METHOD AND APPARATUS TO TRANSMIT VIDEO DATA

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ABSTRACT

A video system includes at least one video subsystem including a video source coupled to a mobile platform. The video source is configured to capture and transmit video data. A video processing system is configured to receive transmission of the video data from the video subsystem at a plurality of locations in which the video subsystem is configured to transmit the video data to the video processing system automatically when the video subsystem is in range of the video processing system at each of the plurality of locations.
METHOD AND APPARATUS TO TRANSMIT VIDEO DATA

RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application Ser. No. 61/259,452 filed Nov. 9, 2009 and entitled “METHOD AND APPARATUS TO TRANSMIT VIDEO DATA” and U.S. Provisional Patent Application Ser. No. 61/259,464 filed Nov. 9, 2009 and entitled “METHOD AND APPARATUS TO PREVIEW VIDEO DATA FROM A VEHICLE,” both of which are hereby incorporated by reference in their entirities.

TECHNICAL BACKGROUND

[0002] Presently, transit vehicles store video data over the course of a shift and download the video data to a storage system when they return to a depot at the end of the shift. However, the bandwidth available at the depot may be limited, especially if several vehicles are downloading the video data at the same time. As a result, only a subset of the video data is often downloaded. This subset often includes video data that has been specifically identified by an operator for downloading during the shift. However, if an operator fails to identify a scene that may be of interest, that scene may be lost when subsequent video data is recorded over the previously recorded video data.

OVERVIEW

[0003] A video system includes at least one video subsystem including a video source coupled to a mobile platform. The video source is configured to capture and transmit video data. A video processing system is configured to receive transmission of the video data from the video subsystem at a plurality of locations in which the video subsystem is configured to transmit the video data to the video processing system automatically when the video subsystem is in range of the video processing system at the plurality of locations.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 illustrates a block diagram of an example of a video system.
[0005] FIG. 2 illustrates a block diagram of an example of a video system.
[0006] FIG. 3 illustrates a method of transmitting video data.
[0007] FIG. 4 illustrates a block diagram of an example of a video source.
[0008] FIG. 5 illustrates a block diagram of an example of a video system.

DETAILED DESCRIPTION

[0009] The following description and associated drawings teach the best mode of the invention. For the purpose of teaching inventive principles, some conventional aspects of the best mode may be simplified or omitted. The following claims specify the scope of the invention. Some aspects of the best mode may not fall within the scope of the invention as specified by the claims. Thus, those skilled in the art will appreciate variations from the best mode that fall within the scope of the invention. Those skilled in the art will appreciate that the features described below can be combined in various ways to form multiple variations of the invention. As a result, the invention is not limited to the specific examples described below, but only by claims and their equivalents.

[0010] Presently, transit vehicles store video all day and download once they park in the depot. But, the wireless bandwidth available at the depot is very limited, and thus only a subset of the video data is downloaded. The remaining portion is written over. Disclose herein is a method and apparatus for the transit vehicles to automatically download video data throughout the day whenever a wireless hotspot is encountered. Inexpensive hotspots could be constructed and placed throughout a route.

[0011] FIG. 1 illustrates a schematic view of an exemplary video system 100. The exemplary video system 100 generally includes at least one video subsystem, such as video subsystem 110, 120. The video system 100 also includes at least one video processing system, such as video processing system 130 and at least one external device 140.

[0012] The video subsystems 110, 120 are configured to capture video data over the course of a time interval. In at least one example, input from an operator, system intelligence, or other input during the shift may identify video data to be transferred from the video subsystems to the external device 140 via the video processing system 130 during the shift 130. Once the shift is ended, the video subsystems 110, 120 may then download additional video data stored thereon to the external device 140 directly. The external device 140 may include a storage system, an input/output interface, and/or other external devices as desired.

[0013] The video processing system 130 is configured to communicate with the video subsystems 110, 120 during the shift to transmit portions of the video data to the external device 140, as will be described at appropriate points hereinafter. Such a configuration can allow for a more complete transfer of video data that occurs during a shift.

[0014] Further, the video processing system 130 may allow an administrator to preview the video data during a shift. Previewing the video data during a shift may allow the administrators to identify video data that should be acted on as soon as possible, thereby allowing earlier access to potentially relevant video data. The general configuration of the exemplary video subsystems 110, 120 and the video processing system 130 will first be discussed, followed by a more detailed description of various components with the video subsystems 110, 120 and the video processing system 130.

[0015] As illustrated in FIG. 1, the video subsystem 110 generally includes a video source 112 and a processing subsystem 114 associated with a platform 116. In the illustrated example, the video source 112 is in communication with the processing subsystem 114, which in turn is in communication with the video processing system 130.

[0016] Similarly, the second video subsystem 120 may include a video source 122 and a processing subsystem 124 associated with a platform 126. The video source 122 is in communication with video processing subsystem 126, which in turn is in communication with the video processing system 130.

[0017] In at least one example, the processing subsystems 114, 124 may be very basic processing systems configured to transmit raw video data to the video processing system 130. In other examples, the processing subsystems 114, 124 may be more full-featured and may do some amount of video processing before transmitting the processed video data to the video processing system 130.
The connections and links between the elements of video system 100 may use various communication media, such as air, metal, optical fiber, or some other signal propagation path—including combinations thereof. Such connections may be direct links, or they might include various intermediate components, systems, and networks.

The video processing system 130 includes at least one device configured to receive transmissions of video subsystems 110, 120. In the illustrated example, the video processing system 130 includes at least one server configured to communicate with either or both of the video subsystems 110, 120, such as servers 131, 132. Accordingly, FIG. 1 illustrates the video subsystems 110, 120 in communication with the entire video processing system 130 to emphasize the video subsystems 110, 120 may couple to either or both of the servers 131, 132, which are part of the video processing system 130. The video processing system 130 then processes the video data to a desired extent.

Once the video processing system 130 has processed the video data, the video processing system 130 transmits some or all of the video data to an external device 140 or other external device. By providing a plurality of pathways which the video subsystems 110, 120 may use to transfer video data from their locations to the central storage systems 140 during their shifts, the video processing system 130 may increase the amount of video data from each shift the video system 100 is able to retain.

Further, such a configuration may allow the video processing system 130 to provide a preview of video data. Such a situation may be desirable when relevance of selected video data is unclear and thus it is unclear whether it would be desirable to analyze the selected video data immediately or whether it may be suitable to analyze the selected video data at a later time. To this point, the locations of the video subsystems 110, 120 and the servers 131, 132 have been introduced generally.

One exemplary arrangement is illustrated in more detail in FIG. 2. As illustrated in FIG. 2, a video system 200 may include a plurality of video subsystems 210, 220 positioned within a geographical region. The video subsystems 210, 220 may be configured similarly to the video subsystems as have been described with reference to FIG. 1 or as will be described with reference to FIG. 4. In any case, the video subsystems 210, 220 are configured to communicate with a processing/transmission system 230 at various locations within the region.

In the illustrated example, the processing/transmission system 230 includes a plurality of hotspots 231, 232. The hotspots 231, 232 may be at fixed locations or mobile locations. For ease of reference, the hotspots 231, 232 will be described as being located at fixed geographic locations.

The hotspots 231, 232 may be configured to provide a range of coverage, illustrated by the dashed lines around the hotspots 231, 232. In such an example, the video subsystems 210, 220 may automatically couple with the video processing system 230 when the video subsystems 210, 220 are within range of the hotspots 231, 232. One such example may occur when the platforms associated with the video subsystems 210, 220 are vehicles that move along various routes within the region. Such routes may include transit routes, such that the vehicles may be transit vehicles.

In the illustrated example, the video subsystem 210 is shown in range of the hotspot 231. While the video subsystem 210 is thus in range of the hotspot 231, the video subsystem 231 automatically transmits video data to the hotspot 231, which in turn transmits the video data to an external system 240.

The selection of which video data the video subsystem 210 transmits may be determined in response to user input, by system intelligence, or by some combination thereof. The transmission of video data to the hotspot 231 may part of a download operation and/or may be a preview of video data that has been identified for potential investigation. Each of these two scenarios will now be discussed in more detail.

FIG. 3 illustrates a method 300 for transmitting video data from a video subsystem to according to one example. As illustrated in FIG. 3, the method 300 begins at step 310 when a video system begins by storing video data on a video subsystem that includes a mobile platform. The video data may include any number of scenes.

As previously discussed, the mobile platform may include one or more video subsystem that travels along various routes within a geographical region. The video subsystems may be configured to communicate with one or more hotspots within the geographical region. Accordingly, the method includes searching for hotspots at step 315 as the video subsystems travel along the various routes. Searching for hotspots 315 may include searching for wireless hotspots.

In at least one example, the method 300 may also optionally include at step 320 receiving selection input to identify one or more scene for investigation by an administrator. This step is shown in parallel with the steps of storing video data 310 and searching for hotspots 315 since all three of these steps may be performed on an ongoing basis.

As shown in FIG. 3, if a hot spot is not available (NO, step 330), the video subsystem continues to search for a hotspot until an available hotspot is in range. Once a hotspot is available (YES, step 330), the method includes connecting to a system via the hotspot. Connecting to a system via the hotspot may include connecting to a processing/transmission system that is in further communication with an external device, such as a storage system or an I/O interface.

How the video subsystem transmits video data may depend on whether a scene has been selected at step 340. If no scene is selected (NO, step 340), then the video subsystem transmits the next scene in a transmission queue at step 345 to an external storage device, such as a storage system. Such an example may occur where no previews are available in the optional steps described above or if no input selection has been received to select a scene. A transmission queue may be merely the earliest video data yet to be transmitted or may be any other arrangement of video data, such as video data that have been selected for retention, but which have been identified as being suitable for analysis at the end of the shift.

However, if a scene has been selected, various steps may be performed to indicate how the video data should be treated. Referring still to FIG. 3, once selection input is received at step 320, the method includes generating a preview of the scene identified by the selection input at step 347. Previews may be generated in any desired format, such as a video clip, video stills, or any other desired format.

If a scene has been selected the method includes transmitting the preview at step 350. For example, the preview may be transmitted to an external I/O device. In at least one example, transmitting the preview may include transmitting the scene to an I/O device for an administrator to view. In at least one example, the preview may be transmitted once the
A method for generating a preview of a video scene includes determining whether to download the identified scene at step 355. The preview may be generated using any suitable network including the processing systems described herein, wide area networks, cellular networks, other networks, or combinations thereof. As a result, the processing system may transmit the video data to the video processing system via a network. The video processing system may then process the video data to generate a preview of the video scene.

Any of the processing subsystems 110, 120 (FIG. 1), the video processing system 130 (FIG. 1), the processor 406 from FIG. 2 and the video processing system 510 from FIG. 5 may be implemented on a computer system 50 such as that shown in FIG. 5. The computer system 50 includes a video processing system 300. The video processing system 300 includes communication interface 311, and processing system 301. Processing system 301 is linked to communication interface 311 through a bus. Processing system 301 includes processor 302 and memory devices 303 that store operating software.

Communication interface 511 includes network interface 512, input ports 513, and output ports 514. Communication interface 511 includes components that communicate over communication links, such as network cards, ports, RF transceivers, processing circuitry and software, or some other communication device. Communication interface 511 may be configured to communicate over metallic, wireless, or optical links. Communication interface 511 may be configured to use TDM, IP, Ethernet, optical networking, wireless protocols, communication signaling, or some other communication format—including combinations thereof.

Network interface 512 is configured to connect to external devices over network 515. In some examples these external devices may include video sources and video storage systems as illustrated in FIGS. 1 and 5. Input ports 513 are configured to connect to input devices 516 such as a keyboard, mouse, or other user input devices. Output ports 514 are configured to connect to output devices 517 such as a display, a printer, or other output devices.

Processor 502 includes a microprocessor and other circuitry that retrieves and executes software from memory devices 503. Memory devices 503 include random access memory (RAM) 504, read only memory (ROM) 505, a hard drive 506, and any other memory apparatus. Operating software includes computer programs, firmware, or some other form of machine-readable processing instructions. In this example, operating software includes operating system 507, applications 508, modules 509, and data 510. Operating software may include other software or data as required by any specific embodiment. When executed by processor 502, operating software directs processing system 501 to operate video processing system 500 to process and/or transfer video data as described herein.

What is claimed is:

1. A video system, comprising:
   at least one video subsystem including a video source coupled to a mobile platform, the video source configured to capture and transmit video data; and
   a video processing system configured to receive transmission of the video data from the video subsystem at a plurality of locations, wherein the video subsystem is configured to transmit the video data to the video pro-
The video system of claim 1, wherein the video processing system includes a plurality of servers.
3. The video system of claim 2, wherein the servers include a plurality of wireless hotspots.
4. The video system of claim 3, wherein the wireless hotspots are positioned along a transit route.
5. The video system of claim 4, wherein the wireless hotspots are at fixed locations along the transit route.
6. The video system of claim 1, wherein the external device includes a storage system in communication with the video processing system.
7. The video system of claim 1, wherein the video subsystem further includes a processing subsystem.
8. The video system of claim 1, wherein the mobile platform includes a vehicle.
9. The video system of claim 8, wherein the video processing system is configured to directly communicate with a storage system.
10. The video system of claim 9, wherein the video source is configured to wirelessly communicate with the storage system and the video processing system.
11. The video system of claim 10, wherein the video source transmits video data directly to the storage system when the video source is in proximity to the storage system and transmits the video data to the storage system via the video processing system when the video source is in proximity with the video processing system.
12. A method of transmitting video data, comprising:
capturing video data using a video source, the video source being coupled to a mobile platform;
determining if the video source is in proximity of a wireless hotspot; and
responsive to a determination that the video source is in proximity to the wireless hotspot, initiating transmission of the video data to the wireless hotspot.
13. The method of claim 12, wherein the video data is transmitted from the wireless hotspot to at least one of a processing system and a storage system.
14. The method of claim 13, wherein the video data is transmitted to the processing system when the video source is in proximity with the processing system.
15. The method of claim 14, wherein the processing system is configured to communicate with the video source at a plurality of locations.
16. The method of claim 15, further comprising transmitting video data received by the processing system to the storage system.
17. The method of claim 14, further comprising transmitting the video data to the storage system directly when the video source is in proximity with the storage system.
18. The method of claim 13, further comprising detecting a plurality of wireless hotspots at fixed locations.
19. The method of claim 18, further comprising transmitting video data to wireless hotspots at fixed locations positioned along at least one transit route.
20. A computer readable medium having instructions residing thereon, that when executed, perform a method for transmitting video data, the method including the steps of:
capturing video data using a video source, the video source being configured to transmit data to a storage system when the video source is in proximity with the storage system;
transmitting the video data from the video source to a processing system when the video source is in proximity with the processing system, the processing system being configured to communicate with the video source at a plurality of locations;
transmitting the video data from the video source to the storage system directly when the video source is in range of the storage system; and
transmitting the video data from the video source to the storage system by way of the processing system when the video source is in proximity to the processing system.

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