

# Computer Art – The future is bright but what is the future?

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*Abstract. It is a curious characteristic of mankind to both revere and revile the use of technology within art but history proves that when scientific logic marries with artistic reasoning, innovative and original ideas are born. Computer Art can justify a 30-year history but despite its relative maturity, digital art continues to suffer from the age-old perception that art made by machine is not a legitimate art form. This paper looks at the digital-imagery prevalent in the public domain today and compares its stage of development to the historical precedents of perspective, photography and film. Keywords. Digital, Art, Technology, 3 Dimensions, Online Games*

## Introduction

It could be argued that advances in technology and tools have been a stimulus for artists since the earliest cave paintings so why continue to resist the latest technological developments as a valid artistic tool? The ancient Greek origins of the word technology, *techne*, which is generally translated as "art, skill, or craft" (Heidegger), emphasises the intertwined relationship that has always existed between art and technology.

Pioneering science and experimental mathematics in Renaissance Europe inspired the development of perspective in art: a method for accurately portraying the three-dimensional world on a two-dimensional surface. Three hundred years later, in the early nineteenth century the amalgamation of three emerging technologies: optics, mechanics and chemistry, inspired the creation of photography (Jones). These historical examples indicate how the synthesis of technological and artistic thinking can inspire conceptual leaps, which have a future influence that is impossible to

predict. "The story of late twentieth-century media art is inextricably linked to developments in photography throughout the century." (Rush, 1999) At the time of the initial chemical experiments with silver nitrate, who could have predicted the ensuing impact that photography, and motion photography, would have on the entertainment of mankind? The film industry has become a global phenomenon in today's society.

The market force of the entertainment industry is a key power driving the development of computer-generated imagery (CGI). The quest for greater verisimilitude in CGI used in the film, advertising and the computer games industries is currently propelling technological advances in digital imagery.

Historical precedent indicates that a recurring pattern of evolution exists before a new technique is recognised as an art form. In the first instance, artists seek to use new technology to strive for realism, accuracy and precision within known boundaries of expression and it is only later, on the maturation of the uses of new technology, that

new forms of expression and modalities of representation occur through artistic exploration.

The development of perspective, photographic and film techniques all inspired artists to strive for, at first, an accurate and precise representation of the real world in their artwork. Progress in current computing hardware and 3D software packages has stimulated such a phase in digital art where the “Holy Grail” is the creation of photo-realistic 3d environments, and animated life forms.

### **Historical Perspective: Technology and Art**

It is illogical to imply that new technologies and art arise in a linear sequence of isolated events; clearly they evolve as part of the complex structure of economic, cultural and philosophical forces that shape social structure. However, for the purpose of this paper a series of three historical precedents: perspective, photography and film, will be reviewed as these techniques have profoundly influenced the development of digital imagery. They also share a commonality in development where the initial artistic exploration of the new technique stayed within known boundaries and the big conceptual leaps came later, after an undetermined period of exploration, experimentation and time.

The discovery of perspective techniques allowed Renaissance artists to explore the depiction of the natural world in a new way and, with the focus on capturing depth and solidity, a fresh sense of realism was reflected in Renaissance painting. Perspective techniques have had an enduring impact on contemporary digital art as depth-cue algorithms used in 3D software packages are based on classical perspective theory. (Kemp, 1990)

Renaissance artists embraced the theories of perspective and challenged previous modes of

depiction but continued to work in the traditional medium of paint that has always held a privileged position within art.

The development of photography caused a backlash from the art establishment because the mechanical process was seen as a threat to the accepted notion of art: the concept of art as a product of the fine arts created by the hand of a trained artist. Photography made available a new method for capturing instances of the natural world which was less time consuming and more affordable than portrait and landscape painting. Family portraits were no longer the privilege of the wealthy; photographic technology made the capture of moments in life affordable to the masses but the art establishment refused to consider it as an art form until after a period of artistic experimentation when the strengths of the media were identified and photography developed a visual language of its own. “It was not until 150 years after its invention that photography was truly given a significance equal to that of the classical media of painting, printmaking, and sculpture, at an exhibition, the 1977 Documenta held in Kassel, Germany.” (Richter, 2001)

The development of photography challenged the traditional roles of the painter and forced artists to re-examine their approach, which in turn freed modern art from the prior focus on realism. The 20th-century witnessed an abundance of art movements that challenged every theory of visual language in their search for new modes of expression. The Cubists created a style that rejected the traditional depiction of three-dimensional space and focused on the exploration of different planes and facets of objects. The invention of Cubism “established a pictorial language on which nearly all of 20th-century art was subsequently built.” (Richter, 2001)

The technology challenged artists’ views of their role in society but artists also challenged the medium and their desire to capture the natural

phenomenon of light and motion pushed the boundaries of technology towards motion photography. The early photographs of Muybridge were intended as additions to scientific experiments into motion. Similarly the Lumiere brothers' interest lay in the techniques required to capture motion rather than on the content of the captured imagery. The French magician, Melies, is widely recognised as being the first to explore the essence of cinematography and to focus on the content and visual narrative made possible by the media.

From these early scientific experiments into the visualisation of time, an aesthetic developed unique to the medium of film that, again, gave artists an opportunity to challenge the established understanding of reality. Within a relatively short space of time, film was recognised as an art form and the film industry has since become a global phenomenon. Filmmakers combine cinematographic and editing techniques to create continuity and narrative tension that they use to manipulate our emotional responses.

The global impact of the film industry reflected in the box office figures with estimated world market revenue of 17 million dollars indicates that cinema fulfils a fundamental need of mankind for entertainment. (Smith, 2003)

### **Art is more than Realism**

New art forms emerge from technological advances but come only after an incubation period of technical exploration followed by a more dynamic phase of artistic discovery. The preliminary technical experimentation tends to be limited by the artistic boundaries of the previous media model. However, artists' long held need to challenge and contradict established thinking changes attitudes and adds impetus to identifying the strengths of technology and from this, eventually, a new visual language unique to the medium

transpires.

The possibility of CGI to create previously impossible imagery has always been an enticing concept in the computer games, film and advertising industries. The general public are probably unaware of the full extent that CGI has been adopted into popular culture through TV advertising and special effects.

The need for seamless realism is the primary force driving current CGI research and development. However, the cold and harsh reality of economics also plays a role. The economic necessity for business to be financially viable encourages replication and repetition of proven past successful products. Therefore, while there may be extensive technological leaps, the inspiration for the artistic content remains relatively static and stays within understood markets. For twenty years, the computer games industry has focused on making games look more "real" but only in an optical sense. The visual system is selective and what we understand as our reality is an interpreted version of the sensory information reflected onto our retina. (Yoshinori, 1999)

The focus of the CG industry on portraying optical reality may produce technically impressive imagery but as a form of expression, the rigid, sterile quality fails to inspire. "Only when designers give up on their grail quest for ever greater verisimilitude will games be free from the scourge of realism." (Buxton, 2003)

Chris Crawford in his article, "Artists against Anatomists" discusses the difference between optical reality and perceptual reality and highlights the fact that graphics researchers focus their work on developing algorithms that accurately portray optical reality but overlook the "internal perceptual algorithms in the human visual system." (Crawford, 2002)

Could these reactions from games industry professionals indicate that CGI has reached the stage of maturity where the emphasis in develop-

ment will shift from technical mastery to artistic investigation? The questions are: when will the medium mature to the extent that it will be recognised as an art form and what will be the new mode of visual language unique to the computer art medium?

Charles Csuri, a leader in computer art from its inception, states that, "the challenge is to use computer technology to serve our human spirituality." (Staudhammer, 1990) This can happen but the vision of progress has to shift from the goal of optical realism to the deeper and more complex problem of perceived reality.

Budd Hopkins defines a work of art as something that "enters life very much like another human being- complicated, loaded with overtones and meaning, mysterious, enticing, obsessive and beautiful. There's no way to control how it will be used, how it will be read, and that's part of the excitement of it."

It is safe to say that the technology is already in place and this is proven by the bewildering array of affordable digital tools available to contemporary artists, for capturing, manipulating and disseminating their art. So, theoretically Hopkins definition of a work of art could be achieved using current digital techniques. It is unlikely that the skills of one individual will suffice, as the vast depth and breadth of skills required to exploit digital tools to their full advantage indicates that the production processes of true computer art is likely to emulate the film industry and will result from the creative synergy of a group of specialists.

The computer games industry is dependant on the creative synergy between artists and technologists. Art critics have generally dismissed the notion of gaming as an art form, largely due to the content of video games that are designed for a very specific market. However, the technology, skills, economics, commerce and market of computer games have vast untapped potential. The growth of the on-line gaming community is evol-

ing new complex social structures around the technology. Perhaps this is the area we should look to for a vision of the future of computer art but first the artistic content has to evolve.

## Conclusion

Computer art has always been a collaboration between artists and technologists. To date the collaboration has concerned itself with harnessing technology to achieve ever-greater verisimilitude. A truly new art form is about to emerge as the collaborators – technologists, artists – work together to address perceptual and emotional engagement.

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