50 & 25 YEARS AGO

EDITOR **ERICH NEUHOLD**
University of Vienna
erich.neuhold@univie.ac.at

MAY 1970

We will be skipping May 1970, and the next time content from the 1970s will appear is in an upcoming issue.

MAY 1995

www.computer.org/csdl/mags/co/1995/05/index.html

Are Telephone Companies Passé? (p. 8) "Remember what happened to centralized MIS departments during the PC revolution of the 1980s? ... We call it CTI (computer telephone integration). Regardless of name, the movement toward desktop telephony is afoot, and desktop telephony will do to the telephone equipment manufacturers what Gorbachev did to the FSU (former Soviet Union). ... Cypress Research of San Jose sells a $600 visual programming tool for writing your own Centrex, fax, messaging, and voice-mail management system on a $2,000 Macintosh. ... Wildfire is a software agent that intervenes during a telephone call to screen, route, announce call-waiting, and in general respond to spoken commands during any telephone call. ... Wildfire seemed to be eavesdropping on our conversation. For example, when Bill wanted some information, he would call on Wildfire, and 'she' would join in." *[Editor's note: This interesting looking-into-the-future article predicts many of the things commonly available today. Wildfire behaves a little like our listening-in gadgets* such as *Siri, Alexa, and others. But the article also wrongly suggests the demise of the phone companies as it does not foresee the move to digital services by those companies.]*

Guest Editors' Introduction: Multimedia Systems and Applications (p. 20) "Advances in computing and networking are generating a significant number of multimedia-enabled applications in computer systems. ... Some people see multimedia as the effort to combine text, graphics, images, video, and audio in computers to convey enriched information to users. Others see multimedia simply as a marriage between computer and TV. Still others view it as a new generation of computer applications featuring video but demanding new computer software and hardware architectures. ... Gradually, as competition reduces costs and increases product functionality, multimedia will have a lasting impact, becoming part of our everyday life similar to the way PCs did." (p. 21) "This theme issue of *Computer* contains five articles that survey key issues and solutions that support the development of multimedia technology, systems, and applications. Our goal was to assemble articles to help readers understand the technology's status and how multimedia will impact their everyday lives." *[Editor's note: I will briefly extract information from those articles but not repeat the arguments about the impact of multimedia as today we are, of course, well aware that much of the presented research has become everyday features.]*

Design Issues for Interactive Television Systems (p. 25) "Can TV sets ever be made interactive? It may not be a question of 'if' but 'when' ... Learn how different designs are being investigated toward that goal. ... A distributed multimedia system architecture that can support on-demand, interactive TV applications is a hierarchical configuration of multimedia servers and network switches, as we show in this article. In such a system, multimedia data must be compressed, stored, retrieved, transmitted over the network to its destination, then decompressed and synchronized for playback at the receiving site." (p. 26) "The three main components of an ITV architecture are content (information) servers, a network, and STBs (Set Top Boxes). Content servers are connected to the STBs at the subscriber premises through a network consisting of switches and transmission medium." (p. 34) "To interact with a full-service network offering personalized, on-demand, multimedia services, subscribers need a device for doing so. The most likely digital cable terminal device is an STB. The STB is the bridge between the subscriber's display devices, peripherals, and input devices (such as a handheld infrared remote controller) and a D/A communication channel. ... Full-service networks are eventually expected to be extensions of current cable TV networks." (p. 37) "Another

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issue is STB addressing. In current cable systems, each analog decoder box is addressable so that the cable company can selectively turn services on and off and control descrambling circuitry. However, the domain of the boxes is usually limited over a small area, and assigning unique STB addresses is not difficult. In the world of full-service networks where services are delivered over a long-haul network, unique addressing must be supported over a large area, possibly extending to a worldwide addressing scheme. One approach is to extend Internet protocol addresses to encompass STBs." *[Editor's note: The interesting observation in this article is the orientation toward STB solutions. Somehow the integration of media was oriented toward television, not laptops and the Internet that actually developed more rapidly.]*

Multimedia Storage Servers: A Tutorial (p. 40) "Real-time processing of multimedia data are required of those who offer audio and video on-demand. This tutorial highlights the unique issues and data storage characteristics that concern designers." (p. 41) "During recording, for example, a server must continuously store the data produced by an input device (such as a microphone or camera) to prevent buffer overruns at the device. During playback, on the other hand, the server must retrieve data from the disk at a rate that prevents an output device (such as a speaker or video display) from starving." (p. 45) "Although the performance of fixed magnetic disks makes them desirable for CM applications, their high cost per gigabyte makes them impractical as the sole storage medium for a large-scale server (such as a video-on-demand server with hundreds of feature-length titles, each being several Gbytes in size even with MPEG-2 compression)." *[Editor's note: This overview of the state of the art in 1995 shows many of the issues that also have to be solved in today's multimedia systems. However, it is equally interesting to remember the pricing concerns in 1995: 1 Mbyte on magnetic disks is US$555, optical disks US$125, low-end tape US$100 and high-end tape US$50, and 10 Tbytes of the high-end tape would cost US$500,000. At that time, nobody foresaw the unbelievable development in the price performance of storage.]*

Resource Management in Networked Multimedia Systems (p. 52) "Multimedia computing and communications impose new requirements on network system components. High-speed networks must not only provide fast data transfer but also guaranteed delivery. Continuous media, such as video and audio, must be delivered error-free to users within well -defined time constraints." (p. 59) "Let's assume successful negotiation of QoS and resource allocation requirements—that is, the contract—has been negotiated and signed. Resource management must now sustain resource accessibility during the multimedia transmission, that is, fulfill the contract. The job of satisfying time, space, and device, frequency, and reliability requirements belongs to various management components, such as process management, buffer management, and rate and error control components." *[Editor's note: Like the article extracted above, this is an interesting tutorial-oriented paper that analyzes requirements and some solutions for multimedia networks.]*

Multimedia MedNet: A Medical Collaboration and Consultation System (p. 65) "This article discusses an ongoing, long-term, distributed multimedia project developed at the University of Pittsburgh Medical Center and used on a daily basis at seven hospitals and multiple diagnostic and research laboratories. ... MedNet provides real time monitoring and multiparty consultation and collaboration during brain surgery for approximately 1,600 cases per year. This intraoperative monitoring places a real time control loop around the patient and surgeon to warn the surgeon when the patient's nervous system is being damaged." (p. 68) "Three types of MedNet nodes can be directly attached to the network. The first is a mobile rack-mounted node for patient monitoring and testing in operating rooms and intensive care units. If necessary, these nodes can function in a stand-alone mode. A second type of data acquisition node is stationary and is used to test patients in diagnostic or research laboratories. The third type is a workstation for remote monitoring." (p. 72) "As system designers, we will not limit the number of applications running at once on a workstation to maintain a certain quality-of-service level, but will leave this decision to individual users. However, this philosophy does not apply to the underlying network, where multiple users compete for resources and where congestion and overload can rapidly degrade performance for all system users." (p. 73) "We are working on an information-filtering and user-profiling scheme for Phase II. This will transparently support varying classes of users working in different settings under different constraints. ... The user profile tracks not only user types such as neurophysiologists but also individual user sophistication, to generate appropriate interfaces." *[Editor's note: This article provides an interesting description of a real-world system that has grown successfully over a number of years.]*

Multimedia Pedagogues (p. 74) "Audiovisual material can provide valuable aids for teaching systems. However, a system is only useful if the learner remains active and motivated. ... We propose an instruction model that moves beyond the 'Tyranny of the Button' and uses intelligent simulation, dynamic links (online generation of links based on student behavior), and multimedia composition and creation." (p. 75) "Literacy skills for creating and using multimedia compositions may one day be essential. Several environments allow inexperienced students to create multimedia communications—working alone or together through distributed networks. Well-connected multimedia interfaces let students access several media forms for each piece of information and move among media presentations." *[Editor's note: Here is another article that somewhat claims that multimedia will solve all our educational problems. It lists and discusses a number of different*

approaches to use multimedia for learning. Unfortunately, time has shown that multimedia, later the Internet, and other teaching "gadgets" have not solved the problems. To gain knowledge has been and always will be hard work and sweat. To believe anything different will always fail.]

Anarchy and Chaos on the Net (p. 87) "The article claimed that anonymous mail servers, flame wars, encryption, and cancel bots turn the Net into a generally nasty area. What's more, anarchy and chaos make the Net most unpleasant for the 'business newcomers who now want access to its huge audience,' said author Martha Siegel. ... Her Arizona law firm opened the floodgates of hate e-mail last year through an ill-thought-out advertising campaign on the Internet. ... But many more people were annoyed by the fact that the lawyers had posted their advertisement to thousands of newsgroups and mailing lists, which were not remotely related to the topic of immigration. ... Some of Siegel's proposed solutions to the apparent chaos, a mish-mash of legal and diplomatic initiatives, seem impractical to me. For example, I'm confused by her bland call for existing 'laws already regulating behavior in the real world [to] be applied in Cyberspace' while at the same time she wants to preserve US-style free speech and the elimination of censorship by Internet access providers. ... I think Siegel should be complimented for drawing attention to the matter of Net regulation in the mainstream press." *[Editor's note: This article is a short discussion on the problem of Internet openness versus Internet regulation. With fake news, hate mail, identity theft, business subversion, and so on, this problem is still unsolved and actually much more severe than it was in 1995.]*

Legal Status of Software Engineering (p. 98) "Currently, software engineering is not one of the 36 engineering professions recognized and licensed in the United States. This situation is more serious than you might think, because 48 states have laws on their books that prohibit anyone who is not licensed from using the term 'engineer' in describing his occupation and work. ... This legal phenomenon affects all of us involved in software. It makes us vulnerable to the probability of increasingly onerous rules and regulations passed by well-meaning but clumsy and often ill-informed legislative bodies. ... However, IEEE Computer Society and ACM task forces are exploring these topics with the idea of making software engineering the 37th engineering profession, perhaps by the end of the century." *[Editor's note: As we all know, that has not happened. ICT education and related codes of ethics that have been developed span a much wider field than software engineering, and licensing just a small part of it because it has the name "engineering" attached seems, to me, not fruitful at all. Failed attempts by governments to establish such licensing just show that accredited education programs are much more important and successful than legalistic regulations.]*

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