

Interactivity of an Affective Puppet

Céline Coutrix, Prayag Narula, Matti Helin, Giulio Jacucci, Stefano Roveda

▶ To cite this version:

Céline Coutrix, Prayag Narula, Matti Helin, Giulio Jacucci, Stefano Roveda. Interactivity of an Affective Puppet. 2009. hal-04447842

HAL Id: hal-04447842 https://hal.science/hal-04447842

Submitted on 8 Feb 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Interactivity of an Affective Puppet

Céline Coutrix, Prayag Narula, Matti Helin, Giulio Jacucci Helsinki Insititue for Information Technology (HIIT) Helsinki University of Technology and University of Helsinki P.O. Box 9800, 02015 TKK, Finland {Firstname.Lastname}@hiit.fi

Stefano Roveda

Studio Azzurro Via Procaccini 4 C.O. La Fabbrica del Vapore 20154 Milano Italia stf@studioazzurro.com



figure 1. View of the test of the application in the science museum in Naples, Italy.

Abstract

This paper describes a computer-animated puppet responding to multimodal and affective inputs from a group of spectators in order to engage them in the visit to a science museum. In order to compute the emotional state of the audience, our system allows fusion of information acquired from microphone and camera input. The objective of our demonstration is to put forth a mechanism for using emotions for group interaction and to provide an example of real world application of this technology.

Keywords

Interaction, Emotion, Multimodality

ACM Classification Keywords

H.5.2 User Interfaces

Introduction

In previous work, digitally augmented puppeteering has been presented [2]. Also the use of emotions as an input or output in interaction has been investigated, e.g. in [3], which shows how to decode and alter the affective states of users. Now, we present the first virtual puppet that is computer animated, providing interactive loops with the spectators through multimodal and affective interfaces. Its aim is engaging users in their visit of the museum, whether they be kids (figure 1), parents or other spectators.

Copyright is held by the author/owner(s). UbiComp 2009, Sep 30 – Oct 3, 2009, Orlando, FL, USA

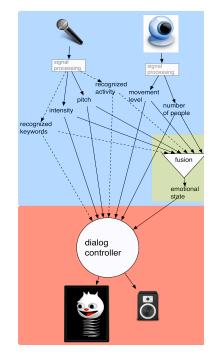


figure 2. System overview.

low and high-level information from the raw video and audio signal (figure 2): audio intensity, pitch, audio activity (music, speech, silence, clapping, whistling, applause, etc.), recognized key spoken words, number of people and the amount of their movement [1]. Also, the timescale between value updates varies greatly from continuous signals (plain line in figure 2) to rare events (dash line in figure 2). Our fusion component (green in figure 2) allows transforming complementary and redundant input values into a comparable scale and provides usable data for the dialog controller (figure 2), e.g. arousal value of the interacting group.

System

numbers,

overview

2, in order to

As shown in figure

engage the visitors

movements, noise,

voices and speech

are analyzed to

compute overall

emotional states

aspects. These

then trigger the

puppet.

The input

animations of the

components of the

system (blue in figure 2) provide

us with several

kinds of data, like

and other semantic

as a group, their

According to the input and the computed emotional state of the audience, the system controls the puppet on the screen and through the speakers (red in figure 2), e.g. its position, facial expression or clothes. For instance, the arousal of the group is used to amplify the reactions of the puppet (e.g. bigger smile) in order to improve the engagement of the audience.

In the context of the science museum (figure 1), the affective puppet allows the visitors to be engaged in their visit to the museum. This system allows the museum curator to propose and install several interactive puppet areas scattered throughout the museum, which all respond uniquely to visitors, whereas a sole human puppeteer could only interact with one area at a time.

Discussion

Our demonstration shows a real-world ubiquitous application using emotions and multimodality with the interaction of an audience. In order to better assess its limits, the accuracy of the emotional model will be evaluated (e.g. through system logs and video analysis) along with the user experience (e.g. through questionnaires) during successive lab and field evaluations.

References

[1] http://www.callas-newmedia.eu/

[2] Bottoni, et al. CoPuppet : Collaborative Interaction in Virtual Puppetry. *Transdisciplinary Digital Art. Sound, Vision and the New Screen*, Springer, 2008, p. 326-341.

[3] Shugrina, Betke, Collomosse. Empathic painting: interactive stylization through observed emotional state. In *Proceedings of NPAR'06*, ACM Press.