AT&T INNOVATION BRIEFS

Innovation Briefs *are summaries of recent discoveries and developments within AT&T Bell Laboratories.* Patents To Build On *call attention to AT&T patents that may have commercial potential. Those wishing further information, or AT&T readers who would like to contribute future items, are encouraged to contact the* AT&T Technical Journal *editor.*

Automatic Scene-Change Detection

Image sequences, such as video, are a significant component of multimedia communications systems, and are highly demanding in terms of storage and transmission requirements. To better manage video information, automatic means are needed for grouping video frames into scenes. To this end, AT&T Bell Laboratories researchers have recently developed a robust and efficient method for the automatic detection of scene changes in image sequences. Innovations include a compact image representation and the associated signal-processing algorithms for region matching, motion estimation, and discrimination between object and camera motion. Gradual changes, such as those involving fade and dissolve, can be identified, as can several other editing modes that are difficult to detect. Scene changes resulting from camera operations, such as pan and tilt, are also detected. The method can be applied to selective video access (such as in interactive TV), fast nonsequential video browsing, content-based video compression, video editing, and image/video databases. Novel multimedia applications of the method, based on combining representative frames from each scene with related text (to generate pictorial transcripts), and/or audio, have also been implemented.

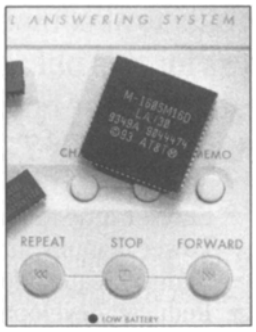
Text-to-Speech Synthesis Applied to Voice-Mail Conversion

A complete text-to-speech synthesis system, requiring no additional hardware, has been implemented on common personal computers, such as the Intel 486* based PC and Apple Computer's Power Macintosh†. One important use of such systems is a new server that intercepts e-mail messages, converts them to voice mail, and automatically forwards them to an Audix® system. This allows the intended e-mail recipient to call an AT&T Audix voice-messaging system from any touch tone telephone and listen to an e-mail message as though it were ordinary voice mail. The conversion process correctly interprets mail headers, special symbols, included and forwarded messages, lists, tables and diagrams, and presents them to the listener in a convenient and comprehensible manner. As a result, the system permits users to retrieve e-mail messages remotely, without having to carry a computer. It also suggests that fax messages could be delivered in audio form, using the same speech-synthesis technology.

*Intel 486 is a registered trademark of Intel Corp.
†Power Macintosh is a registered trademark of Apple Computer, Inc.

Digital Signal Processor Optimized for Answering Devices

The ETAD chip



AT&T Microelectronics recently introduced a digital signal processor that simplifies design, increases reliability and lowers the cost for a range of consumer phone products, such as digital answering machines. The DSP1605 Enhanced Telephone Answering Device (ETAD) chip contains a more powerful DSP core and more memory than its DSP16A1 predecessor, which enables a higher quality CELP+ speech coding. This permits more storage of incoming and outgoing messages. The ETAD chip also offers half-duplex and full-duplex speakerphone capability. Full duplex offers virtually echo-free audio quality, made possible by hybrid and acoustic echo cancellation and suppression. Further information is available from the Customer Response Center (In the U.S., 800-372-2447, Dept. P05; in Canada, 800-553-2448; outside North America by fax, 215-778-4106).

Patent To Build On

Technique for Drawing Directed Graphs

In a particular realization of this invention, a computer-implemented technique is provided for drawing graphs with reduced crossings and improved picture quality. An edge-list description, provided by the user, is processed to produce a ranking of all nodes that minimize the weighted sum of all edges, an edge cost being the product of its weight and length. Nodes within a ranking are then positioned, using a heuristic device based on node positions in adjacent ranks, to reduce edge crossings. Such a heuristic device uses a generalized median as a weighting function, plus node transposition, to avoid senseless edge crossings before proceeding to a following rank. Nodes are then positioned to minimize the weighted sum of horizontal distances among connected nodes. Spline control points are then computed for interconnected nodes, and a code sequence for a drawing is generated. Inventors: E. R. Gansner, S. C. North, and K. P. Vo. (U.S. Patent No. 4,953,106)