



Innovations Workshops

Emotion technology

Article

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July 2004

Many strands of academic study and commercial investment have now been woven into a field loosely known as artificial emotion technology or affective computing. This involves developing tools, resources and strategies for use at the point where human emotion meets technological capability. The field is wide and includes such applications as voice interpretation of human emotion, and empathetic software and robotic devices that will respond to, and perhaps over time even extend, the range and nature of human communication.

How do you get a sense of what the future might hold in the field of artificial emotion technology? The approach taken by Futurelab in July 2004 was to gather academics, media professionals and commercial application developers to read the runes on one of the most important and developing areas of human-computer interaction.

The big questions came early in the day, starting with "What is Emotion - how do we display it?" One suggestion was that: "Emotion is the sand in the machine of action". But the consensus was that emotional range is much more useful and powerful than that. It was thought in fact that emotion conferred higher reasoning potential than that which would be possessed by a purely rational machine.

Dylan Evans (from the University of the West of England) observed that currently we seem to "oscillate in developments between very carefully thought-out models of machines painstakingly developed and demonstrating something which approximates to emotional-type behaviour in an artificially constructed system", and at the other end of the spectrum we resort to "any old kludge" that provokes emotion in the user using a carrier instrument such as a computer programme or simple robot.

Discussion during the day took the delegates to a place where technological constructs such as computers, avatars and robots may soon exhibit or mimic human understanding and sentiments to such an extent that we might begin stop thinking of them as machines and start to interact with them in novel, useful and perhaps even therapeutic ways.

One of the earliest areas of artificial emotion technology to enjoy commercial success has involved the detection of emotion in the human voice. Using profile recognition and algorithms such systems can potentially 'deduce' how someone might be feeling by the way they sound. The floodgates of potential application were opened as the group brainstormed the potential; irate callers could be promoted in the queue by computer analysis of their voice pattern and companies could automatically analyse the voice patterns of their own telesales workers. In education, voiceprints might show student receptivity and confidence to new and difficult content.

Next the group considered the potential for developing small robotic devices - real or virtual - invested with some 'spark of life' which in turn provokes an emotional response or even some 'attachment' from humans engaged with them.

Several tools now exist as a type of 'computer pet', where you can talk to or interact with devices such as an 'on-screen animated cat' which moves around your desktop and reacts to your tone of voice. As the system is not repetitive but subtly different it starts to mimic the variety and complexity of 'real life'. Sometimes we are told it even takes five minutes to get over the argument that you had before so that you can start to rebuild the 'relationship'.

From here we heard of the work at the University of Hertfordshire where a research project, led by Lola Canamero, is building toy robots with some features of emotion for use by autistic children. The aim is to look at what clues and cues such children take when recognising emotion, and in the process give the students safe non-threatening entities for interaction.

Already projects have shown how gameplay with agents clearly fulfils a social and emotional need. We heard from Jane Prophet (Westminster) of the Technofear project where over 100,000 users created over one million creatures to inhabit an online world: "The creatures

had no emotions, they just ran around and bred, but the emotional attachment and the projection of anthropomorphic qualities, including emotion from the user to the creatures, was fundamental to how the project developed. It ran for seven years." It also proved popular with adults outside the target group whose own children had left home and who needed the opportunity to nurture another organism.

Many delegates considered that such emotional technology tools might mimic, extend and support human interaction and emotional nurturing, and could have a major impact on improving mental health - the therapeutic benefits potentially helping to reverse the current 'depression epidemic'. Emotion technology systems will soon be cast in the buddy/mentor role in education, and already some trials have been carried out using immersive software as an agent to explore the issues surrounding bullying, where the neutrality and vividness of on-screen scenarios has a pre-counselling and empathetic role to play. "Students were really engaged by it" was an early stage research observation, and this was followed by discussion around the idea that these levels of engagement and neutrality might in turn come close to creating optimum conditions for effective learning where the challenge is high and the threat is low.

The issue of increased passivity in TV viewing, games playing and computer use behaviours was also considered - especially in the case of younger children watching TV without a parent or sibling to mediate and extend the experience - leading to increased danger of language development steps being delayed or lost at a crucial time. A future scenario was imagined that might provide for a more active viewing experience, achieved with the assistance of a cuddly robot (disguised as a doll in the child's lap). Signals could be sent to the robot via a set-top box that would initiate activities and interaction relevant to the viewing experience.

In summary the field of emotion technology is growing fast - stretching from intelligent agents or avatars arriving shortly on your mobile phone to speak recorded messages, to "creatures in robotic reality or within virtual worlds displaying the characteristics of living organisms and evoking responses and engagement from us". Many embodiments already exist in the research field; as they become developed for learning practice they will offer much to the education mainstream.