

Meeting Reports

Very Large Scale Integration and Artificial Intelligence. Future Computer Technology

Report of a talk by G. Heilmeier, Senior Vice-President and Chief Technical Officer of Texas Instruments, presented at the RAI Congress Centre in Amsterdam on 12 November 1986

Presenting an overview of semiconductor technology, Heilmeier pointed out some revolutionary developments in the past, such as TTL (Transistor-Transistor Logic) in the 1960's, and LSI (Large Scale Integration) and microprocessors in the 1970's. The main results of these developments have been cheap memory chips and a wide variety of special purpose chips (e.g. for graphics, interfacing and data communication). We now witness the advent of VLSI chips, each containing one to ten million components.

Naturally, science has not got this far without clearing away some obstacles. In the 1950's and 60's the major problem was presented by the production of the chips itself; in the two decades thereafter the crucial point seems to have become their design. For the 1990's Heilmeier expects the question to be: what to use the chips for? Attempting to answer this, he foresees that VLSI technology will be used to solve the user-interface problem, preparing the way for a much more "natural" interaction between man and the computer. Then, computer users will no longer require any knowledge of computers,

networks or programming; instead, they will be able to communicate with the computer through natural language interfaces — computers will adapt themselves to the user, rather than the other way around. Says Heilmeier: "All people want from computers are easy query and fast response". To reach this stage, however, fast and complex processors are essential, as well as fast and massive memory and intelligent databases, along with a number of developments in the area of interface technology (networking, speech and image recognition, natural language processing, smart sensors, optical document readers, etc.).

With respect to database technology, Heilmeier stakes everything on object-oriented systems, which allow users to define the representation of data themselves. This freedom facilitates the mutual integration of text, numerical data, graphs, maps, spectra, etc.

Software will be developed increasingly by means of the so-called prototyping methodology. At present, the development of most software passes through three stages: design and specification, implemen-

tation, and testing and debugging. In the prototyping methodology the starting point is a global specification of the functions of the system, from which another, small system is built which is gradually extended, in continuous consultation with future users. On the basis of his own experience, Heilmeier predicts that this methodology may result in a productivity increased by as much as 500%.

Artificial intelligence will become ever more important in many areas: expert systems, natural language interfaces, knowledge and information extraction from large and complex data sets, image interpretation and robotics. Eventually, Heilmeier anticipates a synthesis between traditional numerical and symbolic information processing.

In conclusion, Heilmeier expects that future computers will be fully transparent, in the sense that they will be completely adapted to the user; they will be capable of integrating numerical and symbolic processing, and of multi-windowing and multi-tasking; high-resolution colour graphics will be available; having object-oriented database systems, computers will be operated by means of the UNIX system; their memory will be fast and seemingly limitless.

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Microsymposium on Chemometric Methods in Analytical Chemistry, Ferrara, Italy, 9-10 April 1987

A Symposium organized jointly by the Italian Group of the Chemometrics Society and by the Analytical Chemistry Division of the Italian

Society of Chemistry was held in Ferrara (Italy). Ninety Italian delegates attended the meeting. Fourteen talks were presented. Four general conferences with invited speakers were organized: Prof. H.J. Purnell of University College of Swansea (Great