

El Niño – An Emotion Avatar for Casual, Collateral Communication

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Zusammenfassung

El Niño is the prototype of a set of physical avatars for casual communication. The system is designed to enhance the emotional connection and awareness between people in long distance relationships by providing a low-threshold channel for casual communication. Two stationary anthropomorphic robots are used as tangible user interfaces that can mimic human emotions by displaying symbolic facial expressions on low-resolution screens, in order to reflect the emotional state of the user. The system allows its users to casually express their emotions over a distance through dedicated networked objects. El Niño is currently a functional work-in-progress prototype. The system was built and designed using a combination of open source hardware and a 3D-printed enclosure.

1 Introduction

As of today a wide range of tools and methods for long distance communication are readily available and commonly used by many people to communicate globally. One can choose from a variety of systems that allow for audiovisual conversations with another person across the globe. The overall experience is often designed to closely mirror *some* of the qualities of a face-to-face encounter in real life. However, audiovisual systems usually require the user to be actively engaged with the system. The perceived awkwardness of a telephone conversation where both partners are silent for a prolonged amount of time can also occur when using an audiovisual telecommunication system. The medium itself appears to create expectations about its use. The effectiveness of non-verbal or even non-visual, casual expression of emotions and feelings is strongly inhibited and might even be misunderstood as a lack of interest in the counterpart and thereby often fail to create a feeling of nearness and empathy without using words or expressive gestures.

It appears that the available audiovisual systems are not necessarily the suitable medium for collateral casual communication. Particularly over prolonged periods of continuous use, the awareness of being constantly captured by a camera produces a notion of surveillance and control, rather than creating the intended feeling of nearness, empathy and awareness. Alt-

though they allow people to be constantly connected with each other, the use of such systems can strongly inhibit people's need for freedom, privacy and even their engagement in other social activities, as the system constantly calls for the user's focus and attention.

2 Emotional Awareness and Empathy over a Distance

The ongoing trend towards a work-culture where a job or an office can rapidly be relocated results in an increased demand by companies for more flexible workers. This brings with it a wide range of implications for people's social- and family-life. Prolonged long-distance relationships with friends and loved-ones are increasingly more common.

The available means for telecommunication such as email, videoconferencing, text-messaging, etc. are largely designed for a purposeful transmission of information and intends to avoid ambiguities in the conversation. This approach fails to provide means for sharing and experiencing other qualities that are usually present in a social situation, such as the feeling of another person's presence and attention, the surrounding climate condition, empathic touches, scents and smells or the spatial immersion in the ambient soundscape. Many attempts have been made to simulate parts of these qualities remotely by various means of technology (Eichhorn 2008, Szigeti 2009, Adalgeirsson 2010). Other research has explored the use of physical avatars with speech recognition capabilities (Bartneck 2003) or asymmetric communication using images (Chang 2001) for intimate communication.

However, the importance of creating a remote awareness of each other's *mood* has often been neglected (Lottridge 2009). Many instant messaging systems allow for the creation of so called *mood messages*, usually short snippets of text that are intended to give others an idea of how a person currently feels.

Whereas the available means of text or additional audiovisual media might suffice to give some information about a person's current mood, they often do not reflect the emotional significance of a beloved person and their importance to one's own emotional well-being. Such messages are commonly displayed on the screen of *multipurpose* computing devices such as a personal computer or a contemporary mobile phone. These devices, including the data presented on their screens, are – by design – ephemeral and challenge the user with distracting, and seemingly endless amount of possibilities for their use. Mobile devices – particularly mobile phones – are also designed to be easily stowed away and transported, making them temporarily inaccessible. This makes such devices less-suitable as tools for remote emotional awareness that also express the significance and constancy of a stable social relationship. The ephemeral nature of the object that intends to communicate the mood of a beloved one, conflicts with the emotional significance of the message.

The system presented in the following attempts to address this issue by introducing a dedicated object that embodies the mood of a beloved person in a remote location. It acts as a tangible and persistent emotional avatar that provides a way for casual – yet semantically significant – communication.

3 Prototype

The prototype of *el Niño* consists of two identical – slightly anthropomorphic – standalone objects (see Fig. 1) that both work as in- and output devices. The devices are equipped with a low resolution LC-Display, a rotary encoder and a pushbutton. Both devices can exchange data and synchronize their state over the internet, using a wireless network connection. The display is mounted on the head of the device and used to show different, animated abstract facial expressions (see Fig. 2) that serve as an indication of the emotional state of the user.



Figure 1: Using *el Niño* – Select and confirm

3.1 Using the *el Niño*

By turning the rotary knob on the front-facing belly of one device the user can browse through the available facial expressions and select the one that comes closest to their individual mood. On pushing down the head of the *el Niño* the selected expression is transmitted to the second device and displayed on the remote screen. A mechanism transforms the downward motion into a shoulder shrug to confirm the user input. If the user ends the browsing process without confirming a selection the original facial expression is restored. The available library of expressions can be extended and customized by using separate software that runs on an additional computer and enables users to create their own faces and upload them to the *el Niño*.



Figure 2: A selection of facial expressions as displayed on the *el Niño*

3.2 Hardware Design

The embedded electronics are based on the Open Source electronic platform of Arduino which allowed for a quick development process. The enclosure of the device consists of custom designed, 3D-printed parts that underwent some manual post-processing to achieve the desired appearance and haptics of the surfaces.

4 Conclusion

We introduced the early prototype of *el Niño*, an experimental platform for casual expression of emotional awareness over a distance. The design questions the role and suitability of multipurpose computing devices as a medium for intimate, emotional communication, as opposed to specialized digital artifacts which only serve one purpose. The presented system shows a case study on how the use of a dedicated interactive artifact can enhance the emotional value and persistence of personal messages by becoming a physical embodiment of the message itself. The *el Niño* does not intend to replace common instant messaging systems. Instead it adds an additional channel which – due to its physicality and appearance – attempts to amplify the significance of a message. The limited set of emotional expressions that are available on the *el Niño* can make communication slightly ambiguous and their interpretation often depends on the context of the conversation. However, when using the system as an *additional* means for casual communication along with existing systems, sender and receiver usually have an intimate understanding of the other person's context, thoughts and recent activities which influences the interpretation of the simple facial expression displayed on the *el Niño*. The perceived semantic significance of the same expression is highly individual and can be fundamentally different for different people and different contexts. This vagueness and context dependency makes it hard for outsiders to decipher the meaning of a message, which can add to the perceived intimacy and personal significance of a message, thereby making the message more valuable to the receiver.

5 Outlook

Ongoing work is aimed at further exploring the potential of dedicated artifacts to enhance the significance and value of intimate telecommunication. Along with a series of user observations we plan to investigate whether concepts such as kinematics, human-sensing and simple gestures. To enable individuality, the appearance of the *el Niño* as an anthropomorphic character was chosen to be largely neutral in order to entice the user to use it as a blank screen that can be fully customized, similar to the popular 3D-vinyl figures (Kidrobot 2012) that originate in the street-art scene and have yielded a special genre of 3D graffiti artworks. This idea could further be extended by allowing users to create enclosures with customized shapes. For this purpose, all source code and CAD-data will be released under an open source license to allow for custom modifications of the *el Niño* by its user community.

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