IEEE TRANSACTIONS ON MULTIMEDIA

CONTAINS THE 1999 AND 2000 IEEE TRANSACTIONS ON MULTIMEDIA

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Welcome

Welcome to the 1999 and 2000 IEEE Transactions on Multimedia on CD-ROM. This disc is designed so that you may locate papers by session or author, as well as with full text search.

Papers originated as electronic files or hard copy. The papers were converted to Adobe Acrobat PDF file format for cross-platform access. Since some of the papers were scanned, the viewing quality will vary with the size and quality of fonts used. Even though the viewing quality on your monitor may vary, all papers print clearly.

Be sure to read the “Getting Started” section for useful recommendations on how to use this electronic guide.

Thank you and Enjoy!

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Product Number: JC18299

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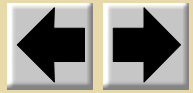

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ORIENTATION

This Electronic Guide file contains hypertext links to individual article files. Links are represented by colored text (e.g. a name or title); clicking on the text activates the link.

Before you start browsing and using the information on this CD-ROM, you will need to install Adobe Acrobat Reader + Search 4.0. If you already have Acrobat Reader installed on your system, make sure it is version 4.0 or higher and includes the Search plug-in.

The README.TXT file found on the root directory of this CD-ROM provides additional information.

In many instances, we refer to the “menu bar” and “tool bar”, shown here for reference.

menu bar: 

tool bar: 

Be sure to read the following on how to achieve the best performance with this electronic guide.

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RECOMMENDATIONS FOR OPTIMAL PERFORMANCE

In order to take full advantage of the performance capabilities of this collection, we recommend that you do the following.

1. To make navigation and searching easier, we strongly recommend changing the following Acrobat Search Preferences (found under File > Preferences > Search on the menu bar.) In the dialog box shown for Acrobat Search Preferences, make the following changes:

   A. Turn ON the “Show Fields” option so that Title, Author, Keywords, and Subject fields are visible when specifying search criteria. If for some reason this preference option is not present on your system, check to see that you have the Search plug-in installed. The Search icon  will be present on the Acrobat tool bar if the function is properly installed. Specifics of the Search function are described later in this section.

   B. Change “Show Top 100 Documents” to “Show Top 1000 Documents”. (Type in “1000” in the field provided.) This allows the maximum number of hits to be displayed during a search.

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2. Articles may have text outside normal print-area defaults. We recommend selecting “Fit to Page” in the print menu (File > Print) to capture the complete image for your printout.

These settings will become your new default.

USING BOOKMARKS

In addition to links, you can navigate through the Electronic Guide using Bookmarks. If they are not already visible, choose Window > Show Bookmarks (F5) from the menu bar or press the “Show/Hide Navigation Pane” button on the tool bar. A panel opens on the left side of the screen displaying Bookmarks in a hierarchy.

Each Bookmark corresponds to a location in the Electronic Guide. Click on the text in a Bookmark to go to that location.

Entries with lower level Bookmarks show a plus sign (+) when subordinate Bookmarks are hidden and a negative sign (-) when subordinate Bookmarks are visible. To view subordinate Bookmarks, click on the plus sign (+). To hide them, click on the negative sign (-). Dragging the right margin of the bookmark panel resizes it. Dragging the Bookmark tab moves the panel to a different location.

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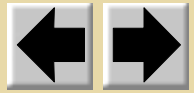

RETURNING TO THE ELECTRONIC GUIDE

After viewing an article, there are three methods of returning to the electronic guide.

1. Select Document > Go Back Doc from the menu bar.
2. Click (as needed) on the Previous View button on the tool bar.
3. Select from the open file list from the “Window” menu.

SELECTING TEXT AND GRAPHICS

To select text or graphics, the appropriate select tool must be visible and selected. The select tools share the same space on the tool bar. The text select tool is visible by default. To select the graphics select tool, you must press and hold on the text select tool. A pop-up will display  the select tools, which you can then select. See the Adobe Acrobat Reader 4.0 Guide (Help > Reader Guide) for more information on these tools.

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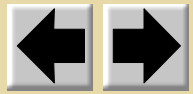
Click to go back (jump) multiple pages in the section.



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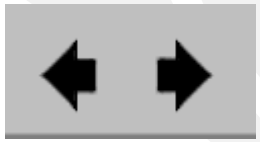

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Choosing Find opens a dialog box. Find scans linearly through the currently open Acrobat file from the cursor forward. If the Electronic Guide PDF is open, Find will scan the entire Electronic Guide for a match to your text. Type a text string in the field provided, check the appropriate options and press the "Find" button. Reader then highlights the first instance of the text string. To look at the next "hit", click on the Find icon and press the "Find Again" button in the Acrobat Find window.

PERFORMING A "SEARCH"

Choosing the "Search" tool bar button or Search menu item (Edit > Search > Query), opens a dialog box from which you can access the more powerful full-text search engine (if you installed Acrobat Reader from this CD-ROM). Its dialog box is shown on the next page.

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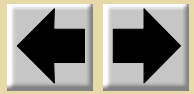

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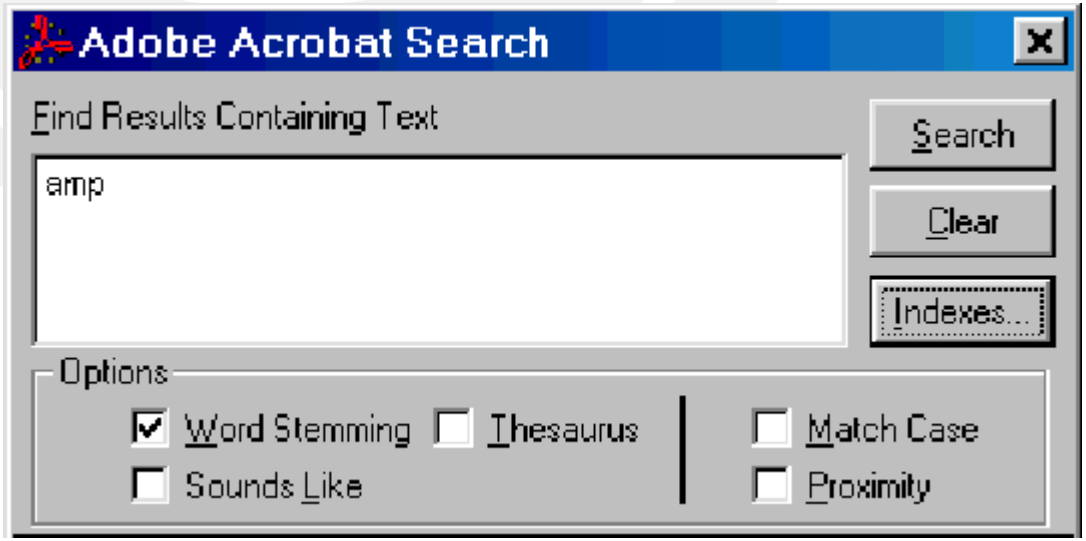
words in the body of papers in the collection. Entering a term in one or more of the fixed fields (Title, Author, Subject or Keywords) will cause a search for hits in only those fields.

If you are not finding files you think should show in the results list, Acrobat may not be attached to the correct index file. To check, press the “Indexes...” button for a list of available indexes. If this collection is not listed, press the “Add...” button and look in the root directory of the CD-ROM for a file called “index.pdx”. Click on that file to add it to the list.

See the Acrobat Reader Guide (on Help menu) for more complete instructions on selecting appropriate options, constructing boolean queries, etc.



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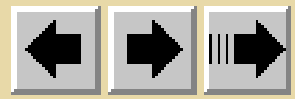

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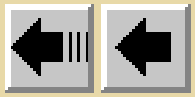

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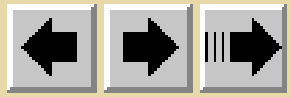

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Multiple Perspectives on Multimedia [Editorial]

R.V. Cox. "Multiple Perspectives on Multimedia [Editorial]." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 1-2.

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A review of the minimum maximum criterion for optimal bit allocation among dependent quantizers

G.M. Schuster, G. Melnikov and A.K. Katsaggelos. "A review of the minimum maximum criterion for optimal bit allocation among dependent quantizers." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 3-17.

In this paper, we review a general framework for the optimal bit allocation among dependent quantizers based on the minimum maximum (MINMAX) distortion criterion. The pros and cons of this optimization criterion are discussed and compared to the well-known Lagrange multiplier method for the minimum average (MINAVE) distortion criterion. We argue that, in many applications, the MINMAX criterion is more appropriate than the more popular MINAVE criterion. We discuss the algorithms for solving the optimal bit allocation problem among dependent quantizers for both criteria and highlight the similarities and differences. We point out that any problem which can be solved with the MINAVE criterion can also be solved with the MINMAX criterion, since both approaches are based on the same assumptions. We discuss uniqueness of the MINMAX solution and the way both criteria can be applied simultaneously within the same optimization framework. Furthermore, we show how the discussed MINMAX approach can be directly extended to result in the lexicographically optimal solution. Finally, we apply the discussed MINMAX solution methods to still image compression, intermode frame compression of H.263, and shape coding applications.

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Dense disparity estimation with a divide-and-conquer disparity space image technique

Chun-Jen Tsai and A.K. Katsaggelos. "Dense disparity estimation with a divide-and-conquer disparity space image technique." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 18-29.

A new divide-and-conquer technique for disparity estimation is proposed in this paper. This technique performs feature matching following the high confidence first principle, starting with the strongest feature point in the stereo pair of scanlines. Once the first matching pair is established, the ordering constraint in disparity estimation allows the original intra-scanline matching problem to be divided into two smaller subproblems. Each subproblem can then be solved recursively until there is no reliable feature point within the subintervals. This technique is very efficient for dense disparity map estimation for stereo images with rich features. For general scenes, this technique can be paired up with the disparity-space image (DSI) technique to compute dense disparity maps with integrated occlusion detection. In this approach, the divide-and-conquer part of the algorithm handles the matching of stronger features and the DSI-based technique handles the matching of pixels in between feature points and the detection of occlusions. An extension to the standard disparity-space technique is also presented to compliment the divide-and-conquer algorithm. Experiments demonstrate the effectiveness of the proposed divide-and-conquer DSI algorithm.

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Motion vector refinement for high-performance transcoding

Jeongnam Youn, Ming-Ting Sun and Chia-Wen Lin. "Motion vector refinement for high-performance transcoding." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 30-40.

In transcoding, simply reusing the motion vectors extracted from an incoming video bit stream may not result in the best quality. In this paper, we show that the incoming motion vectors become nonoptimal due to the reconstruction errors. To achieve the best video quality possible, a new motion estimation should be performed in the transcoder. We propose a fast-search adaptive motion vector refinement scheme that is capable of providing video quality comparable to that can be achieved by performing a new full-scale motion estimation but with much less computation. We discuss the case when some incoming frames are dropped for frame-rate conversions, and propose motion vector composition method to compose a motion vector from the incoming motion vectors. The composed motion vector can also be refined using the proposed motion vector refinement scheme to achieve better results.

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An experimental multimedia system allowing 3-D visualization and eye-controlled interaction without user-worn devices

S. Pastoor, Jin Liu and S. Renault. "An experimental multimedia system allowing 3-D visualization and eye-controlled interaction without user-worn devices." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 41-52.

In this paper, a new kind of human-computer interface allowing three-dimensional (3-D) visualization of multimedia objects and eye controlled interaction is proposed. In order to explore the advantages and limitations of the concept, a prototype system has been set up. The testbed includes a visual operating system for integrating novel forms of interaction with a 3-D graphic user interface, autostereoscopic (free-viewing) 3-D displays with close adaptation to the mechanisms of binocular vision, and solutions for nonintrusive eye-controlled interaction (video-based head and gaze tracking). The paper reviews the system's key components and outlines various applications implemented for user testing. Preliminary results show that most of the users are impressed by a 3-D graphic user interface and the possibility to communicate with a computer by simply looking at the object of interest. On the other hand, the results emphasize the need for a more intelligent interface agent to avoid misinterpretation of the user's eye-controlled input and to reset undesired activities.

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Natural feature tracking for augmented reality

U. Neumann and S. You. "Natural feature tracking for augmented reality." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 53-64.

Natural scene features stabilize and extend the tracking range of augmented reality (AR) pose-tracking systems. We develop robust computer vision methods to detect and track natural features in video images. Point and region features are automatically and adaptively selected for properties that lead to robust tracking. A multistage tracking algorithm produces accurate motion estimates, and the entire system operates in a closed-loop that stabilizes its performance and accuracy. We present demonstrations of the benefits of using tracked natural features for AR applications that illustrate direct scene annotation, pose stabilization, and extendible tracking range. Our system represents a step toward integrating vision with graphics to produce robust wide-area augmented realities.

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Detection of moving cast shadows for object segmentation

J. Stander, R. Mech and J. Ostermann. "Detection of moving cast shadows for object segmentation." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 65-76.

To prevent moving shadows being misclassified as moving objects or parts of moving objects, this paper presents an explicit method for detection of moving cast shadows on a dominating scene background. Those shadows are generated by objects moving between a light source and the background. Moving cast shadows cause a frame difference between two succeeding images of a monocular video image sequence. For shadow detection, these frame differences are detected and classified into regions covered and regions uncovered by a moving shadow. The detection and classification assume plane background and a nonnegligible size and intensity of the light sources. A cast shadow is detected by temporal integration of the covered background regions while subtracting the uncovered background regions. The shadow detection method is integrated into an algorithm for two-dimensional (2-D) shape estimation of moving objects from the informative part of the description of the international standard ISO/MPEG-4. The extended segmentation algorithm compensates first apparent camera motion. Then, a spatially adaptive relaxation scheme estimates a change detection mask for two consecutive images. An object mask is derived from the change detection mask by elimination of changes due to background uncovered by moving objects and by elimination of changes due to background covered or uncovered by moving cast shadows. Results obtained with MPEG-4 test sequences and additional sequences show that the accuracy of object segmentation is substantially improved in presence of moving cast shadows. Objects and shadows are detected and tracked separately.

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Content-based MPEG video traffic modeling

A.M. Dawood and M. Ghanbari. "Content-based MPEG video traffic modeling." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 77-87.

In this paper, we propose a video model to generate VBR MPEG video traffic based on the scene content description. Long sessions of nonhomogeneous video clips are decomposed into homogeneous video shots. The shots are then classified into different classes in terms of their texture and motion complexity. Each shot class was uniquely described with an autoregressive model. Transitions between the shots and their durations have been analyzed. Unlike many classical video source models, this model may be used to generate traffic of any type of video scenes ranging from a low complexity video conferencing to a highly active sport program. The performance of the model is evaluated by measuring the mean cell delay when the generated video traffic is fed to an ATM multiplex buffer.

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Robust image and video transmission over spectrally shaped channels using multicarrier modulation

Haitao Zheng and K.J.R. Liu. "Robust image and video transmission over spectrally shaped channels using multicarrier modulation." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 88-103.

This paper presents a new parallel transmission framework for reliable multimedia data transmission over spectrally shaped channels using multicarrier modulation. We propose to transmit source data layers of different perceptual importance in parallel, each occupying a number of subchannels. New loading algorithms are developed to efficiently allocate the available resources, e.g., transmitted power and bit rate, to the subchannels according to the source layers they transmit. Instead of making the bit error rate of all the subchannels equal as in most existing loading algorithms, the proposed algorithm assigns different error performance to the subchannels to achieve unequal error protection for different layers. The channel induced distortion in mean-square sense is minimized. We show that the proposed system can be applied nicely to both fixed length coding and variable-length coding. Asymptotic gains with respect to channel distortion are also derived. Numerical examples show that the proposed algorithm achieves significant performance improvement compared to the existing work, especially for spectrally shaped channels commonly used in in ADSL systems.

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Adapting multimedia Internet content for universal access

R. Mohan, J.R. Smith and Chung-Sheng Li. "Adapting multimedia Internet content for universal access." 1999 IEEE Transactions on Multimedia [T-MUL] 1.1 (March 1999): 104-114.

Content delivery over the Internet needs to address both the multimedia nature of the content and the capabilities of the diverse client platforms the content is being delivered to. We present a system that adapts multimedia Web documents to optimally match the capabilities of the client device requesting it. This system has two key components. 1) A representation scheme called the InfoPyramid that provides a multimodal, multiresolution representation hierarchy for multimedia. 2) A customizer that selects the best content representation to meet the client capabilities while delivering the most value. We model the selection process as a resource allocation problem in a generalized rate distortion framework. In this framework, we address the issue of both multiple media types in a Web document and multiple resource types at the client. We extend this framework to allow prioritization on the content items in a Web document. We illustrate our content adaptation technique with a web server that adapts multimedia news stories to clients as diverse as workstations, PDA's and cellular phones.

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An 0.5-/spl mu/m CMOS analog random access memory chip for TeraOPS speed multimedia video processing

R. Carmona-Galan, A. Rodriguez-Vazquez, S. Espejo-Meana, R. Dominguez-Castro, T. Roska, T. Kozek and L.O. Chua. "An 0.5-/spl mu/m CMOS analog random access memory chip for TeraOPS speed multimedia video processing." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): 121-135.

Data compressing, data coding, and communications in object-oriented multimedia applications like telepresence, computer-aided medical diagnosis, or telesurgery require an enormous computing power-in the order of trillions of operations per second (TeraOPS). Compared with conventional digital technology, cellular neural/nonlinear network (CNN)-based computing is capable of realizing these TeraOPS-range image processing tasks in a cost-effective implementation. To exploit the computing power of the CNN Universal Machine (CNN-UM), the CNN chipset architecture has been developed-a mixed-signal hardware platform for CNN-based image processing. One of the nonstandard components of the chipset is the cache memory of the analog array processor, the analog random access memory (ARAM). This paper reports on an ARAM chip that has been designed and fabricated in a 0.5-/spl mu/m CMOS technology. This chip consists of a fully addressable array of 32/spl times/256 analog memory registers and has a packing density of 637 analog-memory-cells/mm/sup 2/. Random and nondestructive access of the memory contents is available. Bottom-plate sampling techniques have been employed to eliminate harmonic distortion introduced by signal-dependent feedthrough. Signal coupling and interaction have been minimized by proper layout measures, including the use of protection rings and separate power supplies for the analog and the digital circuitry. This prototype features an equivalent resolution of up to 7 bits-measured by comparing the reconstructed waveform with the original input signal. Measured access times for writing/reading to/from the memory registers are of 200 ns. I/O rates via the I6-line-wide I/O bus exceed 10 Msamples/s. Storage time at room temperature is in the 80 to 100 ms range, without accuracy loss.

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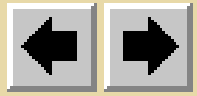

Augmented reality with automatic illumination control incorporating ellipsoidal models

J. Stauder. "Augmented reality with automatic illumination control incorporating ellipsoidal models." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): 136-143.

In applications of augmented reality like virtual studio TV production, multisite video conference applications using a virtual meeting room and synthetic/natural hybrid coding according to the new ISO/MPEG-4 standard, a synthetic scene is mixed into a natural scene to generate a synthetic/natural hybrid image sequence. For realism, the illumination in both scenes should be identical. In this paper, the illumination of the natural scene is estimated automatically and applied to the synthetic scene. The natural scenes are restricted to scenes with nonoccluding, simple, moving, mainly rigid objects. For illumination estimation, these natural objects are automatically segmented in the natural image sequence and three-dimensionally (3-D) modeled using ellipsoid-like models. The 3-D shape, 3-D motion, and the displaced frame difference between two succeeding images are evaluated to estimate three illumination parameters. The parameters describe a distant point light source and ambient light. Using the estimated illumination parameters, the synthetic scene is rendered and mixed to the natural image sequence. Experimental results with a moving virtual object mixed into real video telephone sequences show that the virtual object appears naturally having the same shading and shadows as the real objects. Further, shading and shadow allows the viewer to understand the motion trajectory of the objects much better.

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Capture and representation of human walking in live video sequences

Jia-Ching Cheng and J.M.F. Moura. "Capture and representation of human walking in live video sequences." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): 144-156.

Extracting human representations from video has vast applications. In this paper, we present a knowledge-based framework to capture metarepresentations for real-life video with human walkers. The system models the human body as an articulated object and the human walking as a cyclic activity with highly correlated temporal patterns. We extract for each of the body parts its motion, shape, and texture. Once available, this structural information can be used to manipulate or synthesize the original video sequence, or animate the walker with a different motion in a new synthesized video.

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VideoZoom spatio-temporal video browser

J.R. Smith. "VideoZoom spatio-temporal video browser." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): 157-171.

We describe a system for browsing and interactively retrieving video over the Internet at multiple spatial and temporal resolutions. The VideoZoom system enables users to start with coarse, low-resolution views of the sequences and selectively zoom-in in space and time. VideoZoom decomposes the video sequences into a hierarchy of view elements, which are retrieved in a progressive fashion. The client browser incrementally builds the views by retrieving, caching, and assembling the view elements, as needed. By integrating browsing and retrieval into a single progressive retrieval paradigm, VideoZoom provides a new and useful system for accessing video over the Internet. VideoZoom is suitable for digital video libraries and a number of other applications in which streaming methods provide insufficient quality of video, video downloading introduces large latencies, and generating video summaries is difficult or not well integrated with video retrieval tasks.

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Real-time Internet video using error resilient scalable compression and TCP-friendly transport protocol

Wai-Tian Tan and A. Zakhor. "Real-time Internet video using error resilient scalable compression and TCP-friendly transport protocol." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): 172-186.

We introduce a point to point real-time video transmission scheme over the Internet combining a low-delay TCP-friendly transport protocol in conjunction with a novel compression method that is error resilient and bandwidth-scalable. Compressed video is packetized into individually decodable packets of equal expected visual importance. Consequently, relatively constant video quality can be achieved at the receiver under lossy conditions. Furthermore, the packets can be truncated to instantaneously meet the time varying bandwidth imposed by a TCP-friendly transport protocol. As a result, adaptive flows that are friendly to other Internet traffic are produced. Actual Internet experiments together with simulations are used to evaluate the performance of the compression, transport, and the combined schemes.

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Scheduling multimedia services in a low-power MAC for wireless and mobile ATM networks

Jyh-Cheng Chen, K.M. Sivalingam, P. Agrawal and R. Acharya. "Scheduling multimedia services in a low-power MAC for wireless and mobile ATM networks." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): 187-201.

This paper describes the design and analysis of the scheduling algorithm for energy conserving medium access control (EC-MAC), which is a low-power medium access control (MAC) protocol for wireless and mobile ATM networks. We evaluate the scheduling algorithms that have been proposed for traditional ATM networks. Based on the structure of EC-MAC and the characteristics of wireless channel, we propose a new algorithm that can deal with the burst errors and the location-dependent errors. Most scheduling algorithms proposed for either wired or wireless networks were analyzed with homogeneous traffic or multimedia services with simplified traffic models. We analyze our scheduling algorithm with more realistic multimedia traffic models based on H.263 video traces and self-similar data traffic. One of the key goals of the scheduling algorithms is simplicity and fast implementation. Unlike the time-stamped based algorithms, our algorithm does not need to sort the virtual time, and thus, the complexity of the algorithm is reduced significantly.

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Low power memory storage and transfer organization for the MPEG-4 full pel motion estimation on a multimedia processor

E. Brockmeyer, L. Nachtergaele, F.V.M. Catthoor, J. Bormans and H.J. De Man. "Low power memory storage and transfer organization for the MPEG-4 full pel motion estimation on a multimedia processor." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): 202-216.

Data transfers and storage are crucial cost factors in multimedia systems. Systematic methodologies are needed to obtain dramatic reductions in terms of power, area and cycle count. Upcoming multimedia processing applications will require high memory bandwidth. In this paper, we estimate that a software reference implementation of an MPEG-4 video encoder typically requires five Gtransfers/s to main memory for a simple profile level L2. This shows a clear need for optimization and the use of intermediate memory stages. By applying our ACROPOLIS methodology, developed mainly to relieve this data access bottleneck, we have arrived at an implementation which needs a factor 65 less background accesses. In addition, we also show that we can heavily improve on the memory transfers, without sacrificing speed (even gaining about 10% on cache misses and cycles for a DEC Alpha), by aggressive source code transformations.

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Real-time interactive MPEG-4 system encoder using a cluster of workstations

Yong He, I. Ahmad and M.L. Liou. "Real-time interactive MPEG-4 system encoder using a cluster of workstations." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): 217-233.

MPEG-4 currently being finalized by the Moving Pictures Experts Group of the ISO is a multimedia standard, MPEG-4 aims to support content-based coding of audio, text, image, and video (synthetic and natural) data, multiplexing of coded data, as well as composition and representation of audiovisual scenes. One of the most critical components of an MPEG-4 environment is the system encoder. An MPEG-4 scene may contain several audio and video objects, images, and text, each of which must be encoded individually and then multiplexed to form the system bitstream. Due to its flexible features, object-based nature, and provision for user interaction, MPEG-4 encoder is highly suitable for a software-based implementation. A full-scale software-based MPEG-J system encoder with real-time encoding speed is a nontrivial task and requires massive computation. We have built such an encoder using a cluster of workstations collectively working as a virtual parallel machine. Parallel processing of MPEG-4 encoder needs to be carried out carefully as objects may appear or disappear dynamically in a scene. In addition, objects may be synchronized with each other. User interactions may also prohibit a straightforward parallelization. We propose a modeling methodology that captures the spatio-temporal relationship between various objects and user interaction. We then propose a number of scheduling algorithms that periodically allocate MPEG-4 objects to multiple workstations ensuring load balancing and synchronization requirements among multiple objects. Each scheduling algorithm has its own performance and complexity characteristics. The experimental results, while showing real-time encoding rates, exhibit tradeoffs between load balancing, scheduling overhead cost, and global performance.

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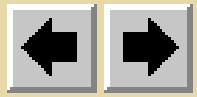

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"EDICS Categories for IEEE, Transactions on Multimedia: Jun. 1999 [T-MUL]." 1999 IEEE Transactions on Multimedia [T-MUL] 1.2 (June 1999): bm1-bm1.

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AudioBIFS: Describing audio scenes with the MPEG-4 multimedia standard

E.D. Scheirer, R. Vaananen and J. Huopaniemi. "AudioBIFS: Describing audio scenes with the MPEG-4 multimedia standard." 1999 IEEE Transactions on Multimedia [T-MUL] 1.3 (September 1999): 237-250.

We present an overview of the AudioBIFS system, part of the Binary Format for Scene Description (BIFS) tool in the MPEG-4 International Standard. AudioBIFS is the tool that integrates the synthetic and natural sound coding functions in MPEG-4. It allows the flexible construction of soundtracks and sound scenes using compressed sound, sound synthesis, streaming audio, interactive and terminal-dependent presentation, three-dimensional (3-D) spatialization, environmental auralization, and dynamic download of custom signal-processing effects algorithms. MPEG-4 sound scenes are based on a model that is a superset of the model in VRML 2.0, and we describe how MPEG-4 is built upon VRML and the new capabilities provided by MPEG-4. We discuss the use of structured audio orchestra language, the MPEG-4 SAOL, for writing downloadable effects, present an example sound scene built with AudioBIFS, and describe the current state of implementations of the standard.

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Timestamping schemes for MPEG-2 systems layer and their effect on receiver clock recovery

C. Tryfonas and A. Varma. "Timestamping schemes for MPEG-2 systems layer and their effect on receiver clock recovery." 1999 IEEE Transactions on Multimedia [T-MUL] 1.3 (September 1999): 251-263.

We propose and analyze several strategies for performing timestamping of an MPEG-2 Transport Stream transmitted over a packet-switched network using the PCR-unaware encapsulation scheme, and analyze their effect on the quality of the recovered clock at the MPEG-2 Systems decoder. When the timestamping scheme is based on a timer with a fixed period, the PCR values in the packet stream may switch polarity deterministically, at a frequency determined by the timer period and the transport rate of the MPEG signal. This, in turn, can degrade the duality of the recovered clock at the receiver beyond acceptable limits. We consider three timestamping schemes for solving this problem: (1) selecting a deterministic timer period to avoid the phase difference in PCR values altogether, (2) fine-tuning the deterministic timer period to maximize the frequency of PCR polarity changes, and (3) selecting the timer period randomly to eliminate the deterministic PCR polarity changes. For the case of deterministic timer period, we derive the frequency of the PCR polarity changes as a function of the timer period and the transport rate, and use it to find ranges of the timer period for acceptable quality of the recovered clock. We also analyze a random timestamping procedure based on a random telegraph process and obtain lower bounds on the rate of PCR polarity changes such that the recovered clock does not violate the PAL/NTSC clock specifications. The analytical results are verified by simulations with both synthetic and actual MPEG-2 Transport Streams sent to a simulation model of an MPEG-2 Systems decoder.

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Face detection using quantized skin color regions merging and wavelet packet analysis

C. Garcia and G. Tziritas. "Face detection using quantized skin color regions merging and wavelet packet analysis." 1999 IEEE Transactions on Multimedia [T-MUL] 1.3 (September 1999): 264-277.

Detecting and recognizing human faces automatically in digital images strongly enhance content-based video indexing systems. In this paper, a novel scheme for human faces detection in color images under nonconstrained scene conditions, such as the presence of a complex background and uncontrolled illumination, is presented. Color clustering and filtering using approximations of the YCbCr and HSV skin color subspaces are applied on the original image, providing quantized skin color regions. A merging stage is then iteratively performed on the set of homogeneous skin color regions in the color quantized image, in order to provide a set of potential face areas. Constraints related to shape and size of faces are applied, and face intensity texture is analyzed by performing a wavelet packet decomposition on each face area candidate in order to detect human faces. The wavelet coefficients of the band filtered images characterize the face texture and a set of simple statistical deviations is extracted in order to form compact and meaningful feature vectors. Then, an efficient and reliable probabilistic metric derived from the Bhattacharrya distance is used in order to classify the extracted feature vectors into face or nonface areas, using some prototype face area vectors, acquired in a previous training stage.

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Improved WWW multimedia transmission performance in HTTP/TCP over ATM networks

Ruay-Shiung Chang and Chin-Dong Wang. "Improved WWW multimedia transmission performance in HTTP/TCP over ATM networks." 1999 IEEE Transactions on Multimedia [T-MUL] 1.3 (September 1999): 278-290.

Transmission control protocol/Internet protocol (TCP/IP) is the de facto standard of the networking world. It dynamically adjusts routing of packets to accommodate failures in channels and allows construction of very large networks with little central management. But IP packets are based on the datagram model and are not really suited to real-time traffic. In order to overcome the drawbacks, a new network technology, ATM, is proposed. ATM provides quality of service (QOS) guarantees for various classes of applications and in-order delivery of packets via connection oriented virtual circuits. Unfortunately, when ATM is to be internetworked with the existing network infrastructure, some special signaling, addressing and routing protocols are needed. IP over ATM is one of the methods proposed by IETF. It allows existing TCP/IP applications to run on ATM end-stations and ATM networks to interconnect with legacy LAN/WAN technologies. But the performance of TCP/IP over ATM leaves something to be desired. Partial packet discard (PPD) and early packet discard (EPD) are two schemes to improve its performance. This paper proposes a "selective packet retransmission" scheme for improving HTTP/TCP performance when transmitting through ATM networks. In selective packet retransmission, we take advantage of the property of humans' perception tolerance for errors to determine whether to retransmit a corrupted TCP segment or not. For lossable data, such as images, when an error occurs because of cell losses, it will not be retransmitted. The simulations show that, for the same buffer size and traffic load, selective packet retransmission performs better than PPD, EPD, and plain TCP over ATM.

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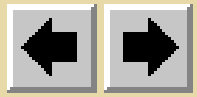

Alpha-stable modeling of noise and robust time-delay estimation in the presence of impulsive noise

P.G. Georgiou, P. Tsakalides and C. Kyriakakis. "Alpha-stable modeling of noise and robust time-delay estimation in the presence of impulsive noise." 1999 IEEE Transactions on Multimedia [T-MUL] 1.3 (September 1999): 291-301.

A new representation of audio noise signals is proposed, based on symmetric /spl alpha/-stable (S/spl alpha/S) distributions in order to better model the outliers that exist in real signals. This representation addresses a shortcoming of the Gaussian model, namely, the fact that it is not well suited for describing signals with impulsive behavior. The /spl alpha/-stable and Gaussian methods are used to model measured noise signals. It is demonstrated that the /spl alpha/-stable distribution, which has heavier tails than the Gaussian distribution, gives a much better approximation to real-world audio signals. The significance of these results is shown by considering the time delay estimation (TDE) problem for source localization in teleimmersion applications. In order to achieve robust sound source localization, a novel time delay estimation approach is proposed. It is based on fractional lower order statistics (FLOS), which mitigate the effects of heavy-tailed noise. An improvement in TDE performance is demonstrated using FLOS that is up to a factor of four better than what can be achieved with second-order statistics.

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Performance evaluation of smoothing algorithms for transmitting prerecorded variable-bit-rate video

W.-C. Feng and J. Rexford. "Performance evaluation of smoothing algorithms for transmitting prerecorded variable-bit-rate video." 1999 IEEE Transactions on Multimedia [T-MUL] 1.3 (September 1999): 302-312.

The transfer of prerecorded, compressed variable-bit-rate video requires multimedia services to support large fluctuations in bandwidth requirements on multiple time scales. Bandwidth smoothing techniques can reduce the burstiness of a variable-bit-rate stream by transmitting data at a series of fixed rates, simplifying the allocation of resources in video servers and the communication network. This paper compares the transmission schedules generated by the various smoothing algorithms, based on a collection of metrics that relate directly to the server, network, and client resources necessary for the transmission, transport, and playback of prerecorded video. Using MPEG-1 and MJPEG video data and a range of client buffer sizes, we investigate the interplay between the performance metrics and the smoothing algorithms. The results highlight the unique strengths and weaknesses of each bandwidth smoothing algorithm, as well as the characteristics of a diverse set of video clips.

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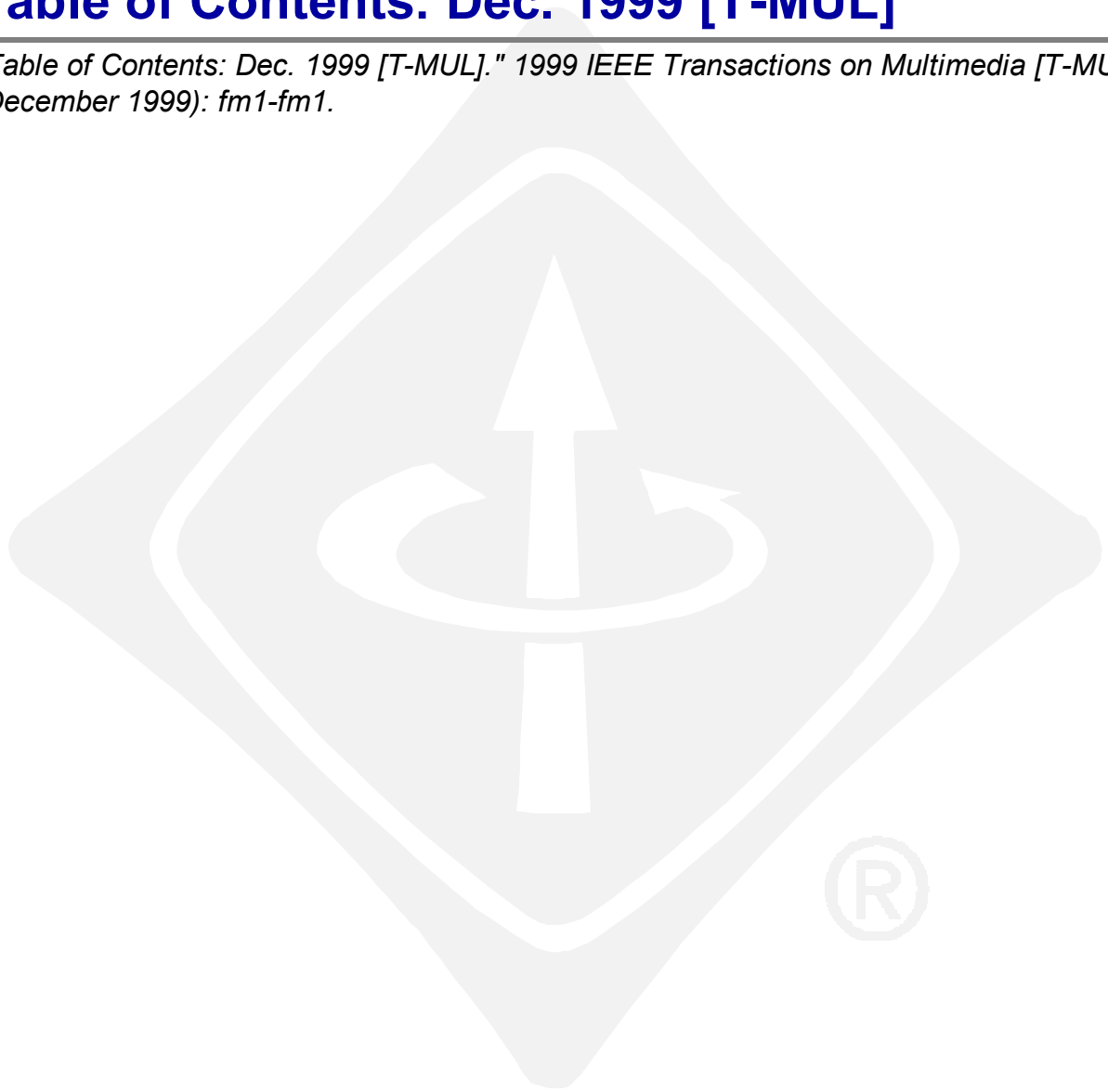

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Efficient MPEG compressed video analysis using macroblock type information

Soo-Chang Pei and Yu-Zuong Chou. "Efficient MPEG compressed video analysis using macroblock type information." 1999 IEEE Transactions on Multimedia [T-MUL] 1.4 (December 1999): 321-333.

Efficient indexing methods are required to handle the rapidly increasing amount of visual information within video databases. Video analysis that partitions the video into clips or extracts interesting frames is an important preprocessing step for video indexing. We develop a novel method for video analysis using the macroblock (MB) type information of MPEG compressed video bitstreams. This method exploits the comparison operations performed in the motion estimation procedure, which results in specific characteristics of the MB type information when scene changes occur or some special effects are applied. Only a simple analysis on MB types of frames is needed to achieve very fast scene change, gradual transition, flashlight, and caption detection. The advantages of this novel approach are its direct extraction from the MPEG bitstreams after VLC decoding, very low complexity analysis, frame-based detection accuracy and high sensitivity.

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Multimodal integration-a statistical view

Lizhong Wu, S.L. Oviatt and P.R. Cohen. "Multimodal integration-a statistical view." 1999 IEEE Transactions on Multimedia [T-MUL] 1.4 (December 1999): 334-341.

We present a statistical approach to developing multimodal recognition systems and, in particular, to integrating the posterior probabilities of parallel input signals involved in the multimodal system. We first identify the primary factors that influence multimodal recognition performance by evaluating the multimodal recognition probabilities. We then develop two techniques, an estimate approach and a learning approach, which are designed to optimize accurate recognition during the multimodal integration process. We evaluate these methods using Quickset, a speech/gesture multimodal system, and report evaluation results based on an empirical corpus collected with Quickset. From an architectural perspective, the integration technique presented offers enhanced robustness. It also is premised on more realistic assumptions than previous multimodal systems using semantic fusion. From a methodological standpoint, the evaluation techniques that we describe provide a valuable tool for evaluating multimodal systems.

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Transformation-based reconstruction for real-time voice transmissions over the Internet

B.W. Web and Ding Lin. "Transformation-based reconstruction for real-time voice transmissions over the Internet." 1999 IEEE Transactions on Multimedia [T-MUL] 1.4 (December 1999): 342-351.

We explore the loss behavior encountered in transmitting real-time voice over the Internet and propose a new loss-concealment scheme to improve its received quality. One known technique to conceal loss is to send interleaved streams of voice samples and reconstruct missing or late samples by interpolation at the receiver. Based on this method, we propose a new transformation-based reconstruction algorithm. Its basic idea is for the sender to transform an input voice stream, according to the interpolation method used at the receiver and the predicted loss behavior, before interleaving the stream. The transformation is derived by minimizing reconstruction error in case of loss. We show that our method is computationally efficient and can be extended to various interleaving factors and interpolation-based reconstruction methods. Finally, we show performance improvements of our method by testing it over the Internet.

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Issues of quality and multiplexing when smoothing rate adaptive video

N.G. Duffield, K.K. Ramakrishnan and A.R. Reibman. "Issues of quality and multiplexing when smoothing rate adaptive video." 1999 IEEE Transactions on Multimedia [T-MUL] 1.4 (December 1999): 352-364.

We have proposed a smoothing and rate adaptation algorithm-SAVE (Smoothed Adaptive Video over Explicit rate networks)-for transport of compressed video over rate-controlled networks. SAVE attempts to preserve quality as much as possible, and exercises control over the source rate only when essential to prevent unacceptable delay. In order to understand the impact on quality of rate adaptation, we have evolved the quality metrics typically used to evaluate the efficacy of mechanisms to transport video. We investigate the dynamic nature of rate reduction: any prolonged impairment is likely to be noticeable. We study the sensitivity of SAVE to its parameters and network characteristics. Finally, the utility of the proposed scheme is measured by its ability to multiplex a large number of streams effectively. Our evaluations are based on experiments with 20 traces of entertainment videos using different compression algorithms.

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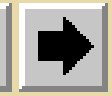

Content-based query processing for video databases

T.C.T. Kuo and A.L.P. Chen. "Content-based query processing for video databases." 2000 IEEE Transactions on Multimedia [T-MUL] 2.1 (March 2000): 1-13.

This paper presents a query processing strategy for the content-based video query language named CVQL. By CVQL, users can flexibly specify query predicates by the spatial and temporal relationships of the content objects. The query processing strategy evaluates the predicates and returns qualified videos or frames as results. Before the evaluation of the predicates, a preprocessing is performed to avoid unnecessary accessing of videos which are impossible to be the answers. The preprocessing checks the existence of the content objects specified in the predicates to eliminate unqualified videos. For the evaluation of the predicates, an M-index is designed based on the analysis of the behaviors of the content objects. The M-index is employed to avoid frame-by-frame evaluation of the predicates. Experimental results are presented to illustrate the performance of this approach.

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Frontal face authentication using discriminating grids with morphological feature vectors

C.L. Kotropoulos, A. Tefas and I. Pitas. "Frontal face authentication using discriminating grids with morphological feature vectors." 2000 IEEE Transactions on Multimedia [T-MUL] 2.1 (March 2000): 14-26.

A novel elastic graph matching procedure based on multiscale morphological operations, the so called morphological dynamic link architecture, is developed for frontal face authentication. Fast algorithms for implementing mathematical morphology operations are presented. Feature selection by employing linear projection algorithms is proposed. Discriminatory power coefficients that weigh the matching error at each grid node are derived. The performance of morphological dynamic link architecture in frontal face authentication is evaluated in terms of the receiver operating characteristic on the M2VTS face image database. Preliminary results for face recognition using the proposed technique are also presented.

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The correlation structure for a class of scene-based video models and its impact on the dimensioning of video buffers

M.M. Krunz and A.M. Ramasamy. "The correlation structure for a class of scene-based video models and its impact on the dimensioning of video buffers." 2000 IEEE Transactions on Multimedia [T-MUL] 2.1 (March 2000): 27-36.

We analyze the autocorrelation structure for a class of scene-based MPEG video models at the groups-of-pictures (GOP) (course grain) and frame (fine grain) levels assuming an arbitrary scene-length distribution. At the GOP level, we establish the relationship between the scene-length statistics and the short-range/long-range dependence (SRD/LRD) of the underlying model. We formally show that when the intrascene dynamics exhibit SRD, the overall model exhibits LRD if and only if the second moment of the scene length is infinite. Our results provide the theoretical foundation for several empirically derived scene-based models. We then study the impact of traffic correlations on the packet loss performance at a video buffer. Two popular families of scene-length distributions are investigated: Pareto and Weibull. In the case of Pareto distributed scene lengths, it is observed that the performance is rather insensitive to changes in the buffer size even as the video model enters the SRD regime. For Weibull distributed scene lengths, we observe that for small buffers the loss performance under a frame-level model can be larger than its GOP-level counterpart by orders of magnitude. In this case, the reliance on GOP-level models will result in very optimistic results.

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Online smoothing of variable-bit-rate streaming video

S. Sen, J.L. Rexford, J.K. Dey, J.F. Kurose and D.F. Towsley. "Online smoothing of variable-bit-rate streaming video." 2000 IEEE Transactions on Multimedia [T-MUL] 2.1 (March 2000): 37-48.

Bandwidth smoothing techniques for stored video perform end to end workahead transmission of frames into the client playback buffer, in advance of their display times. Such techniques are very effective in reducing the burstiness of the bandwidth requirements for transmitting compressed, stored video. This paper addresses online bandwidth smoothing for a growing number of streaming video applications such as newscasts, sportscasts, and distance learning, where many clients may be willing to tolerate a playback delay of a few seconds in exchange for a smaller bandwidth requirement. The smoothing can be performed at either the source of the videocast or at special smoothing server(s) (e.g., proxies or gateways) within the network. In contrast to previous work on stored video, the online smoothing server has limited knowledge of frame sizes and access to only a segment of the video at a time. This is either because the feed is live or because it is streaming past the server. We formulate an online smoothing model which incorporates playback delay, client and server buffer sizes, server processing capacity, and frame size prediction techniques. Our model can accommodate an arbitrary arrival process. Using techniques for smoothing stored video at the source as a starting point, we develop an online, window-based smoothing algorithm for delay tolerant applications. Extensive experiments with MPEG-1 and M-JPEG video traces demonstrate that online smoothing significantly reduces the peak rate, coefficient of variation, and effective bandwidth of variable-bit-rate video streams. These reductions can be achieved with modest playback delays of a few seconds to a few tens of seconds and moderate client buffer sizes, and closely approximate the performance of optimal offline smoothing of stored video. In addition, we show that frame size prediction can offer further reduction in resource requirements, though prediction becomes relatively less important for longer playback delays. However, the ability to predict future frame sizes affects the appropriate division of buffer space between the server and client sites. Our experiments show that the optimal buffer allocation shifts to placing more memory at the server as the server has progressively less information about future frame sizes.

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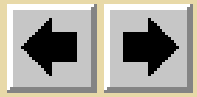

Run-time optimization of heterogeneous media access in a multimedia server

T.-P.J. To and B. Hamidzadeh. "Run-time optimization of heterogeneous media access in a multimedia server." 2000 IEEE Transactions on Multimedia [T-MUL] 2.1 (March 2000): 49-61.

Discrete media (DM) data throughput is vital to systems that need to support the heterogeneity and variety of data found in interactive hypermedia and digital library applications. Therefore, a multimedia server's ability in delivering a high DM data throughput without degrading its CM data throughput deserves more attention. In this paper, we address this issue by optimizing the use of disk bandwidth spent on CM service at run-time and redirecting the saved bandwidth to service DM requests. Based on a new cost model of disk access incurred in CM service, we formulate strategies to control the size of each disk read at run time. These strategies improve the efficiency of each disk access and improve the DM data throughput of a multimedia server, without jeopardizing the CM throughput. Through experimental evaluations, the improvements achieved are demonstrated. Furthermore, efficient control of the allocation of disk bandwidth between DM and CM services over a wide range is also demonstrated.

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Methodologies for designing video servers

D. Meliksetian, Frank Feng-Kuo Yu and C.Y.R. Chen. "Methodologies for designing video servers." 2000 IEEE Transactions on Multimedia [T-MUL] 2.1 (March 2000): 62-69.

This paper proposes an approach for integrating CPU/disk/network scheduling and memory management for supporting a variety of VCR operations and dynamic service changes efficiently. Under this approach we can optimize individual resources, and support a maximal number of clients on a given system. We present a framework of service modeling to characterize the requested video services and identify the scheduling parameters for supporting these services. A number of techniques and methodologies are developed for analyzing the behaviors of disk accesses, network operations, and CPU activities under the loads of both single and multiple clients. We also describe an admission control strategy that utilizes information about all the system resources to determine if a set of video services is acceptable.

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Inverse filter design for immersive audio rendering over loudspeakers

A. Mouchtaris, P. Reveliotis and C. Kyriakakis. "Inverse filter design for immersive audio rendering over loudspeakers." 2000 IEEE Transactions on Multimedia [T-MUL] 2.2 (June 2000): 77-87.

Immersive audio systems can be used to render virtual sound sources in three-dimensional (3-D) space around a listener. This is achieved by simulating the head-related transfer function (HRTF) amplitude and phase characteristics using digital filters. In this paper, we examine certain key signal processing considerations in spatial sound rendering over headphones and loudspeakers. We address the problem of crosstalk inherent in loudspeaker rendering and examine two methods for implementing crosstalk cancellation and loudspeaker frequency response inversion in real time. We demonstrate that it is possible to achieve crosstalk cancellation of 30 dB using both methods, but one of the two (the Fast RLS Transversal Filter Method) offers a significant advantage in terms of computational efficiency. Our analysis is easily extendable to nonsymmetric listening positions and moving listeners.

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Delay reduction techniques for playout buffering

C.J. Sreenan, Jyh-Cheng Chen, P. Agrawal and B. Narendran. "Delay reduction techniques for playout buffering." 2000 IEEE Transactions on Multimedia [T-MUL] 2.2 (June 2000): 88-100.

Receiver synchronization of continuous media streams is required to deal with delay differences and variations resulting from delivery over packet networks such as the Internet. This function is commonly provided using per-stream playout buffers which introduce additional delay in order to produce a playout schedule which meets the synchronization requirements. Packets which arrive after their scheduled playout time are considered late and are discarded. In this paper, we present the Concord algorithm, which provides a delay-sensitive solution for playout buffering. It records historical information and uses it to make short-term predictions about network delay with the aim of not reacting too quickly to short-lived delay variations. This allows an application-controlled tradeoff of packet lateness against buffering delay, suitable for applications which demand low delay but can tolerate or conceal a small amount of late packets. We present a selection of results from an extensive evaluation of Concord using Internet traffic traces. We explore the use of aging techniques to improve the effectiveness of the historical information and hence, the delay predictions. The results show that Concord can produce significant reductions in buffering delay and delay variations at the expense of packet lateness values of less than 1%.

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Heterogeneous video transcoding to lower spatio-temporal resolutions and different encoding formats

T. Shanableh and M. Ghanbari. "Heterogeneous video transcoding to lower spatio-temporal resolutions and different encoding formats." 2000 IEEE Transactions on Multimedia [T-MUL] 2.2 (June 2000): 101-110.

In this work, transcoding of pre-encoded MPEG-1, 2 video into lower bit rates is realized through altering the coding algorithm into H.261/H.263 standards with lower spatio-temporal resolutions. For this heterogeneous transcoding, we extract and compose a set of candidate motion vectors, from the incoming bit stream, to comply with the encoding format of the output bit stream. For the spatial resolution reduction we generate one motion vector out of a set of input motion vectors operating on the higher spatial resolution image. Finally, for the temporal resolution reduction we compose new motion vectors from the dropped frames motion vectors. Throughout the paper, we discuss the impact of motion estimation refinement on the new motion vectors and show that for all cases a simple half-pixel refinement is sufficient for near-optimum results.

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Low-power architectures for compressed domain video coding co-processor

Jie Chen and K.J.R. Liu. "Low-power architectures for compressed domain video coding co-processor." 2000 IEEE Transactions on Multimedia [T-MUL] 2.2 (June 2000): 111-128.

Low power as a de facto is one of the most important criteria for many signal-processing system designs, particularly in multimedia cellular applications and multimedia system on chip design. There have been many approaches to achieve this design goal at many different implementation levels ranging from very-large-scale-integration fabrication technology to system design. In this paper, the multirate low-power design technique will be used along with other methods such as look-ahead, pipelining in designing cost-effective low-power architectures of compressed domain video coding co-processor. Our emphasis is on optimizing power consumption by minimizing computational units along the data path. We demonstrate both low-power and high-speed can be accomplished at algorithm/architecture level. Based on the calculation and simulation results, the design can achieve significant power savings in the range of 60%-80% or speedup factor of two at the needs of users.

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Automatic key video object plane selection using the shape information in the MPEG-4 compressed domain

B. Erol and F. Kossentini. "Automatic key video object plane selection using the shape information in the MPEG-4 compressed domain." 2000 IEEE Transactions on Multimedia [T-MUL] 2.2 (June 2000): 129-138.

Object-based video representation, such as the one suggested by the MPEG-4 standard, offers a framework that is better suited for object-based video indexing and retrieval. In such a framework, the concept of a "key frame" is replaced by that of a "key video object plane". In this paper, we propose a method for key video object plane selection using the shape information in the MPEG-4 compressed domain. The shape of the video object (VO) is approximated using the shape coding modes of I, P, and B video object planes (VOPs) without decoding the shape information in the MPEG-4 bit stream. Two popular shape distance measures, the Hamming and Hausdorff distance measures, are modified to measure the similarities between the approximated shapes of the video objects. Although they feature different computational and implementation complexity tradeoffs, the corresponding algorithms achieve essentially the same performance levels in selecting key video object planes that represent efficiently the salient content of the video objects.

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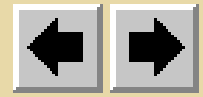

Audio-visual speech modeling for continuous speech recognition

S. Dupont and J. Luettin. "Audio-visual speech modeling for continuous speech recognition." 2000 IEEE Transactions on Multimedia [T-MUL] 2.3 (September 2000): 141-151.

This paper describes a speech recognition system that uses both acoustic and visual speech information to improve recognition performance in noisy environments. The system consists of three components: a visual module; an acoustic module; and a sensor fusion module. The visual module locates and tracks the lip movements of a given speaker and extracts relevant speech features. This task is performed with an appearance-based lip model that is learned from example images. Visual speech features are represented by contour information of the lips and grey-level information of the mouth area. The acoustic module extracts noise-robust features from the audio signal. Finally the sensor fusion module is responsible for the joint temporal modeling of the acoustic and visual feature streams and is realized using multistream hidden Markov models (HMMs). The multistream method allows the definition of different temporal topologies and levels of stream integration and hence enables the modeling of temporal dependencies more accurately than traditional approaches. We present two different methods to learn the asynchrony between the two modalities and how to incorporate them in the multistream models. The superior performance for the proposed system is demonstrated on a large multispeaker database of continuously spoken digits. On a recognition task at 15 dB acoustic signal-to-noise ratio (SNR), acoustic perceptual linear prediction (PLP) features lead to 56% error rate, noise robust RASTA-PLP (relative spectra) acoustic features to 7.2% error rate and combined noise robust acoustic features and visual features to 2.5% error rate.

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Photo-realistic talking-heads from image samples

E. Cosatto and H.P. Graf. "Photo-realistic talking-heads from image samples." 2000 IEEE Transactions on Multimedia [T-MUL] 2.3 (September 2000): 152-163.

This paper describes a system for creating a photo-realistic model of the human head that can be animated and lip-synched from phonetic transcripts of text. Combined with a state-of-the-art text-to-speech synthesizer (TTS), it generates video animations of talking heads that closely resemble real people. To obtain a naturally looking head, we choose a "data-driven" approach. We record a talking person and apply image recognition to extract automatically bitmaps of facial parts. These bitmaps are normalized and parameterized before being entered into a database. For synthesis, the TTS provides the audio track, as well as the phonetic transcript from which trajectories in the space of parameterized bitmaps are computed for all facial parts. Sampling these trajectories and retrieving the corresponding bitmaps from the database produces animated facial parts. These facial parts are then projected and blended onto an image of the whole head using its pose information. This talking head model can produce new never recorded speech of the person who was originally recorded. Talking-head animations of this type are useful as a front-end for agents and avatars in multimedia applications such as virtual operators, virtual announcers, help desks, educational, and expert systems.

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Image retrieval by examples

R. Brunelli and O. Mich. "Image retrieval by examples." 2000 IEEE Transactions on Multimedia [T-MUL] 2.3 (September 2000): 164-171.

A currently important research field in information sciences is the management of nontraditional distributed multimedia databases. Two related key issues are to achieve an efficient content-based query by example retrieval and a fast response time. This paper presents the architecture of a distributed image retrieval system which provides novel solutions to these key issues. In particular, a method to quantify the effectiveness of low level visual descriptors in database query tasks is presented. The results are also used to improve the system response time, which is an important issue when querying very large databases. A new mechanism to adapt system query strategies to user behavior is also introduced in order to improve the effectiveness of relevance feedback and overall system response time. Finally, the issue of browsing multiple distributed databases is considered and a solution is proposed using multidimensional scaling techniques.

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Robust watermarking of facial images based on salient geometric pattern matching

A. Nikolaidis and I. Pitas. "Robust watermarking of facial images based on salient geometric pattern matching." 2000 IEEE Transactions on Multimedia [T-MUL] 2.3 (September 2000): 172-184.

We introduce a novel method for embedding and detecting a chaotic watermark in the digital spatial domain of color facial images, based on localizing salient facial features. These features define a certain area on which the watermark is embedded and detected. An assessment of the watermarking robustness is done experimentally, by testing resistance to several attacks, such as compression, filtering, noise addition, scaling, cropping and rotation.

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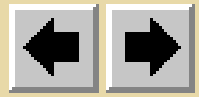

A concealment method for shape information in MPEG-4 coded video sequences

S. Shirani, B. Erol and F. Kossentini. "A concealment method for shape information in MPEG-4 coded video sequences." 2000 IEEE Transactions on Multimedia [T-MUL] 2.3 (September 2000): 185-190.

We propose a new method for error concealment of shape information in MPEG-4 video bit streams that are transmitted over error prone channels. The proposed method employs a MAP estimator with a Markov random field (MRF) as the image a priori model. The MRF is designed for binary shape information and its parameters are adapted based on the information of neighboring blocks. Our experimental results show that the proposed concealment method restores missing shape blocks with high accuracy. Compared to the median filtering method, our method restores 20% more missing shape data, with a much greater subjective improvement. The proposed algorithm requires a relatively small number of integer multiplications and additions and simple logic operations, making it suitable for real-time implementations.

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A Good Read [Editorial]

J.M.F. Moura. "A Good Read [Editorial]." 2000 IEEE Transactions on Multimedia [T-MUL] 2.4 (December 2000): 197-197.

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SNR scalability based on matching pursuits

C. De Vleeschouwer and B. Macq. "SNR scalability based on matching pursuits." 2000 IEEE Transactions on Multimedia [T-MUL] 2.4 (December 2000): 198-208.

In this paper, SNR scalable representations of video signals are studied. The investigated codecs are well suited for communications applications because they are all based on backward motion-compensated predictive coding, which provides the necessary low-delay property. In a very-low bit rate context (VLBR), the matching pursuits (MP) signal representation algorithm is used to represent the displaced frame difference (DFD) of each layer of a multilevel decomposition of the video signal. A number of conventional prediction schemes that can be generalized to any DFD representation technique are considered. They are compared with an original and MP specific DFD prediction method. Two scenari have been considered. In the first scenario, an enhancement layer is built on a base layer that has been encoded using a classical, i.e., nonscalable scheme. In that case, all methods appear to be comparable, In the second scenario, the fact that the base layer is used as a reference for an enhancement layer is taken into account to build it. In that case, the proposed MP prediction method clearly outperforms all other conventional approaches, Additional lessons can be drawn from this work. The same motion vectors can be used in both SNR layers, and the DFD prediction between layers improves coding efficiency. Moreover, the MP representation of the signal enable us to measure the predictability of the high SNR layer DFD from the low SNR layer DFD, i.e., to quantify the part of the low SNR layer information that also belongs to the high SNR layer.

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Cocktail watermarking for digital image protection

Chun-Shien Lu, Shih-Kun Huang, Chwen-Jye Sze and Hong-Yuan Mark Liao. "Cocktail watermarking for digital image protection." 2000 IEEE Transactions on Multimedia [T-MUL] 2.4 (December 2000): 209-224.

A novel image protection scheme called "cocktail watermarking" is proposed in this paper. We analyze and point out the inadequacy of the modulation techniques commonly used in ordinary spread spectrum watermarking methods and the visual model-based ones. To resolve the inadequacy, two watermarks which play complementary roles are simultaneously embedded into a host image. We also conduct a statistical analysis to derive the lower bound of the worst likelihood that the better watermark (out of the two) can be extracted. With this "high" lower bound, it is ensured that a "better" extracted watermark is always obtained. From extensive experiments, results indicate that our cocktail watermarking scheme is remarkably effective in resisting various attacks, including combined ones.

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Retrieval by shape similarity with perceptual distance and effective indexing

S. Berretti, A. Del Bimbo and P. Pala. "Retrieval by shape similarity with perceptual distance and effective indexing." 2000 IEEE Transactions on Multimedia [T-MUL] 2.4 (December 2000): 225-239.

An important problem in accessing and retrieving visual information is to provide efficient similarity matching in large databases. Though much work is being done on the investigation of suitable perceptual models and the automatic extraction of features, little attention is given to the combination of useful representations and similarity models with efficient index structures. In this paper we propose retrieval by shape similarity using local descriptors and effective indexing. Shapes are partitioned into tokens in correspondence with their protrusions, and each token is modeled according to a set of perceptually salient attributes. Shape indexing is obtained by arranging shape tokens into a suitably modified M-tree index structure. Two distinct distance functions model respectively, token and shape perceptual similarity. Examples from a prototype system and computational experiences are reported for both retrieval accuracy and indexing efficiency. Shape retrieval has been tested under shape scaling, orientation changes, and partial shape occlusions. A comparative analysis of different indexing structures, for shape retrieval is presented.

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Fast scene change detection using direct feature extraction from MPEG compressed videos

Seong-Whan Lee, Young-Min Kim and Sung Woo Choi. "Fast scene change detection using direct feature extraction from MPEG compressed videos." 2000 IEEE Transactions on Multimedia [T-MUL] 2.4 (December 2000): 240-254.

In order to process video data efficiently, a video segmentation technique through scene change detection must be required. This is a fundamental operation used in many digital video applications such as digital libraries, video on demand (VOD), etc. Many of these advanced video applications require manipulations of compressed video signals. So, the scene change detection process is achieved by analyzing the video directly in the compressed domain, thereby avoiding the overhead of decompressing video into individual frames in the pixel domain. In this paper, we propose a fast scene change detection algorithm using direct feature extraction from MPEG compressed videos, and evaluate this technique using sample video data, First, we derive binary edge maps from the AC coefficients in blocks which were discrete cosine transformed. Second, we measure edge orientation, strength and offset using correlation between the AC coefficients in the derived binary edge maps. Finally, we match two consecutive frames using these two features (edge orientation and strength). This process was made possible by a new mathematical formulation for deriving the edge information directly from the discrete cosine transform (DCT) coefficients. We have shown that the proposed algorithm is faster or more accurate than the previously known scene change detection algorithms.

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Design and simulation of an efficient real-time traffic scheduler with jitter and delay guarantees

Fu-Ming Tsou, Hong-Bin Chiou and Zsehong Tsai. "Design and simulation of an efficient real-time traffic scheduler with jitter and delay guarantees." 2000 IEEE Transactions on Multimedia [T-MUL] 2.4 (December 2000): 255-266.

In this paper, we propose a framework for real-time multimedia transmission in asynchronous transfer mode (ATM) networks using an efficient traffic scheduling scheme called multilayer gated frame queueing (MGFQ). MGFQ employs only one set of FIFO queues to provide a wide range of QoS for real-time applications. We also propose special cell formats for real-time multimedia transport and a hybrid design to allow MGFQ to combine its scheduling scheme with Age Priority Packet Discarding scheme. For this hybrid design, the cell level performance as well as the packet level QoS can be improved at the same time, Simulation results show that this hybrid design will be useful for packetized voice and progressive layer-compressed video transmission across the backbone networks. With the presented framework and the MGFQ algorithm, real-time multimedia traffic streams can be much better supported in terms of cell/packet delay and jitter.

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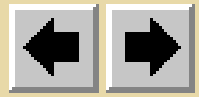

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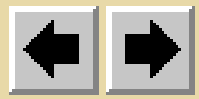

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