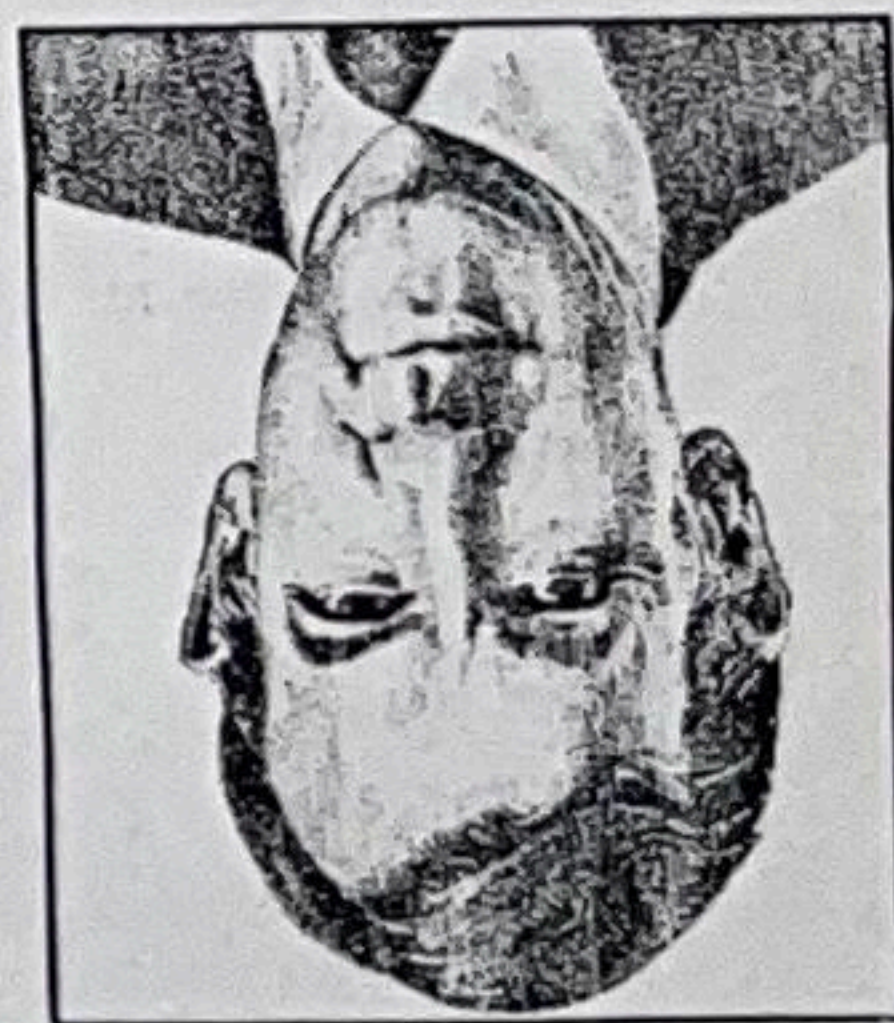


Modeling Technology for the 21st Century

APPLIED INTELLIGENCE



JAMES MARTIN

In this, the fifth of six related columns, James Martin describes the most significant aspects of computer technology that we can expect in the first decade of the 21st century. As we approach the end of the 20th century, there is a general feeling that we are entering a dramatically new, technologically based era. The last years of the 20th century will lay the technological infrastructure for this move to a remarkably different era. The century will end with a spectacular sequence of New Year parties around the world, linked with satellite television on digital, high-resolution sets with windows comparing the frenzy in different locations. The celebration will be symbolic of a 21st century world in which all peoples are united by telecommunications and technology.

Intercorporate networks: By the turn of the century, the world will be laced with intercorporate networks moving large quantities of transactions from computers in one corporation to those in others. Electronic Document Interchange (EDI) networks, which used to give a competitive advantage, will become an operational imperative. Computers in one corporation will interact directly with computers in other corporations, obeying rules that have been established for their behavior and generating management reports on the activities carried out.

Communications networks will use ever more intelligence, both in switching and control computers and in microelectronic user devices. Machines will have unique 48-bit numbers and all people in a corporation will also have unique numbers.

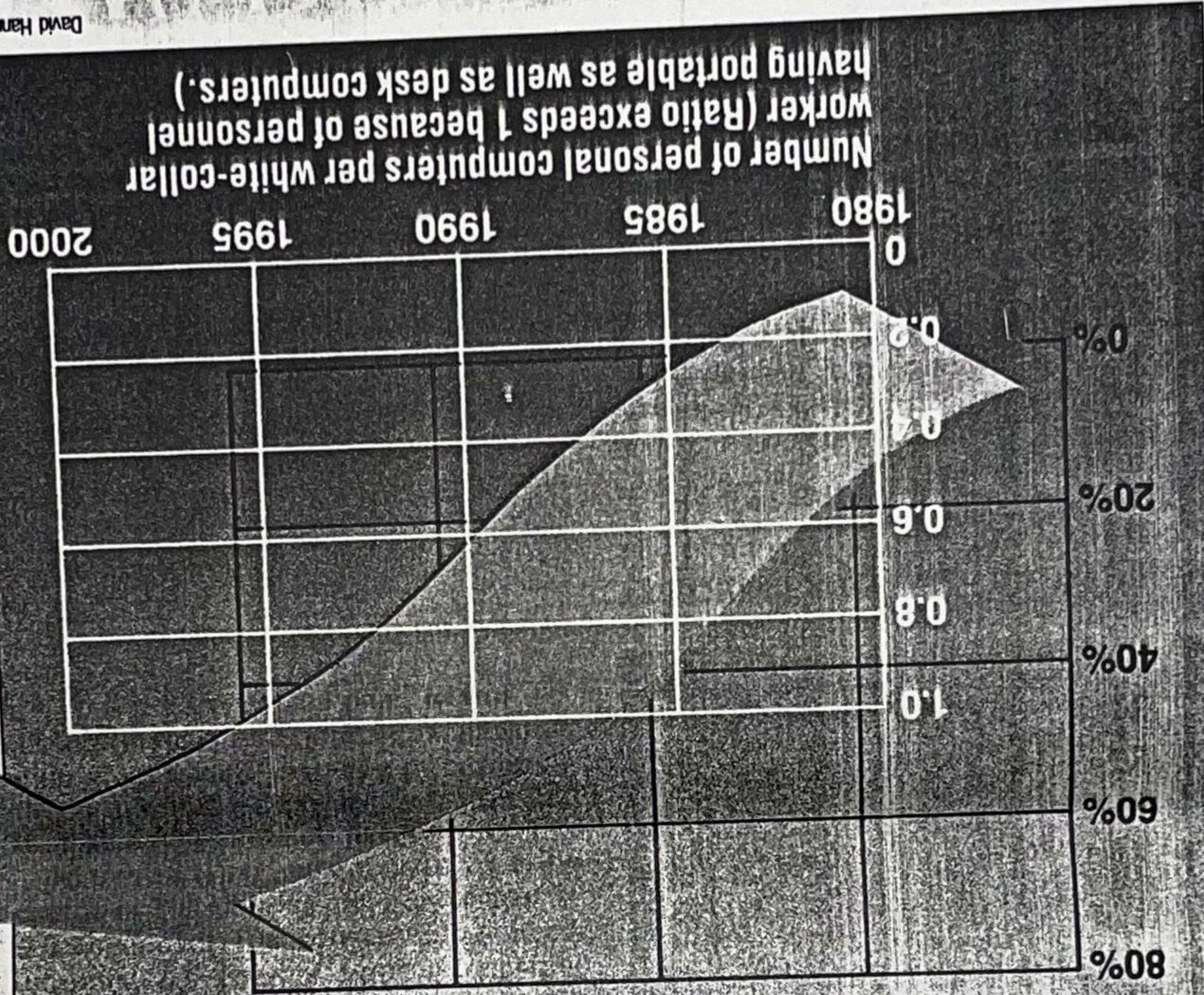
Increasingly, telephone or mail calls will be addressed to a person rather than to an instrument and the network will keep track of where the individual is, either by means of the calls the person places or by receiving transmissi- sponders.

Low-cost speech-input word processors, using almost the whole human vocabulary, will replace most keyboard word processors.

Computer technology: The sixth generation of computers, introduced during the first decade of the century, will be ultra-parallel machines built from wafers containing many processors. They will employ superconductivity, some optical components, massively parallel database engines and inference engines, multiple neuro-coprocessors and optical channels operating at many billions of bits per second.

By the year 2000, there will be limited scope for making unprocessors faster. Increasing the power of computers will depend largely on increasing their degree of parallelism.

Computer Profile of Typical Advanced Corporation and software dedicated to end-user computing



Number of personal computers per white-collar worker (Ratio exceeds 1 because of personnel having portable as well as desk computers.)

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Most corporations have collected vast amounts of data, some current and accurate, some historical and archived. New computer techniques will enable this mass of data to be mined, often striking seams of gold. Neurocomputing will enable corporate strategists and marketeers to search for patterns that help to put them ahead of their competition.

Information access technology: By the beginning of the next century, rather than using paper as a media, information will increasingly be accessed from electronic media.

Several new technologies will converge to provide an infrastructure for electronic access to information: large optical-storage libraries; wideband electronic-mail networks; distributed data-base management; textbase management systems; "open" distributed hypertext; artificial-intelligence aids for locating and retrieving information; highly parallel search engines; and personal "libraries" that help an individual find, monitor and pay for information.

A major medium for publishing will be the interactive compact disk (CDI), which can interleave text, pictures, moving images, speech and music of different quality levels.

Next week, we will explore the technology that we can expect to see in the second decade of the 21st century. ■

Neurocomputer sales will exceed one billion dollars annually. Wafer-scale integration neurocomputers will be manufactured with more than a billion neurons and interconnections. Neurocomputers will be widely used for applications such as pattern recognition and image processing.

Computer applications: By the first decade of the 21st century, most computer applications will be created for ultra-parallel machines using non-processor systems to operate in the following:

Most new computers will be ultra-parallel machines. Because there are so many processors per wafer, and wafers are mass-produced in large quantities, the cost per processor will be extremely low.

With the exception of supercomputers, most computers will be built from large numbers of cheap wafers, without expensive cooling requirements. Supercomputers will achieve the landmark speed of a trillion floating-point operations per second (flops). Early in the decade of 2000, the use of highly parallel processors will permit computer systems to operate in the following:

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The James Martin Productivity Services, an information service updated quarterly, is available through High Productivity Software Inc., of Marblehead, Mass. (617) 639-1958. For information on seminars, please contact (in the United States and Canada) Tech- nology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402 (213) 394-8305. In Europe, contact Savam, 2 New St., Carnforth, Lancs, LA5 9BX United Kingdom (0524) 734 505.