Essay: New Media at Bell Labs

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Abstract

The unique environment at Bell Telephone laboratories, Inc. in the 1960s enabled and fostered work into new media involving digital computers. This short essay recounts some of my experiences and observations.

Introduction

During the late 1950s and particularly the 1960s much innovative research was performed at Bell Labs that resulted in what today is know as multimedia. The work involved the use of programmable digital computers in music, art, and animation.

My own work involved digital computer art, stereoscopic animation, and experimental aesthetics. I very much knew that this work was pioneering the development of a new medium for the visual arts. For example, just two of my published papers were: "Computers and the Visual Arts" (1967)[1] and "The Digital Computer as a Creative Medium" (1967)[2].

Max Mathews was working on computer music as a new medium, and Ken Knowlton was working on programming languages to create animated movies. It is quite clear that we all knew we were inventing new media for the arts.

Rationale for Support

There are reasons this kind of work was supported at Bell Labs. For one, there was considerable freedom in the research area to pursue new directions – although Bell Labs was not in the business of creating and selling music and art. The development of software for the visual arts was an application that resulted in programs that could be used for scientific applications. In fact, one of my published papers was "Computer Graphics in Acoustics research" (1968)[3]. There also was strong interest in what was known back then as "man-machine communication," which involved synthetic speech and graphics.

Management at Bell Labs defended and supported research in computer graphics and also music and art. William O. Baker was vice president, research, and he more than anyone else was responsible for the environment within the research area at Bell Labs.[4] Research was only about 5 percent of the total R&D effort at Bell Labs – but its impact was considerable. I recently created a lengthy list on the innovations and discoveries that flowed from Bell Labs[5] – much of today's information age and digital era came from Bell Labs.[6]

Computer Art and Animation

Initially, I spent little time working on computer art. The programming I did was during evening and weekends. At the time, I was quite busy doing investigations of the perceptual effects of telephone quality and also investigating new ways to determine the fundamental frequency of speech. But some of this research benefitted from graphic display, and this stimulated me to develop stereographic programs and interactive 3D systems that could be used both for the arts and also for scientific research. Toward the late 1960s, this interactive display research occupied much of my time, ultimately resulting in the invention of a 3D tactile system [US Patent 3,919,691 "Tactile Man-Machine Communications System"].[7]

There were others at Bell Labs working on computer animation, such as Edward E. Zajac, Frank Sinden, and Kenneth C. Knowlton. Bela Julesz was working on stereoscopic depth perception, using random-dot stereograms made on the computer. While we all aware of the research being done by each of us, we did not work together, and many of us were in completely different departments. But we all ultimately reported to John R. Pierce and he to Dr. Baker. Having archived all his papers, I cannot emphasize strongly enough that Dr. Baker was responsible for the special and unique environment of research organization at Bell Labs.

I suggested in one of my published papers from the 1960s that computer-generated stereoscopic images could be used by sculptures before creating a physical version of a work. Today this would be probably called virtual sculpture." As an example, I made a computer version in 3D of the "Orpheus and Apollo" work that hangs in the lobby of Philharmonic Hall at Lincoln Center. I suggested that choreographers could use computers as a tool, and I made a simple 3D animated film as a crude example and published an article describing the potentials in *Dance Magazine* (1967).[8]

Discussion

The use of "st" words – such as first, last, worst, best – is always controversial. Many at about the same period made most innovations and discoveries. "Computer art" originally involved analogue computers long before digital computers were used. Thus such analogue pioneers as Maughan Mason should be acknowledged. The vision of Howard Wise in holding a show of computer-generated pictures in April 1965 at his Gallery was significant – particularly when most major museums knew little, or even cared, about the use of digital computers in the visual arts. There is plenty of credit to be acknowledged and shared by many – at Bell Labs and elsewhere.

Documentation

In 1968, an award winning documentary film "Incredible Machine" was made about the work at Bell Labs in graphics and new media. " [http://techchannel.att.com/play-video.cfm/2011/4/22/AT&T-Archives-Incredible-Machine] This film had the official approval and support of the management at Bell labs and presents both scientific and artistic applications of visual and auditory media involving digital computers. In 1968 the same time, the BBC made a short documentary of my work in computer choreography –

again with the full knowledge of the management of Bell Labs.
[http://www.youtube.com/watch?v=phVN_HS5Fy8&feature=youtu.be] In 1998, Art and Science Collaborations, Inc. (ASCI) organized a panel on "Bell Labs and the Origins of the Multimedia Artist." A video and transcript are available at:
http://www.ieeeghn.org/wiki/index.php/Archives:Bell_Labs_%26_The_Origins_of_the_Multimedia_Artist

References

[1] Noll, A. Michael, "Computers and the Visual Arts," *Design and Planning 2: Computers in Design and Communication* (Edited by Martin Krampen and Peter Seitz), Hastings House, Publishers, Inc.: New York (1967), pp. 65-79.

[2] Noll, A. M., "The Digital Computer as a Creative Medium," *IEEE Spectrum*, Vol. 4, No. 10, (October 1967), pp. 89-95.

[3] Noll, A. Michael, "Computer Graphics in Acoustics Research," *IEEE Transactions on Audio and Electroacoustics*, Vol. AU-16, No. 2, (June 1968), pp. 213-220).

[4] Website: williamobaker.org

[5] Download at: noll.uscannenberg.org/BellLabs.html

[6] Noll, A. Michael, "The Digital Era: New Applications Rooted in Bell Labs Breakthroughs," *Telecommunications Online*, February 20, 2007.

[7] US Patent 3,919,691 "Tactile Man-Machine Communications System," (filed May 26, 1971; issued November 1, 1975).

[8] Noll, A. Michael, "Choreography and Computers," *Dance Magazine*, Vol. XXXXI, No. 1, (January 1967), pp. 43-45.