Tang. 2012. Focusing on shared experiences: moving beyond the camera in video communication. In Proceedings of the Designing Interactive Systems Conference (DIS '12). ACM, New York, NY, USA, 96-105. DOI: https://doi.org/10.1145/2317956.2317973

[2] Franco Curmi, Maria Angela Ferrario, Jen Southern, and Jon Whittle. 2013. HeartLink: open broadcast of live biometric data to social networks. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13). ACM, New York, NY, USA, 1749-1758. DOI: https://doi.org/10.1145/2470654.2466231

[3] Daniel A. Epstein, Bradley H. Jacobson, Elizabeth Bales, David W. McDonald, and Sean A. Munson. 2015. From "nobody cares" to "way to go!": A Design Framework for Social Sharing in Personal Informatics. In Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing (CSCW '15). ACM, New York, NY, USA, 1622-1636. DOI: https://doi.org/10.1145/2675133.2675135

[4] Azadeh Forghani, Gina Venolia, and Kori Inkpen. 2014. Media2gether: Sharing Media during a Call. In Proceedings of the 18th International Conference on Supporting Group Work (GROUP '14). ACM, New York, NY, USA, 142-151. DOI: https://doi.org/10.1145/2660398.2660417

[5] Anna Macaranas, Gina Venolia, Kori Inkpen, and John Tang. 2013. Sharing Experiences over Video: Watching Video Programs together at a Distance. In: Kotzé P., Marsden G., Lindgaard G., Wesson J., Winckler M. (eds) Human-Computer Interaction – INTERACT 2013. INTERACT 2013. Lecture Notes in Computer Science, vol 8120. Springer, Berlin, Heidelberg. DOI: https://doi.org/10.1007/978-3-642-40498-6_5

[6] Daniel McDuff, Rana El Kaliouby, Thibaud Senechal, David Demirdjian, and Rosalind Picard. 2014. Automatic measurement of ad preferences from facial responses gathered over the internet. Image and Vision Computing, 32(10), pp.630-640. DOI: https://doi.org/10.1016/j.imavis.2014.01.004

[7] David A. Shamma, Marcello Bastea-Forte, Niels Joubert, and Yiming Liu. 2008. Enhancing online personal connections through the synchronized sharing of online video. In CHI '08 Extended Abstracts on Human Factors in Computing Systems (CHI EA '08). ACM, New York, NY, USA, 2931-2936. DOI:https://doi.org/10.1145/1358628.1358786

[1] https://www.statista.com/chart/8660/smartphone-vs-tv-usage/