

Virtual Emotions and Facial Expressions

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I am using 3D scanning devices in an AHRC-supported project developing a prototype for emotional facial expressions in animals and humans. The first screening was at the Triangle project space at Chelsea College of Art & Design in London in February 2007.



Figure 1: documentation shot of the installation 'Virtual Emotions', Triangle project space, London, 2007.

My project 'Mapping Virtual Emotions: 3D-surface capturing of animated facial expressions in animals and humans' is in progress. The focus of this work is a theory suggested by Charles Darwin (1872) in Ekman (1998) over 125 years ago. It is the idea that our human facial expressions, contrary to what we often like to believe, are not unique to human beings. Darwin's metatheory of the continuity of species explains that neither our facial expressions nor the musculature in the face are unique to humans. Both are the product of evolution and internal physiology (Ekman 1998).

I use a 3D high-resolution laser scanner to capture animal and human faces. I use the data from these faces, animate and then combine them with human emotional facial expressions. In doing so it is hoped to visualize through critical experimentation what evolution has selected and accommodated. While it is often through new technologies that we aim to expand our current understanding of the world, I would question whether it is possible to imagine beyond this in terms of human perception and the way we analyze and rationalize,

taking into account the emotional responses we usually have as human beings.

As suggested in my original proposal, I have studied theories of emotions through the works of Damasio, Darwin, Ekman and LeDoux. Paul Ekman's work was particularly relevant to the study of human facial expressions, while I returned to Darwin (and Ekman's commentary on Darwin's book 'The Expression of the Emotions in Man and Animals', from 1872) for details on animal facial expressions.

Building on my research into consciousness studies and emotions, I have developed a new artwork to reveal aspects of characteristic human emotions (i.e. laughing, crying, frowning, sneering, etc.), which uses new technology, in particular digital scanning devices and special effects animation software. The morphing of the human and animal facial data are not merely layers of the different scans but an algorithmic programme has been applied which merges crucial landmarks in the animal face to match with the human. The results are morphings of the physical characteristics of animals with the emotional characteristics of the human face in 3D. Examples of stills and animated sequences are given below and in more detail during the presentation in Singapore.



Figure 2: Screenshots from the animation '3D Virtual Emotions'

My previous research into the dreaming brain (Rauch 2005) led me to the issues of emotion. Dreaming is driven by the forebrain system of the brain, and, as Hobson justifies, it is primary emotion that seems to shape the dream plot. The limbic system and, in particular, the amygdala shown in PET-scans are hyperactive, causing emotional direction in dreaming (Hobson 2001). One of the leading figures in emotion research is Antonio Damasio.

Damasio discusses the error of the Cartesian view wherein scientists studied only the body, while matters of the mind were left to religion and philosophy. Only recently have cross-disciplinary approaches emerged in the area of brain/mind study. Damasio's concern about this mutually exclusive dualism, where the brain and mind are seen as separate entities, is of interest for consciousness research. "The organism constituted by the brain-body partnership interacts with the environment as an ensemble, the interaction being of neither the body nor the brain alone" (Damasio 1994). Although consciousness arises within the brain it is still questionable whether this therefore situates the mind in the "physical realm" of the brain (Damasio 1994).

Damasio considers the mind not only to be embedded in the brain but in the rest of the body too. He does not only challenge the notion of a separation between brain and mind, and the Western tradition of dividing brain experience from cultural experience, but also the division made between reason and feeling. He investigates issues of decision-making, and states that if there is an impairment of emotions, we would not be able to be rational either. He suggests that a correspondence between emotional feelings and the rational mind is vital. In the words of Damasio "the mind arises from activity in neural circuits" (Damasio 1994). He does not say that the mind is in the body, but "that the body contributes more than life support and modulatory effects to the

brain. It contributes a content that is part and parcel of the workings of the normal mind" (Damasio 1994).

According to Damasio, mind is an integrated function of an advanced organism arising through evolutionary selection. The developing brain, when it became complex enough, produced mental responses (i.e. thoughts) that may have contributed to survival. As he states: "the minded brain minded the body" (Damasio 1994). The survival mechanism can be thought of as a greater appreciation of external circumstances, with a "prediction of future consequences by way of imagining scenarios and planning actions" (Damasio 1994).

I believe that the face represents a particularly important part of the body. Emotional facial expressions can reveal conscious and subconscious feelings to the outside world. My experiment with the scanned animal and human faces suggests a seamless evolution of emotions from the animal to the human. In addition it suggests the virtual model to be integrated in a larger idea of realities that exist in parallel. The natural reality seems to ask for a synthetic addition.

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- 1 Darwin, Charles. 1872, 1998. *The Expression of the Emotions in Man and Animals*, introduction and afterword by editor Paul Ekman. London: Harper Collins Publishers.
 - 2 Ekman, Paul. 1998 ed. *The Expression of the Emotions in Man and Animals*. London: Harper Collins Publishers, pp. 25 – 28.
 - 3 Rauch, Barbara. 2005. Ph.D. *Natural and Digital Virtual Realities: A practice-based exploration of dreaming and online virtual environments*. University of the Arts London.
 - 4 Hobson, Alan. 2001. *The Dream Drugstore: Chemically Altered States of Consciousness*. Cambridge, MA: MIT Press, p.77.
 - 5 Damasio, Antonio. 1994. *Descartes' Error: Emotion, Reason and the Human Brain*. London: Papermac, Macmillan General Books, pp.88 – 95, 226 – 230.