Continuous Media Data Management
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1. Introduction

Multi-media is one of the hot topics in the computer field with the recent advances in computer hardware and communications equipment. Continuous media, where continuous data are handled, are hard to manipulate in a computer. However, with the steady expansion of computer applications areas, there will be increasing needs for continuous media to be manipulated in computers.

Continuous media can be divided into time-dependent media and time-independent media. Voice and audio are typical examples of time-dependent media, while full-text is an example of time-independent media. Here we focus on only the time-dependent media, such as video and audio, because these two are more difficult to handle than full-text data.

There are several key characteristics of continuous media data, compared with other existing types of data. The first characteristic, in our context of video and audio data, is that continuous media data is temporal data. Video data is represented by a sequence of frames. It becomes meaningless if video information is represented by only a set of frames without taking the temporal ordering of the frames into account. The second characteristic is that the data tends to be manipulated after frequent sampling from original information and digitizing. The original continuous information is never restored completely in a computer. The last characteristic is its data volume. The size of continuous media data is very large even for audio data.

Let us consider an example on the video data volume. Suppose that you have a video of 1000 by 500 pixels per frame. You need about 1 megabyte of memory to store one frame in a video if you represent each pixel with 2 bytes. A video is a sequence of frames, containing 30 frames per second usually. Thus you have to prepare 30 megabytes for each second and 1.8 gigabytes for each minute of video. So even if you have 1 gigabyte of disk space, you can store only a 30-second portion of a video.

The importance of continuous media data management can be understood from the following two viewpoints: hardware and software innovation and new multimedia applications.

In order to handle continuous media data in a computer, it is necessary to have advanced hardware and software technologies. A number of technology advances have been made recently or will be made soon in hardware and in software for continuous media data handling. LSI implementations of video compression are approaching. Using such LSI chips, you can achieve video compression and decompression in real time. One of the video compression methods which will be implemented is MPEG, a candidate for a video compression standard. With MPEG the real-time video compression ratio will typically be 50 times to 200 times. One recent software innovation is the advent of video extension window software. The conventional window system cannot support any video display features such as rotation, scaling and image cutting from video. Video extensions to window systems are now under consideration by several research institutes. One such extension, VEX (Video Extension to X), is currently available as a commercial product.

As the technologies grow rapidly, the number of applications also increase. Some examples are desktop multimedia publishing, multimedia electronic mail, and multimedia information services. It is going to be necessary to manage continuous media
What are the database problems for continuous media data?

As described above, the volume of video data is very large, but it can be reduced by using a compression method such as MPEG. For example, suppose that you have a 50:1 compression method and you apply this to video data. You then need 20 kilobytes for each frame and 600 kilobytes for 1 second of video. If you have 1 gigabyte of disk space and want to store video data, you can store about 30 minutes of video. While the size of video data may be large even with MPEG compression, it becomes feasible for such applications as computer-aided instruction and presentation systems, and these applications therefore require video data management tools. In these applications, if you define an object as a sequence of frames, we call it a scene, and if one scene takes about 30 seconds on the average, then you have to handle 2 megabyte objects and also you have to manipulate each object within 30 seconds for real-time viewing. So the first requirement for continuous media data management is object management and efficient access performance for large size objects.

The second requirement is synchronization of video and text. There are many examples requiring such synchronization. Suppose that we have a hyper-media book of English learning. Video is displayed, and the sentences that some English speakers pronounce on video are displayed synchronously with the video. It is necessary to get video and textual information from a time-dependent query. Both video and text information in each scene should be manipulated synchronously.

The third requirement is annotation, in other words indexing of video. You can get many kinds of information from a video, but it is very difficult for a computer to generate index data for a video because methods are not known to automatically extract semantic information from video. Someone has to interactively annotate the video, then generate textual information representing videos. Tools to support such interactive annotation are required as database utilities.

The fourth requirement regards the connection between video and its attributes. "Attributes" here means scenes in videos or objects appearing in videos. Attributes should be connected to a snapshot or a sequence of frames in videos. A model for continuous data with attributes should be developed.

The last requirement is a need for a unified language. Currently, special video file access functions have to be developed in order to construct a specific application. In order to manage video and sound like other database-managed information, a database language should be extended so as to handle both temporal queries and synchronized manipulation of continuous media data.

Continuous media data is very new to the database research area. Because of the importance of multimedia processing, database researchers should solve some of the database related problems described above and contribute to the development of multi-media related technologies. Memory requirements and access performance should be improved. Functions should be developed for easily manipulating continuous media data, such as interactive annotation support, synchronized query facilities and a unified database manipulation language
Significance vs Success in Test Data Management. TDM is fast gaining importance in the testing industry. Behind increasing interest in TDM are major financial losses caused by production defects, which could have been detected by testing with the proper test data. Penalties for regulatory non-compliance can run into hundreds of thousands of dollars or more. Data masking (obfuscating) of sensitive information and synthetic data creation are some of the key TDM services that can assure compliance. Next, let's list down top reasons that indicate you need Test Data Management. Top reasons that indicate you need Test Data Management. A high number of false defects root cause to data issues. Continuous Auditing and Continuous Monitoring: Transforming Internal Audit and Management Monitoring to Create Value. Advisory. Continuous Auditing and Continuous Monitoring: Transforming Internal Audit and Management Monitoring to Create Value. Processes and Transactions Electronically Stored Data ERP and Other Business Systems Paper Based Data and Other Evidence Processes and Transactions. Manual Automated. In contrast, continuous monitoring is an automated feedback mechanism for management to ensure that the systems and controls have been operating as designed and transactions are processed appropriately. International Workshop on Multi-Media Database Management Systems. Advances in computing power and the development of high-speed networks have enabled research on interactive and real-time multimedia computing. Nevertheless, the video server in MMDBMS suffers from the limitation of current magnetic disk technology for supporting large amounts of interactive requests simultaneously. We study the problem of data placement in MMDBMS consisting of multiple disks to provide natural retrieval of different portions of video concurrently. Our approach is to disperse... CONTINUE READING. Continuous Intelligence transforms streaming machine data from all infrastructure, compute nodes, devices, and applications that make up digital services into real-time analytics to monitor, troubleshoot and secure those digital services as well as to empower business teams with insights needed to improve business operations in real-time. Old analytics tools built for OTS and ERP apps won't cut it for this new digital business running in the cloud, agile, microservices-based world. The chart above is from data we track in our Continuous Intelligence Platform. It shows how various industries have been impacted by Covid-19, and which ones are thriving.