Sensing Audience Response – Beyond One Way Streaming of Live Performances

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1. Introduction

One of the aims of the Vconect program is to support the area of interactive mediated performance through videoconferencing technologies, featuring automated editing (orchestration) and composition of multiple live audio-video streams onto multiple screens based on cues originating from directional audio, face detection and physiological sensors. Currently, live performances are reaching a wider audience by streaming to cinemas and audiences at home. However, there are no possibilities for remote audience feedback.

2. Exposition

Galvanic Skin Response (GSR) measures excitation of the sympathetic nervous system and has been applied to measure audience engagement [1,2], usually experiments in which a single person watches a video recording of a performance. We measured simultaneously the GSR of 15 people watching a live theatre performance. The readings were synchronized with video recordings of the performance and the audience. The audience filled out questionnaires aimed to evaluate the emotions that the performance evoked.

2.1 Elaboration

Seven Females (mean age 28.29) and eight males (mean age 23.13) took part in the experiment. They were the audience for a short theatre performance and their GSR was monitored throughout.

The GSR measurement system (Figure 1) consisted of 15 GSR sensors. Five sensors were connected to three Arduino UNO boards (sample rate 1Hz). Xbee RF modules were used to create a wireless network such that the GSR data were sent directly to a laptop. This ensured the synchronization of all GSR readings. Cameras recorded the audience and the performance. Video streams were synchronized (post production) with GSR data.

Student actors devised a 28 minute comedy play that was aimed at audience participation and produced occasional audience “shocks” (e.g. popping balloons) to elicit the occurrence of GSR spikes during the performance.

Before the performance participants filled out a short questionnaire about the type and intensity of emotions they had experienced during the day. Afterwards, participants filled out a questionnaire about emotions experienced during the play.

3. Results

We found that GSR readings of ten participants correlated closely (on average r = .86, p<.01), showing an initial rise in GSR followed by a flattening towards the end of the performance. Spikes were identified that corresponded to the intended “shocks”, e.g. balloon popping. Five participants displayed different patterns: two showed an initial rise in GSR followed by a decrease; two showed an initial lack of rise in GSR followed by an increase and one participant displayed a consistent drop in GSR. Using the video footage we were able to identify the clusters based on the content of the performance.

4. Conclusions

We found that GSR readings of most of the audience were closely correlated, following a curve where in the initials stages readings were low and as the play progressed this increased steadily, most likely reflecting an increase in engagement with the play across time.

References
