Editorial

Image processing

The word "Image"—the representation of a person or object—sounds dry, ikonish, and slightly technical; it has a broader meaning than "Picture" which sounds warmer and seems to have artistic overtones. "Image Processing" sounds as if various operations are in process, while the word "Management" in association with "Image", or "Picture", implies organisation or control.

All these terms are in use in the "Electronic Image" context. I will settle for "Image Processing" as encompassing all of them. A number of articles about the subject are brought together in this special issue.

Image processing is usually brought to our attention in two ways—first, in connection with the huge amount of research on image recognition for vision systems in robotics, or for military purposes, and second, by the presence of images on computer screens, in advertisements, in technical articles, at exhibitions, or even (at the time of writing) on enormous TV screens stuck into the snow at the end of ski-jumps.

Less expensive ways of scanning, digitizing, manipulating, storing, compressing, enhancing, and reproducing images in colour have been discovered and they can all be offered in a microcomputer system at a price which tempts us to have a go—after all a picture is supposed to be worth a thousand words.

But for what purposes are images used?

By and large, image applications are technology driven. An intensive sales campaign has been in progress for some time mainly because new waves of hype are essential to sustain microcomputer gizmo growth. There are many offerings in the form of plug-in cards and software for microcomputers such as genlock, frame-capture, graphics processing, motion-video, and go-faster cards. They are being purchased mainly by military researchers, computer buffs, multimedia experimenters, and medics.

Several articles about multimedia—an obvious field for images—are included in this issue, although it is still a field of prospects rather than achievements (see Williams et al.). Another highly specialised but important new field is PACS (Picture Archiving and Communication Systems)—the provision for rapidly supplying images acquired radiologically to those who need patient data.

There is no doubt that the availability of appropriate technology will stimulate applications but for the moment the supply of imaging devices is exceeding demand.

"Image Database Software" is among the numerous software offerings. It usually consists of the provision of records to contain a picture with some descriptive words, and search software for retrieval purposes. The problems of indexing are never mentioned.

It is feasible to index small specialised collections of simple pictures (usually digitized) by words. For larger collections of more complex more diverse images the number of words that might be used by a searcher becomes very large. The small number of existing collections of this kind usually include a huge thesaurus and/or special languages for describing positions of objects, abstract concepts, etc.

The result is that it takes a long time to index a picture—half an hour or more—and a long time to learn and apply the search rules, quite apart from the labour-intensive job of compiling and up-dating the thesaurus.

Some of the problems inherent in system organisation and forms of indexing for an art collection (pictures by John Wyeth) have been described by Fred Mintzer et al. (IBM) in Proc. SPIE, San Jose, Volume 1460, February 1961—an article well worth reading.

A possible alternative to word-indexing is described in the article by O'Docherty et al. in this issue. *Information Services & Use* is not usually a vehicle for research articles. This article is intended to provide an idea of the state of the art on content recognition. Image recognition is as least as difficult as speech recognition. You will note that a system of considerable complexity is needed to deal with very simple objects.

The authors tell me that the principles described could be extended to handle more elaborate "2D thresholded pictures", and to half-tones or colour. They consider, as I do, that it will take about five years before fairly simple recognising systems of this kind are able to do useful tasks. Commercially viable systems are likely to take at least fifteen years to appear. The arrival date of any system capable of handling 3D images cannot be predicted.

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