3D WORLD

THE MAGAZINE FOR 3D ARTISTS

INSPIRATION / EXPERT TUTORIALS / CD IN

STAR POWE

Complete project: create a detailed re
of the sun using fluids and part

SKIN DEEP

The hidden anatomy of PS3's poster girl: we uncover the 3D inside Heavenly Sword

SPECIAL REPORT • SPECIAL REPORT • SPECIAL REPORT • SPECIAL REPORT

SIGGRAPH 2007

NEWS, COMMENT AND ANALYSIS

+

WIN A CUSTOM PC WORTH $3,900

ESCAPING THE UNCANNY VALLEY

A BEGINNER'S GUIDE TO CINEMA 4D

PRO TIPS FOR TIGHTER ANIMATICS

HOW TO SELL ANIMATIONS ON DVD

CD INSID

ARCHITECTURAL MO
MIKI 1.0 POSER FI
TEXTURES & HDR

WORTH $

NOVEMBER 2007

Future
MEDIA WITH PASSION

9 771470 43801

SPECIAL REPORT • SIGGRAPH 2007 • NEWS, COMMENT AND ANALYSIS

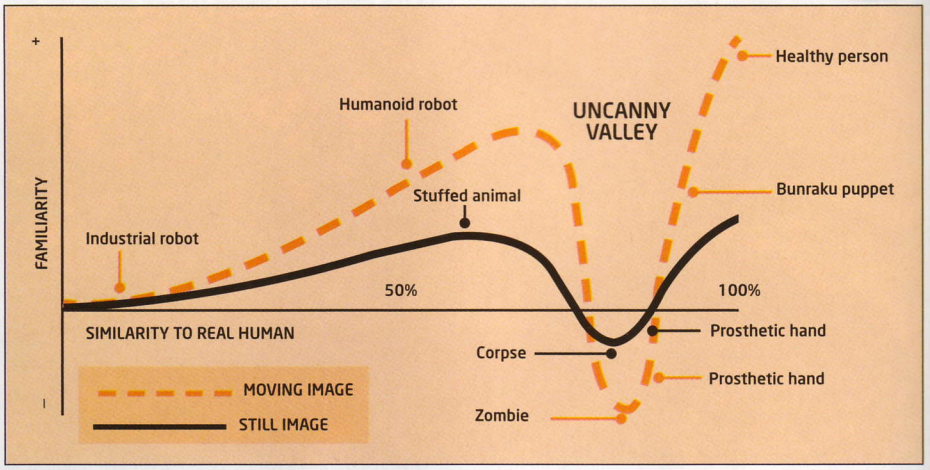
Escaping Uncanny Valley

SHOW REPORT Siggraph panel reveals new twists on old problem in creating engaging CG characters

Roboticist Masahiro Mori introduced the term 'Uncanny Valley' in 1970s when he plotted emotional response against similarity to human appearance in a study designed to provide insight into psychological reaction to robot design. His studies showed that initially, the closer artificial beings come to resembling humans, the more positive our emotional response; but that as resemblance approaches 100%, our responses shift sharply to disbelief and even disgust, before recovering when total realism is achieved. Now that CG characters are achieving levels of resemblance that fall into this transitional zone, Mori's Uncanny Valley presents a problem to games and special effects artists.

And according to research presented at Siggraph this year, that problem may be even more complex than we first thought. At the show, a panel including Karl MacDorman of Indiana University and Thierry Chaminade of University College London, and *King Kong* VFX Supervisor Joe Letteri, gathered to discuss new theories and evidence.

Firstly, the meaning of 'uncanniness' itself is in doubt. In his research, MacDorman conducted an experiment screening 17 robot video clips and one human clip using 143 Indonesian participants who had never been exposed to robots. They rated the videos according to a list 27 emotions and four terms including 'eerie', 'creepy', 'strange' and 'human-looking'. MacDorman's study then mapped local topological relationships showing which emotions were closest to each other. His conclusion was that fear stood out as being a strong predictor of eeriness: a significant finding, because past studies have shown disgust is the main factor.



The drop-off in our emotional responses to CG characters as they approach 100% resemblance to humans is more acute when they are seen in motion: animators take note!

Research also shows that uncanniness varies with the part of the body on show – regions that appear to be most disturbing are the eyes, mouth, and hands – and the age of the subject.

Letteri, who worked on the CG character Gollum in the *Lord of the Rings* movies, provided the industrial perspective on the issues at stake, revealing that while Andy Serkis's original live-action performance was flawless, if the animation team matched it exactly, the CG character ceased to look believable. To make the character come alive, they had to soften up some aspects, and emphasise others.

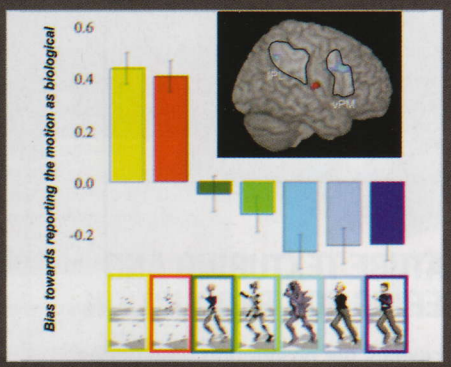
In fact, when asked to pick the factor most critical to the phenomenon, every panellist cited variations in movement. MacDorman said jerkiness – the lack of synchronisation between speech and gesture – is a major issue with robotics. Letteri felt that perfecting co-ordinated and overlapping movements was critical, and Chaminade suggested synchronisation of micro-movements. It seems that if we are ever to escape the Uncanny Valley, our hope lies in the hands of animators.

www.siggraph.org

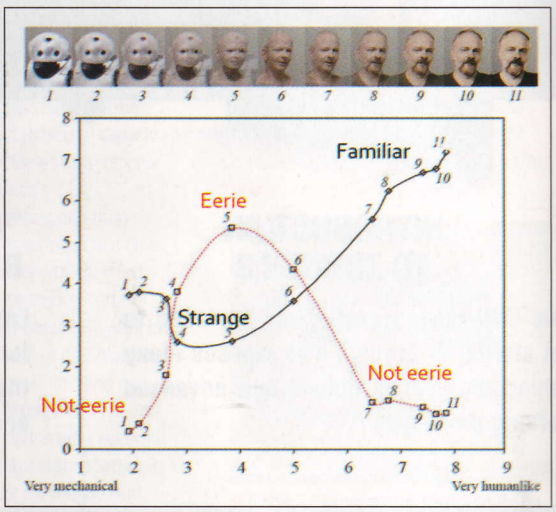
IN FOCUS | The Uncanny Valley of the mind

University College London's Thierry Chaminade reveals which areas of the brain are in use when we look at images of real and artificial people

"Mirror neurons [neurons in the brain which fire both when we perform an action and when we observe another person perform the same action] experienced a revival of interest in the 1990s. This resonance between individuals explains observable behaviour such as 'motor interference': that it is easier to imitate the action observed than perform another one. Using brain-imaging techniques, we studied the human mirror system's response to artificial agents. Outside the Uncanny Valley, the bias to report an animated character's running motion as biological decreases with the anthropomorphism of the character; this decrease is associated with activity in the mirror system in the ventral premotor cortex and inferior parietal lobule [pictured, right] in the right hemisphere of the brain. An in-progress experiment using an android robot suggest that its uncanniness causes a surge of activity in the mirror system, as well as in systems controlling attention. One possible



hypothesis for the origin of the Uncanny Valley could be that the mirror system becomes increasingly sensitive to errors in form and motion as the artificial agents become human-like. Getting on the other side of the valley will require elucidating all that influences the mirror system to be able to trick it."



Uncanniness relates to 'eerieness'. MacDorman adapted this graph from Mori's original Uncanny Valley paper for use in his own research