PATENT REVIEW - REQUEST FOR OPINION OF COUNSEL

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Please answer the following questions as <u>completely</u> as possible.

1.   SUBJECT (Title of your Idea)

   Method for content-based non-linear control of multimedia playback.

2.   OBJECTIVE (What problem does the proposal solve or what purpose does it serve?)

   The method provides an intelligent and efficient means for users to easily find and navigate high quality video material, using another (preferably small, portable) device (e.g. a PDA), and based on detailed program-specific index.

3.   BRIEF DESCRIPTION (1. What is it? 2. How does it operate? 3. Is there a date involved, e.g. introduction or announcement of a service or product?)

   1. It can be thought of as the next generation of interactive television remote control that enables the searching and browsing of video and multimedia content archives. The remote control can be similar to today's high-end PDA devices, which are able of displaying dynamic content including graphic images. It is assumed that the remote control communicates with a multimedia database which includes not only metadata such as program title etc., but also detailed content-specific index data that are extracted from the content either by automatic media processing techniques (e.g., video indexing, audio indexing), or manually by a human.
   2. See attached disclosure for details.
   3. Our current negotiations with potential technology licensees for our multimedia indexing technology has confirmed a market for such a method. We would like to include this submission as part of the package of technologies to be licensed.

4. **COMPARISON** (1. What is the known prior art (e.g. past publications or products), if any? 2. What are the differences over the prior art? 3. What commercial benefits are derived from these differences?)

1. Multimedia indexing systems that support searching and browsing of video using a single device such as a desktop computer and displaying condensed versions of video programs on portable devices is covered by: "Second Supplemental Preliminary Amendment Method for Providing a Compressed Rendition of a Video Program in a Format Suitable for Electronic Searching and Retrieval," docket # 109579 C. Dynamic bitmapped displays in remote controls for home entertainment systems are known. Using a PDA as a remote by displaying control keys (similar to the mechanical keys on today's remote controls, and the dynamic bitmaps on remote controls) on the touch-sensitive screen is known.

2. Unlike the existing methods that either simulate the physical media control keys on the touch-sensitive screen, or display metadata, such as the title of the movie or name of a song, the proposed method is based on the display of detailed content-specific information from the content. Unlike existing systems that display information related to the content on the same display, the new method employs two separate devices and uses each to its maximum advantage.

3. The method enables the creation of more user-friendly network-based video-on-demand entertainment and information services. It also has commercial applications to self-contained home entertainment systems.

5. **USE** (1. What is the probability of commercial use? By AT&T? By Others? 2. Is it scheduled for use in an AT&T Product or service? 3. Which one, and when? 4. Is this idea likely to be adopted by others? If so, to what extent? Why? 5. Is it likely to become a standard? 6. Do you see applications for the idea other than the one described above?)

1. There is a high probability of commercial use of this technology given the trends to lower device cost and increasing availability of wireless IP networks and broadband IP to the home. Any cable TV service provider, including AT&T can make use of this service.

2. Not currently.

3. Not applicable.

4. Yes. AT&T Broadband does not operate in every geographic market, so it is likely that other cable companies will adopt this method. The invention also has applications in home networking environments for controlling the replay of video and multimedia content stored at the customer premises or at a remote location.

5. No, but the method makes use of existing and emerging standards such as XML, HTML, MPEG-2, MPEG-7.

6. Yes, e.g., pay-per-view video services on-the-go (e.g., airports) where the user uses a personal remote (e.g., PDA) to find/select video or multimedia content to be delivered on a separate device (e.g., a network-connected video monitor at the airport).

6. **SUBMITTERS** (You and any others who collaborated with you in the development of this idea) **Please include name, social security number, home address, including county, and citizenship of each submitter**.

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subject: Method for content-based non-linear
control of multimedia playback.

date: April 30, 2001

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Overview:

This document discloses a method for content-based non-linear control of multimedia playback. A request for opinion of council has been submitted under the same title, and the introduction section repeats some of the information from that document.

Introduction:

The method provides an intelligent and efficient means for users to easily find and navigate high quality video material, using another (preferably small, portable) device (e.g. a PDA), and based on detailed program-specific index.

It can be thought of as the next generation of interactive television remote control that enables the searching and browsing of video and multimedia content archives. The remote control can be similar to today's high-end PDA devices, which are able of displaying dynamic content including graphic images. It is assumed that the remote control communicates with a multimedia database which includes not only metadata such as program title etc., but also detailed content-specific index data that are extracted from the content either by automatic media processing techniques (e.g., video indexing, audio indexing), or manually by a human.

Unlike the existing methods that either simulate the physical media control keys on the touch-sensitive screen, or display metadata, such as the title of the movie or name of a song, the proposed method is based on the display of detailed content-specific information from the content. Unlike existing systems that display information related to the content on the same display, the new method employs two separate devices and uses each to its maximum advantage.

The method enables the creation of more user-friendly network-based video-on-demand entertainment and information services. It also has commercial applications to self-contained home entertainment systems. Other possible uses of the invention include pay-per-view video services on-the-go (e.g., airports) where the user uses a personal remote (e.g., PDA) to find/select video or multimedia content to be delivered on a separate device (e.g., a network-connected video monitor at the airport).

Operation:

The method involves retrieving video material from a multimedia database and associated video server. During operation of the method, a user interacts with a *control device* and observes video material on a *video device* such as a television monitor. It is assumed that the control device is not capable of playing video material, but that it is capable of displaying dynamically generated content; preferably color still images and text. The control device must be capable of data communications, but may do so at low bandwidth (such as less than 100 Kbps) (Alternatively: the control device could play preview video, further, the device may be incapable of displaying color images or any images at all.) The data communications of the control device are preferably wireless and may employ Bluetooth, IEEE 802.11b, infrared or other means. The video device is preferably connected to an IP network of at least 10Mbps bandwidth and can decode

compressed digital video. Wireless connectivity is also possible for the video device as well, but the wireless connection, if used, must be of sufficient bandwidth to support video.

Figure 1 shows how video material is added to the database. The video is preferentially analyzed automatically to detect video shot boundaries and to record any associated closed caption information. Additionally, LVASR can be used to obtain a transcription. Optionally, ancillary source material can be added to the database to improve the accuracy or to bring in other information suitable for indexing and retrieval of the video content. Examples include: off-line transcriptions, manual annotations, topic classifications, post-production scripts, metadata such as actors' names, genera classifications, etc. It is assumed that each television program or logical unit of video material (such as a single video tape, or a single speech from a corporate CEO) will be entered into the database as a distinct entry, and that the database will typically consist of a large number of such entries. (Alternatively, another embodiment would break down video programs into smaller units such as topic or story boundaries. The invention can be applied in this case as well.) The advantage of the current invention is to facilitate navigation of a large collection of video content, and further, to navigate within a particular entry in the database, such as a single video program. An illustrative example is an archive of all television programs in a particular geographic area for a seven-day period.

In addition to the metadata or information used for indexing, the video material is preferably digitized and compressed in a standard format such as MPEG-2 and stored on a video server. Other embodiments include digital video encoded for delivery at lower bitrates such as 300Kbps MPEG-4. The preferred embodiment maintains multiple versions of the video, and the highest possible quality version is selected based upon the available bandwidth and client terminal capabilities. While centralizing the video database offers economies of scale and ease of maintained, it is also possible that the video material can be stored locally (in close proximity to the users video device.) Additionally, hybrid embodiments are possible in which some of the video material is stored locally and other video content is stored remotely, perhaps in several distinct geographic locations. Such embodiments may be organized such that popular or frequently viewed content is stored locally to minimize the amount of video material that is transported by the network. Further, intelligent content distribution networks can be utilized to efficiently distribute the content form the source to the consumers.

The system incorporates a content generation or rendering engine as disclosed in US Patent #6,098,082, which is used to generate content for remote devices. During searching the multimedia database also generates content to help the user quickly navigate to the desired program (see figures). During browsing, the generated content serves two main purposes: 1) it conveys a summary or condensed representation of the video program for browsing, and 2) it acts as a dynamic control pad for initiating video playback.

One Embodiment:

In one embodiment of the invention, the control device is a Compaq iPAQ model 3650 running the Microsoft PocketPC (Windows CE) operating system. An expansion pack supports PCMCIA cards and an Orinoco 802.11b wireless LAN card is used for data communications. An Orinoco network access point connects the wireless LAN to a 100 BaseT LAN.

The iPAQ includes a MS Windows IE web browser that supports HTML 2.0. The multimedia database runs MS Windows 2000 Advanced Server and includes MS Internet Information and Index Services. Custom application software (including CGI programs and templates) is used to dynamically generate content from a multimedia database in HTML format specifically designed for the iPAQ device.

A dedicated PC running the Linux operating system and including a Real Magic Netstream MPEG-2 decoder PCI bus card is used to serve as an Internet protocol transport endpoint and to convert compressed digital video to baseband analog S-Video (and audio) format to feed a television monitor.

The video device includes application software for receiving compressed video data over IP using either HTTP (TCP) or RTSP (UDP.) The software also listens on a socket for control commands such as STOP, PAUSE, etc. The preferred control protocol is HTTP, although a custom protocol has also been implemented.

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