



The *Affective Mirror* is an interactive standalone demo developed on the drawing board of the Multimodal Interaction project. The user enters a cabin and looks in the mirror behind which is a device that allows the mirror, as it were, to 'look back'. The device registers and interprets the emotions of the user on the basis of his voice and facial expression. Then the mirror image changes, with the aim of influencing the emotions of the user and then reacting again. Actually it is a multimodal user interface that knows how to adjust to the emotions shown by the user, a dataprocessing system that gives the emotions meaning and tries to influence these realtime.

MultimediaN: behind the face

At the beginning of next year a team of six astronauts will be locked up for 520 days on an isolated Russian Institute for Biomedical Problems (IBMP) base in Moscow where they will simulate an entire mission to Mars. The aim: to study the psychological and medical problems that may occur during such a journey. TNO methods and techniques make it possible to monitor and analyse the crew's emotions.

The basis for this is laid in the MultimediaN project completed last year in which TNO collaborated with universities, companies and social institutions. In the *Multimodal interaction* sub-project TNO worked with the TU (University of Technology) Delft, Waag Society, V2, Vicar Vision and LogicaCMG to develop the basic technologies to teach the computer to observe, record and influence human emotions.

INFLUENCING EMOTIONS

TNO expert Professor Mark Neerinx, professor of man-machine interaction at the TU Delft, believes that it is socially vital to be able to draw a perception from voice, facial expression, posture and gesture – and to influence these.

'Little research had been done on user influence. Substantial databases of emotions existed, but these were performed. We have recorded spontaneous emotions by getting people to game together. We have made significant progress within the project in the field of classifying emotion from speech, such as pitch and speed of speech, and facial

expression. It is about being able to properly detect different emotions like fear, joy and anger, and to understand how these emotions affect behaviour and physical and mental health.'

The number of applications is numerous. During the simulated mission to Mars, in which TNO became involved through the European Space Agency, astronauts will learn to be aware of their own and their colleagues' emotions and so better be able to solve potential problems 'en route'.

Neerinx: 'We have done something similar on a naval vessel where people work under considerable pressure, which makes such methods so vital. They help prevent stressful situations.'

CHILD ABUSE

In the *Professional's dashboard* sub-project the emphasis lies on developing new resources for video analysis and forensic research into video images. Partners and users are the TU Delft, the University of Amsterdam (UvA), NS

(national railways), ProRail, NOC*NSF, NFI, the police and the company ZiuZ.

Dr John Schavemaker, TNO expert in multimedia: 'Looking, for example, for images of child abuse in the PC of a suspect, and sometimes in hundreds of CDs and DVDs, is not just time-consuming but also emotionally testing for the criminal investigator. Together with the University of Amsterdam and ZiuZ visual intelligence we have developed a method for the police to automatically and rapidly scan video material in a very specific way. We have made algorithms that can detect skin in video images; the system detects the pixels in which skin occurs, filtering the images and presenting them in order of relevance. This allows the investigator to quickly identify which fragments are most likely to contain incriminating images. The system will in the future also be able to remember the details and positions of objects in a room. If that room is where abuse has occurred earlier, you can quickly discover whether that room also appears in other videos.'

Almost all the police departments now use this video analysis method. A closely related European project is I-Dash in which TNO is working with the Dutch parties referred to above (UvA, ZiuZ) and universities from England and Portugal on methods of quickly detecting child abuse on the internet. Europol is one of the interested parties.

Info: mark.neerinx@tno.nl,
john.schavemaker@tno.nl;
www.multimediaN.nl, www.crewassistant.com,
www.i-dash.eu