

**Manager's Journal:**

**Life! Give My Data Life!**

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O.J. Simpson's attorneys will have access to a full-text database encompassing all of the documentary evidence in the case. When the prosecution raises a particular issue, Mr. Simpson's lawyers will use advanced searching software to quickly identify all the relevant documents, much like running a magnet through a haystack to extract all the needles. The computer will then retrieve and display a digital image of that document for immediate use in court. Business process re-engineering, or BPR, uses this type of advanced technology to reorganize all the tasks in a given business for maximum efficiency.

American Express's cardmember billing operation historically sorted its charge slips so that they were enclosed with each member's monthly statement. This important marketing tool cost American Express the float on the charges during the time-consuming sorting process. Using BPR, American Express and TRW Financial Systems designed an imaging system that digitally

collates the slip images and prints them on each member's statement. As a result, the member still has a visual verification of each charge and American Express minimizes its float.

Interest in document imaging is hardly new. Since the 1920s, businesses have transferred images of documents onto microfilm. For nearly as long, science fiction writers have dreamed of machines that can retrieve and display a facsimile image of any document in the world. The spread of commercial computing gave rise to real-life digital document image management systems.

Pilot commercial applications of this technology in the 1970s were expensive and required large mainframe computers to manage the massive volumes of image data. But developments of the 1980s, including optical disk storage (the technology of CD-ROM) and data compression (originally developed for fax machines), made large-scale storage and retrieval of images economically feasible. Personal computers became powerful enough to act as image workstations. The wave of digital imaging overtook microfilming; even the National Micrographics Association changed its name to the Association for Image and Information Management.

Unlike the physical document itself, a document image can exist in more than one place at one time. Thus, paper-bound sequential processes (for example, a series of sign-offs for loan approval) can now be reorganized as parallel processes (allowing income verification, credit checking and collateral evaluation to occur simultaneously).

But digital document imaging has its own limitations. For most applications, users want data, not documents; information, not images. For example, of all the data on a loan application, only the signature has intrinsic value in image form. The remainder must be converted to digital fields that can be used by a computer program that automates credit checking or other functions, or to knowledge on the part of the person evaluating the application. This conversion transforms the data from its dead, written form to a living, working form. Many BPR practitioners now look to an alphabet soup of emerging technologies that combine with digital document imaging to work this magic. These include:

- ICR (image-based, or intelligent, character recognition), to convert images of typed or typeset text to computer-usable character codes.

- SGML (standard generalized mark-up language) tagging, to further convert text from ICR and images of illustrations into an all-purpose format for searching, editing, displaying and printing.

- Geometric recognition, to convert shapes and symbols on architectural and engineering drawings and schematics into codes that can be interpreted and manipulated by a CADD (computer-aided design and drafting) program.

- GIS (geographic information systems) mapping, to build a computer model of the spatial relationships between data sets and locations on maps and charts.

All of these technologies bring dead data back to life in ways so powerful it's almost eerie. Circuit City, a consumer electronics retailer, converted service

manuals for the products it carries to images that are available to operators on its customer service telephone line. Texaco Frontier Exploration developed a pilot system that allows a geophysicist to select a feature (a well, for example) on a GIS map and retrieve all documents associated with that feature, reducing time lost in searching paper files. Major loan servicers such as Bank of America have cut the time it takes to answer customer-service requests to minutes from hours or days.

Document users have always had the ability to resurrect their data by hiring clerks and draftsmen to key in characters or redraft drawings. But labor costs made the procedure impractical for all but the most critical data. The emerging technologies mentioned above help automate these processes. Each is still relatively expensive to use, due to the processing power employed and the amount of manual effort required to "clean up" the output. But as processing power declines in cost and the technologies become more efficient and accurate, the cost of resurrection will no longer be a barrier to acceptance. For example, one can now purchase a hand-held image scanner with basic ICR software for use on a personal computer for under \$250. On Halloweens to come, it will become even easier to bring dead data back to life.

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