

Measuring Viewers' Heart Rate Response to Environment Conservation Videos

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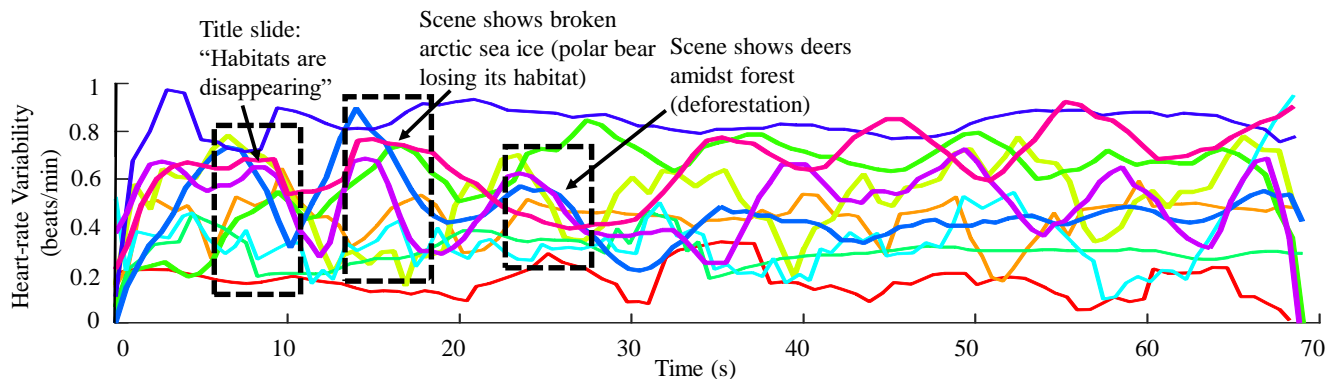


Figure 1: Heart rate variability across ten participants is shown for the video *World Disappearing*. The black dotted regions mark regions of interest, where significant cardiac deceleration can be observed.

Abstract

Digital media, particularly pictures and videos, have long been used to influence a person's cognition as well as her consequent actions. Previous work has shown that physiological indices such as heart rate variability can be used to measure emotional arousal. We measure heart rate variability as participants watch environment conservation videos. We compare the heart rate response against the pleasantness rating recorded during an independent Internet survey.

Keywords: heart rate variability, video understanding

Concepts: •Human-centered computing → User studies; •Applied computing → Marketing;

1 Introduction

Public service announcements are used by environment conservation organizations to influence public perception and hopefully, behavior. Previous research has shown that emotionally arousing images and videos can trigger physiological responses such as heart rate variability [Bradley et al. 2008; Soleymani et al. 2009]. This physiological response can be used as a tool to study how positive and negative messaging impacts a viewer.

2 Our Approach

For our experiment, we used five environment conservation videos as stimuli. We collected ECG data from 10 participants as they watched the videos, using a bluetooth-based BITalino board. The raw ECG sensor values are processed to find peaks in the QRS complex, and instantaneous heart rate is computed as the inverse of the interval (R-R interval). The overall statistics of the instantaneous heart rate across all participants indicated that the average heart rate range shows a U-like trend when the videos are ordered by

pleasantness score. This score was derived from an Internet survey, comprising 542 participants who ranked each video for pleasantness on a scale of 1 to 9, 9 being most pleasant (Figure 2). This trend indicates that videos rated as most pleasant and most unpleasant have the highest heart rate range, suggesting that people were more responsive to the audio-visual cues being presented to them.

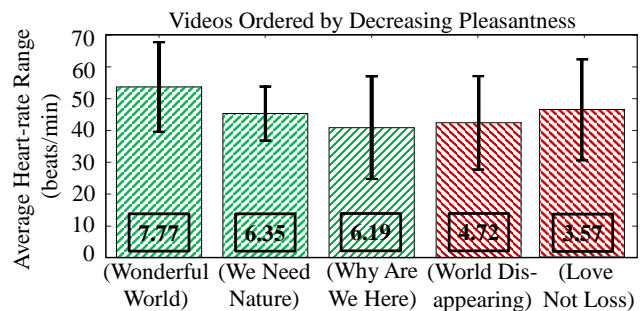


Figure 2: Bar chart showing the average range of heart rate across participants for the five stimuli videos, arranged in decreasing order of pleasantness ratings (shown in black rectangles). Average heart rate range is stronger at either end of the pleasantness scale.

We normalized the heart rate data between 0 and 1, and smoothed it with a moving average filter. We looked for consistent patterns in the smoothed heart rate data across participants. Figure 1 shows the heart rate variability for ten participants, for the video *World Disappearing* (negative messaging). The first dotted rectangle displays an alarming message that habitats are disappearing, causing a heart rate deceleration. The second dotted rectangle corresponds to a scene showing a polar bear as it loses its habitat, i.e. the arctic sea ice is broken. Similarly, in the third dotted rectangle, the scene comprises a forest and deer, indicative of deforestation.

References

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