A bright shining lie
**Synthespians, why we don't like them
and their future role in cinema**

Matthias Zabiegly

Traditions
Semester B 2007

Introduction

The visual effects business is receiving much positive attention lately. Nearly every month there is a new animated feature film released to cinemas, the latest example *Shrek the Third* (2007, Dreamworks Animation) produced a box office revenue of about $122 million on its first weekend[1]. All big blockbuster movies that were or that are going to be released in 2007 employ extensive special effects work. With titles like *Spiderman 3* (2007, Columbia Pictures), *Pirates of the Caribbean – At world's end* (2007, Bruckheimer Films) and *Harry Potter and the Order of Phoenix* (2007, Warner Bros.) the coming months are packed with visual effect epics.

Yet in all these films computer generated images are only used to support actors in stunt scenes or to generate environments, worlds or effects that would not be possible to do at such high quality with real life props. The task of creating photoreal digital actors that star in leading roles of big Hollywood movies has only been tackled twice and no announced movie seem to have digital cast for leading roles. The two movies that did have their main cast made up of computer generated photoreal characters are *Final Fantasy: The spirits within* (2001, Square Co.) and *Polar Express* (2004, Castle Rock Entertainment). Both movies didn't do very well at box offices and the reviews were mixed.

This essay is concerned with how people react to synthespians (a term for digital actors coined by Jeff Kleiser in 1989) in movies, why past experiments like Final Fantasy on that subjects were not successful and how future applications of that technology could be used for more prosperous outcomes than what we saw in the past. I will develop a line of thinking that is based on a recurring theme of slow starts of new technology going all the way back to the Lumière brothers in 1869. I will also discuss and apply the notion of the uncanny valley that can be adapted from robotics (where it comes from) to film studies. But firstly I'm going to take a look at traditional film theory and test if it is still valuable in such a radically changed medium as synthespians-cast movies.

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[1] Internet Movie Database – Weekend Box Office revenues, http://www.imdb.com/chart/, 27th May 2007

Adapting film theory for digital actors

Can traditional film theory that is based on the works of, among others, Roland Barthes and Charles S. Peirce still describe modern movies that contain an overwhelming number of effect shots or in other words, things that are not real? Roland Barthes says that "Every photograph is a certificate of presence"[2]. But what happens to that certificate of presence when there are dinosaurs in the picture like in *Jurassic Park* (1993, Universal Pictures) or a walking robot made out of liquid metal as in *Terminator 2: Judgment Day* (1991, Canal+)? Surely we can not take it for granted any longer that something exists only because we see it on the big screen. In Charles S. Peirces' model of indexical, iconic and symbolic signs photographs as well as cinema, as cinema is a photographic medium, belong to the indexical signs as they reference an existing object as opposed to iconic signs that only denote resemblance to the original object and symbolic signs that that have an arbitrary learned signification.[3] Once again that can not fully be applied to special effect movies where there might be an overwhelming amount of things that appear real yet are artificially produced.

The shortcomings of those classical models and ideas in an effects movie age are quite obvious and there needs to be an additional element introduced to describe the apparent discrepancies of the realities we see on screen and our reality better. Stephen Prince does so in his article *True Lies – Perceptual Realism, Digital Images and Film Theory* where he introduces the notion of perceptual realism. "Perceptually realistic images correspond to [real world objects] because film-makers build them to do so. […] Because of this, unreal images may be referentially fictional but perceptually realistic"[4] So artificial objects generated by a computer network somewhere in a basement can seem real to us because of the way they are modelled, how their texture and surface shading looks, the way they are lit, animated and composited onto a background. These objects might not reference any real world objects, certainly there haven't been any dinosaurs around for a rather

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[2] Roland Barthes, *Camera Lucida: Reflections on Photography*, Hill and Wang, New York, 1981, quoted in Stephen Prince, *True Lies – Perceptual Realism, Digital Images and Film Theory*, Film Quarterly, Vol 49, No 3, University of California Press, Berkley, 1996, p. 28

[3] Charles Sanders Peirce, Stanford Encyclopaedia of Philosophy, http://plato.stanford.edu/entries/peirce, 21st May 2007

[4] Stephen Prince, *True Lies – Perceptual Realism, Digital Images and Film Theory*, Film Quarterly, Vol 49, No 3, University of California Press, Berkley, 1996, p. 32

long period, yet we accept these images as real because the way we perceive reality would look in those situations.

There only is one problem with manufacturing perceptual realism on screen. It might be relatively easy to trick the audience into believing that living, walking dinosaurs on an island are real. But building a convincing photoreal human that not just sits somewhere in the background but acts in close-ups, communicating feelings and emotions on screen is much more demanding as "Multiple levels of information capture must be successfully executed to convincingly animate and render living movement because the viewer's eye is adept at perceiving inaccurate information"[5] One of the things the human eye is trained to do is recognizing human animation pattern. We know the way people walk, move and act and use that to identify friends and family. As computer graphics offer the freedom to move a digital character in every way, not just in every naturally possible way but literally in every way, there is a lot of opportunity to get something wrong in the animation. And every person can tell when the animation does not equal natural movements of such a character. They might not know what is wrong but they will sense that there *is* something wrong.

The uncanny valley

In 1970 Japanese roboticist Masahiro Mori was working on a humanoid robot project. He noticed that when his robots only slightly resembled humans people thought they were cute. But when his robots came too close to the human form people didn't find them cute anymore but creepy. The robots did not look exactly like humans; there was that small gap between the robots and the human body that caused an uneasy feeling. Mori described that as the uncanny valley[6]. More than 55 years earlier Sigmund Freud argued in *Animism, Magic and the Omnipotence of Thoughts* that the notion of the uncanny is based on old believes of ghosts and monsters that are still embedded in us. Modern

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5 Stephania Loizidou and Gordon J. Clapworthy, *Legged Locomotion using HIDDS*, in Models and Techniques in Computer Animation, Springer, London, 1993, p. 257 - 269
6 Lisa Bode, *From Shadow Citizens to Teflon Stars: Reception of the Transfiguring Effects of New Moving Image Technologies*, animation: an interdisciplinary journal, Vol 1(2), SAGE Publications, London, 2006, p. 176

believes of science and reason only barely conceal those older believes and our subconscious mind welcomes every opportunity to go back to them. Freud writes "We do not feel quite sure of our new beliefs, and the old ones still exist within us ready to seize upon any confirmation"[7]

Synthespians nowadays are much like Moris robots in the 1970. Films like *Final Fantasy* try to make their digital cast undistinguishable from real humans. However mostly due to technological limitations they do not succeed in that. Technology in computer graphics has developed so much over the past decades. New techniques for modelling, lighting, animation and especially shading the skin of digital actors in a physically correct way were introduced but it is still not easy to get that perfect photoreal look. And even if a still picture of a three dimensional character is accomplished a lot of challenges lie in the animation of that character. As mentioned above the human eye is adept to noticing any small discrepancies in animation. And that does not make animating a character in a realistic natural human way any easier. There are several systems for capturing the motion of real actors and transferring that motion data on a digital double but those motion capture systems produce data of very varying quality. Nearly all of the captured data must be reworked and tailored to the specific 3d models and can't be used on an automated basis.

All those technological inadequacies contribute to that small gap there still is between digital and real actors. That same gap that also separated Moris robots from being accepted as close-to-human also keeps synthespians from being accepted as fully fletched actors on screen. Following Freuds train of thought synthetic actors appeal to our lower instincts, our old believes in ghosts and monsters and that is what kept Aki Ross from *Final Fantasy* from becoming a successful first digital actress. If we want to have synthespians in future movies we need to avoid the uncanny valley at all cost. That can be done by either going the cartoon-route, which is not the topic of this essay, or trying to make the digital actors indistinguishable from real humans. Anything less than

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[7] Lisa Bode, *From Shadow Citizens to Teflon Stars: Reception of the Transfiguring Effects of New Moving Image Technologies*, animation: an interdisciplinary journal, Vol 1(2), SAGE Publications, London, 2006, p. 178

perfection in copying humans will result in a crash at the uncanny valley which will render any movie a failure.

The only successful examples of digital actors being used so far are movies where the synthespians are not staring in leading roles. Synthetic actors reduced to faceless extras in a crowd like in *Titanic* (1997, 20th Century Fox) or *Gladiator* (2000, DreamWorks SKG), hidden in alien forms like Jar Jar Bings, *StarWars Episode 1 – The phantom menace* (1999, LucasFilm), as toys in *ToyStory* (1995, Walt Disney Pictures) or animals characters as in *Stuart Little* (1999, Columbia Pictures) were successful. A remarkable achievement is the completely computer generated newborn baby in *Children of Men* (2006, Universal Pictures). Only when watching the Making-Of it becomes clear that the baby is not real. However it works in favour of the baby in *Children of Men* that a newborn still covered in blood is not a common sight so people do not have that instinctive cognition of not-quite-right 3d graphics. All attempts of creating a recognizable main character as a 3d digital actor have failed so far.

A recurring theme of spooky breakthroughs in technology

In the 1890 when the Lumière brothers showed their first films the audience were swept off their feet by this new and overwhelming technology they witnessed. However there also were critical reviews. After seeing the movies for the first time Russian author Maxim Gorky wrote "Their smiles are lifeless, even though their movements are full of living energy […] Before you a life is surging, a life deprived of words and shorn of the living spectrum of colours – the grey, the soundless, the bleak and dismal life."[8]

This partly refers to the notion of the uncanny valley as the technological limitations in reproducing colour, sound and also playing the film back at the right speed (early movies always seem to play too fast) for Gorky were producing a creepy and uncanny version of real life being portrayed on screen.

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[8] Colin Harding and Simon Popple, *In the Kingdom of Shadows: A Companion to Early Cinema*, Cygnus Arts, London, 1996, p. 5

Technical limitations were also a problem for the first colour movies. In the *Wizard of Oz* (1939, Metro Goldwyn Mayer) the scene before the famous switch to Technicolor was supposed to be in sepia tone. But at that time sepia could not be reproduced on film or television prints so that scene appeared in true black and white. Only in later restorations the original sepia was brought back. "With the Kansas scenes returned to their original sepia tints, however, they closely match the magical opening door and the effect is powerful"[9]

Over a hundred years after the first Lumière brothers films reviews of *Final Fantasy* resemble Gorkys' review in a way that they speak of uneasy discomfort when watching the film. "In reviews, the film's cast of computer-generated actors are variously described as "three-day-old-cadavers (all grey and acting rather strangely)" (LePetit, 2001: 98), […] "not just like real people; they're like really boring people" (Vognar, 2001)"[10]

Final Fantasy gives us another example of early technology being used that is not quite up to the task of reproducing reality in a way that is a hundred percent convincing. It seems, and it is also quite logical, that early adoptions of new technology needs some time and more development to really meet the standards to cross the uncanny valley and reach a point where it is no longer questioned by the audience but genuinely enjoyed. In his book *Orality & Literacy – The technologizing of the world* Walter J. Ong argues that everything that is newly introduced needs a period of adjustment, when people are not yet ready to accept the new either to shortcomings in the new technology itself or because they simply like to hang on to the old a bit longer.[11]

Looking back at the history of cinema and the problems black and white and early colour movies had and how they were fixed eventually it seems that once technology gets more advanced synthespians are bound to become successful one day. This is also

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[9] IMDb, *Wizard of Oz*, http://www.imdb.com/title/tt0032138/trivia, 22nd May 2007
[10] Lisa Bode, *From Shadow Citizens to Teflon Stars: Reception of the Transfiguring Effects of New Moving Image Technologies*, animation: an interdisciplinary journal, Vol 1(2), SAGE Publications, London, 2006, p. 174
[11] Walter J. Ong, *Orality and Literacy – The technologizing of the world*, Routledge, London, 1988

supported by Marshall McLuhan who says that "No society has ever known enough about its actions to have developed immunity to its new extensions or technologies"[12]

But have a reason please

One could argue that there is no reason at all to have digital actors that are indistinguishable from humans when you could just use real actors instead. And that is very much true in my opinion. However there are reasons to have synthetic actors in movie. Of course they make it possible to produce action sequence of ever increasing quality. Digital actors could render stunt doubles unnecessary as they can do better and more dangerous stunts than their human counterparts and have the benefit that they can not get hurt.

More elaborate reasons of having synthespians would be to bring back dead actors to the screen or confronting real actors with their younger (computer generated) self. This essay is not concerned with the ethical implications of bringing back dead actors but there surely needs to go some consideration into that. It has been done before in *Superman Returns* (2006, Red Sun Productions) which brought back Marlon Brando as Jor-El in a mixture of 3d computer generated graphics and archive footage.

Another scenario for having a digital actor in a film would be a movie where a younger or older self of an actor is shown. This could happen in flashback sequences or maybe utilizing time travel. It is possible to make an actor younger or older using make-up effects but that always looks a bit fake and also is limited in the time span that can be covered with such effects. Computer generated actors can be created at any age, becoming a teen self or ninety year old representation of the actor.

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[12] Marshall McLuhan, *Understanding Media*, Routledge, London, 1964

Conclusion

It seems to me that in the history of cinema there are recurring times of uneasiness. The first films of the Lumière brothers made people cheer at the technological achievements but at the same time gave them a troubled feeling. The first colour movies with their pastel colour palette did not reproduce reality but showed a stylized version just as movies featuring synthespians do right now. But all these shortcomings, merely caused by technological inadequacies, were resolved in the end. No one is questioning the visual representation of real actors on screen anymore like it has been done at Lumières time. In my opinion in future times digital actors will star in leading roles and be indistinguishable from real actors, not causing any uneasy feelings anymore and having fully crossed the uncanny valley. That might not happen in the next five or even ten years, but eventually technology will be advanced enough to produce digital actors that people accept as "real". Using the same line of thought Tom Hanks is often cited: "I'm very troubled by it [digital actors]. But it's coming down, man. It's going to happen. And I'm not sure what actors can do about it."[13] If I might add to that I'd like to say that maybe actors don't have to do something about it as synthespians will only supplement them, making their job easier and help do deliver better films and not bring all real actors out of employment.

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[13] Rick Lyman, *Movie Stars Feel Inroads By Upstart Digital Actors*, The New York Times, 8th July 2001

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