Title: MEDICAL MEDIA CAPTURE SYSTEM AND METHOD

Abstract: A novel system for conducting a medical examination having an examination data processing device controllable by voice commands for hands-free digital recording of video and/or still image signals captured during the examination. The recorded data are compressed on the fly, while the video and/or still image signal is being received. The examination data processing device supports hands-free generation of a text document including captured images of examined areas to represent examination results.
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MEDICAL MEDIA CAPTURE SYSTEM AND METHOD

Technical Field

[01] This disclosure relates to data processing, and more particularly, to device and methodology for hands-free digital recording video and still image signals. The subject matter of the disclosure has applicability, but not limitations to systems for processing information captured during a medical examination.

Background Art

[02] Due to technological innovations in radiological imaging combined with implementation of modern endoscopic instrumentation, medical practice underwent a sea change beginning about 20 years ago. For example, the ability to image the head and neck with computer enhanced radiology (CAT scan) enabled Ear-Nose-Throat (ENT) practitioners to approach the nose and sinuses with a better understanding of the surgical anatomy and physiological relationship of the sinuses to the nose. The result of this has been an explosion in knowledge and expertise in managing diseases of the nose and throat as well as the sinuses. The use of a nasal endoscope or laryngoscope has become the de facto standard for properly examining the upper airway. The limitations imposed on
physicians in employing this standard are largely the cost of the instruments, the time involved, and the expense of performing this procedure as a routine examination.

[03] Even when these examinations are done routinely, it has been estimated that less than 5% of these examinations are video recorded. This is true for the number of reasons. First, recording to analog media does not offer easy retrieval for a physician. Capturing still images has been more widely adopted but examination of the nose and throat involves studying three-dimensional structures, their relationship to each other, and often includes examining moving structures like the larynx for which still images are often inadequate. Second, examining physicians are not able to operate the recording devices themselves because they must carry an examination tool during the examination. Therefore, the examining physician has to be attended by an assistant to help operate the recording device. Third, systems currently in place for digital video recording of medical examinations are expensive to the point that they are deployed as single workstations even in offices with multiple examining rooms and clinicians. Fourth, known video recording systems produce video or still images that are not easily integrated into digital medical records or networked so that the visual data can be shared across a platform among users in a clinically useful way.

[04] Therefore, there is a need for a system able to capture video and still images relating to a medical examination and integrate them into digital medical records. Also, there is a need for a hands-free media capture system enabling an examining physician to perform a medical examination without an assistant.
Summary of the Disclosure

[05] The present disclosure offers a novel system for conducting a medical examination including an examination tool having a viewing device for producing video and/or still image signals representing an area being examined, and an examination data processing device controllable by voice commands for storing the captured video and/or still image signals as digital data. For example, the system of the present disclosure supports conducting an endoscopic procedure using an endoscope.

[06] In accordance with one aspect of the disclosure, the examination data processing device supports hands-free digital recording of data captured during examination to enable a user to perform the examination without an assistant. In response to respective voice commands, the examination data processing device enables a user to playback recorded video signals and preview the recorded images.

[07] In accordance with another aspect of the disclosure, the examination data processing device compresses the digital data on the fly, while the video and/or still image signal is being received.

[08] In accordance with a further aspect of the disclosure, the examination data processing device is customized for a particular user and a particular use of the examination tool. In particular, it may operate in response to customized voice commands. Further, it may enable a user to select preferred system parameters including parameters of video and/or still images captured during the medical examination.

[09] In accordance with another aspect of the disclosure, the examination data processing device supports hands-free generation of a text document representing examination results.
The text document may include images corresponding to captured images of the examined area. The examination data processing device may set a size of the images in the text documents in accordance with a size of the text document. Also, the examination data processing device may support hands-free annotation of the text document.

[10] In accordance with a method of the present disclosure, the following steps are carried out to conduct a medical examination:

- capturing video and/or still image signals representing an area being examined, and
- by respective voice commands, operating an examination data processing device to provide hands-free recording of digital data representing the captured signals, and generating a text document including the captured images.

[11] In accordance with a further aspect of the disclosure, a medical system provides capturing data, such as image data, during a medical procedure. The medical system includes a data source, such as a camera, for supplying captured data, and a data processing device having a mechanism for saving the captured data in a memory, and a mechanism for incorporating the captured data into a text document presenting results of the medical procedure. Also, the captured data may be temporarily stored in a temporary storage.

[12] The data processing device may enable a user to save the captured data in the memory, incorporate the captured data into the text document, and clear the captured data from the temporary storage using a single action, for example, a single click of a mouse button.

[13] The captured data may be represented by multiple files identified in accordance with identification information of a patient. The data processing device may enable the user to
save some of the multiple files in the memory, incorporate some of them into the text document, and clear some of them from the temporary storage using a single action, such as a single click of a mouse button.

[14] The captured data may be automatically cleared from the temporary storage when a captured data saving procedure is complete. Also, a data supply from the data source may be automatically disconnected from the data processing device when the captured data saving procedure is complete.

[15] Additional advantages and aspects of the disclosure will become readily apparent to those skilled in the art from the following detailed description, wherein embodiments of the present disclosure are shown and described, simply by way of illustration of the best mode contemplated for practicing the present disclosure. As will be described, the disclosure is capable of other and different embodiments, and its several details are susceptible of modification in various obvious respects, all without departing from the spirit of the disclosure. Accordingly, the drawings and description are to be regarded as illustrative in nature, and not as limitative.

Brief Description of the Drawings

[16] The following detailed description of the embodiments of the present disclosure can best be understood when read in conjunction with the following drawings, in which the features are not necessarily drawn to scale but rather are drawn as to best illustrate the pertinent features, wherein:

[17] FIG. 1 is a general architecture of a medical media capture system of the present disclosure.
[18] FIG. 2 is a block diagram illustrating a command control procedure of the present disclosure.

[19] FIG. 3 is a block diagram illustrating voice command and audio recording mechanisms of the present disclosure.

[20] FIG. 4 is a block diagram illustrating a video capture mechanism of the present disclosure.

[21] FIG. 5 is a block diagram illustrating an image capture mechanism of the present disclosure.

[22] FIG. 6 is a diagram illustrating a graphical user interface (GUI) for customizing the medical media processing system of the present disclosure.

[23] FIG. 7 shows an exemplary configuration setting GUI.

[24] FIGS. 8-13 illustrate various operations supported by the configuration setting GUI.

[25] FIG. 14 is a block diagram illustrating a video and image saving procedure of the present disclosure.

[26] FIG. 15 is a block diagram illustrating a media import procedure for generating a text document of the present disclosure.

[27] FIG. 16 illustrates an image save dialog window that enables a user to save multiple images captured during a medical procedure.

Detailed Disclosure of the Embodiments

[28] The present disclosure will be made with the example of a hands-free medical media capture system for supporting a medical examination. It will become apparent, however,
that the concepts described herein are applicable to any system for recording video and/or still image signals.

[29] FIG. 1 illustrates a general architecture of a medical media capture system 10. The system 10 includes a video capture and compressing utility (VCCU) workstation 12 that receives video signals and still images produced by a camera 14 used for examination of a patient. For example, the camera may be incorporated in an endoscope that enables an Ear-Nose-Throat (ENT) practitioner to examine the head and neck of a patient. As discussed in more detail below, the VCCU workstation is controllable by voice commands to perform hands-free recording and compressing of video and/or still images representing the patient’s areas being examined.

[30] The VCCU workstation 12 includes a processing unit 16 provided for processing video and/or still images supplied from the camera 14 to enable a user to store the video and/or still images in a digital form. To support both analog and digital cameras, the workstation 12 may be provided with an S-video input 18 and digital inputs 20, such as USB2 and Firewire connectors, for linking the processing unit 16 to the camera 14. A wireless connection may be used for connecting the camera 14 to the workstation 12. An internal PCI Analog/Digital Audio/Video card 22 is connected to the S-video input 18 for transforming the analog video and/or still image data produced by the camera 14 into a digital form.

[31] As discussed in more detail below, the CPU 16 includes a programmably controlled compression mechanism that compresses received video and still image data simultaneously
with receiving this data from the camera 14. Also, the CPU 16 may include a mechanism for programmably controlling video and image capture size.

[32] Further, the processing unit 16 supports processing of voice commands and audio signals supplied from microphones 24 and 26 that enable a user to enter voice commands for controlling operations of the workstation 12 and to capture audio signals during examination. The microphones may be connected to the workstation 12 via a microphone input 28 and the internal PCI Analog/Digital Audio/Video card 22. For example, the microphone 24 may be used for receiving voice commands from a user, such as a doctor or medical assistant, to control operations of the VCCU workstation 12. The microphone 26 may be used for recording audio signals associated with a patient being examined.

[33] As discussed in more detail later, a command control software mechanism 30 is provided for controlling operations of the VCCU workstation 12. Via the microphone input 28, the command control mechanism 30 is linked to the microphone 24 responsive to voice commands. A USB/PS2 port 32 may be provided for linking the command control mechanism 30 to data input devices 34 such as a keyboard and/or mouse. Wireless connections may be used to connect the microphones and data input devices to the workstation 12.

[34] Also, the processing unit 16 has a playback mechanism for playing back video and still image signals captured during examination or recorded previously. Via a video card 36, such as an Advanced Technology Attachment (ATA) video card, the processing unit 16 may be connected to a display interface 38 for supporting connection to a video terminal, such as a VGA display. Also, a connection to a second external video terminal 40 may be provided.
[35] The workstation 12 may be equipped with disk storages 42 and 44 for storing programs and media data captured during examination. For example, the disk storage 42 may be utilized for storing an operating system, e.g. Microsoft Windows XP, and various application programs for supporting operations performed by the workstation 12. The application programs used by the workstation 12 may include a Speech Application Programming Interface (SAPI) for providing speech recognition, a Direct Show Application for previewing and playing video, a Video Card Application Programming Interface (API) for supporting graphics display in a programmable manner, Microsoft Active X for sharing information among several applications, Direct X that enables higher performance in graphics and sound, Media Player for playing media files, and object linking and embedding (OLE) that allows an editor to transfer a part of a document to another editor and then reimport it.

[36] The disk storage 44 may be used for temporarily storing media data captured during the examination. An external storage 46 coupled to the workstation 12 via an appropriate interface 48 such as an USB/CDRW interface may be used for local storage of data. Via a local area network (LAN) card 50 and an appropriate database layer 52, the workstation may have access to a network storage 54.

[37] A document generating unit 56 is connected to the processing unit 16 for generating documents that represent results of the examination. In particular, the document generating unit 56 generates a text document such as a memorandum that may include one or more images representing video and/or still images captured during examination. Also, the document generating unit 56 may generate facsimile and/or E-mail documents representing
results of an examination. These documents also may include images representing video and/or still images captured during examination. In addition, email documents may include files containing video, still images and/or audio data captured during the examination. The document generating unit may also include a voice dictation mechanism for generating a text document in response to dictation.

[38] The document generating unit 56 is connected to the LAN card 50 for sending generated documents, such as E-mail or facsimile documents, over a network 58, such as the Internet, to a remote destination. A security layer 60 may be provided for supporting secure network communication. Also, documents generated by the document generating unit 56 may be transferred to the network storage 54. A printer 62 may be connected to the document generating unit 56 for printing out generated documents. For example, a USB connector may be used for connecting the printer 62 to the workstation 12.

[39] As discussed above, the workstation 12 supports hands-free recording and processing of information captured during medical examination to enable a medical practitioner to perform examination without an assistant. FIG. 2 illustrates a command control procedure carried out by the command control mechanism 30 to support hands-free operations of the workstation 12. The command control procedure provides a user with an option to employ a voice or device control of the workstation 12. If a voice control option is chosen, a voice control mechanism 102 of the workstation 12 is activated. The voice control mechanism 102 activates the microphone 24 to enable the user to issue voice commands for controlling workstation operations. The voice communications using the voice control mechanism 102 are supported by the Speech Application Programming Interface (SAPI) that provides
speech recognition. If a device control option is chosen, a device control mechanism 104 may enable the user to utilize mouse 34a and/or keyboard 34b for controlling workstation operations.

[40] As illustrated in FIG. 3, the workstation 12 has a voice enable/disable mechanism 106 for enabling or disabling voice commands via the microphone 24 that may be used by a medical practitioner during examination. The voice enable/disable mechanism 106 may include a voice-controlled switch for enabling or disabling voice command control. Alternatively, a switch for enabling or disabling voice command control may be controlled programmably in response to certain conditions. For example, the voice command control may be temporarily disabled during examination to avoid interference with audio recording made via the microphone 26 to record sounds associated with patient's conditions. The workstation 12 is provided with an audio recording mechanism 108 for recording voice commands issued via the microphone 24 and audio signals sensed by the microphone 26. An enable/disable mechanism 110 is provided for programmably enabling or disabling recording of voice commands and audio signals. Also, the workstation 12 has an audio compression mechanism 112 for programmably configuring and controlling compression of audio signals being recorded.

[41] FIG. 4 illustrates capturing video signals during examination. The camera 14 supplies the workstation 12 with video signals via an S-video input 18 or digital input 20, such as a USB2 or Firewire connector. A camera that produces analog video signals is linked to the S-video input 18, whereas a camera for producing digital video signals is coupled to the digital input 20. Audio/Video card 22 connected to the S-video input 18
converts the analog video signal produced by the camera 14 into a digital form. The workstation 12 is provided with a video compression mechanism 114 for programmable control of video compression so as to compress video signals on the fly, while they are being supplied from the camera 14. A video capture size mechanism 116 provides programmable control of video capture size.

[42] As illustrated in FIG. 5, the workstation 12 also supports capture of still images supplied from the camera 14. A camera that produces still images in an analog form is linked to the S-video input 18, whereas a camera for producing digital still images is coupled to the digital input 20. Audio/Video card 22 connected to the S-video input 18 converts the analog still image signal produced by the camera 14 into a digital form. An image compression mechanism 118 is provided in the workstation 12 for programmable control of image compression so as to compress still images on the fly, while they are being supplied from the camera 14. An image capture size mechanism 120 provides programmable control of image capture size. Separate mechanisms for capturing and compressing video signals and still images enable the workstation 12 to capture, store and playback still images relating to examination in addition to video signals captured during the examination.

[43] Operations of workstation 12 may be customized for a particular user and for a particular use. FIG. 6 illustrates a configuration setting graphical user interface (GUI) 130 displayed on the screen of the video terminal to enable a user to customize operations of the workstation 12 using a configuration setting mechanism 132 for defining configurations of media, voice and memo settings. The configuration setting mechanism 132 enables multiple
users to select their own unique media, voice and memo settings based on their preferences. Also, the configuration setting mechanism 132 supports unique media, voice and memo settings for each of multiple possible uses of the workstation 12. For example, different settings may be selected for different types of medical examinations. The configuration setting mechanism 132 provides users with an option 134 to create new settings, an option 136 to delete existing settings, or an option 138 to edit previously created settings.

[44] The configuration setting GUI 130 includes Source tab 140, Video tab 142, Audio tab 144, Still Image tab 146, Memo tab 148 and Voice tab 150. The Source tab 140 supports selection of a source of video signals and still images to be captured. A user is enabled to select desired sizes of video and/or still images, their desired quality. The Video tab 142 supports selection of a type of video compression, and various options relating to video compression. The Audio tab 144 allows a user to enable or disable recording of audio signals, and to select channels for supplying audio signals and parameters of audio compression. The Still Image tab 146 enables a user to set a compression amount for still images, and to manage image save folders for saving captured still images. The Memo tab 148 supports settings relating to generating text documents containing results of examination. The Voice tab 150 allows a user to enable or disable voice commands, and supports selective configuration of microphones and speech recognition procedures.

[45] Also, a user is enabled to customize voice command settings using a voice command loading mechanism 152 and a voice command saving mechanism 154. These mechanisms support loading and saving of a unique set of voice commands for a particular user and for a particular use of the workstation 12. For example, the voice commands may include
commands relating to video and/or still image recording and storing, such as "Start Video Recording", "Stop Video Recording", "Save Recorded Video", "Snapshot", "Image Save", etc. Also, the voice commands may include commands for controlling system operations, such as "Reset", "Turn On Voice Command", "Turn Off Voice Command", etc.

[46] Further, the configuration setting GUI 130 involves a setting lock mechanism 154 to prevent a selected configuration from being accidentally modified, and a sequence lock mechanism 156 to lock settings relating to a sequence of captured images.

[47] FIG. 7 shows an exemplary configuration setting GUI 130 that enables a user to customize operations of the workstation 12. As illustrated in FIG. 8, when the Source tab 140 is activated, the user may select a source of video signals and still images, and various parameters relating to the source. In particular, the user may select a desired number of frames per second using a combo box 182, and a desired video size using a combo box 184.

[48] Further, different medical procedures could mandate using different cameras. Therefore, a video source selection button 186 enables the user to choose a proper camera for a particular procedure among multiple cameras that may be attached to the workstation 12 (block 188). For example, a still image camera may be attached for performing some of the medical procedures, and a video camera may be attached for performing other procedures.

[49] A video format selection button 190 enables the user to select a data format and compression parameters (block 192). In particular, the user may set a capture quality to select a required compression ratio for compressing a captured video or image signal. For example, a slider 194 may be used for setting the capture quality. A text box 196 may
provide the user with ability to enter a desired numerical value of the compression ratio. A
format selection combo box 198 enables the user to select a desired format.

[50] Further, the video format selection button 190 may allow the user to set capture
dimensions (block 200). For example, a combo box 202 enables the user to choose a capture
size among a number of predefined sizes. Alternatively, the user may customize a capture
size using a custom size text box 204.

[51] As illustrated in FIG. 9, when the Video tab 142 is selected, the user may predefine
locations for storing video files. For example, a text box 210 may present a default
temporary video folder path for temporarily storing captured video data, and a text box 212
may present a default video folder path to identify a folder for storing saved video data.
Using these text boxes, the user may select any folders for temporarily storing captured
video data and for storing saved video data. Temporarily stored video may also be used as
a system flag to enable playback, and video save controls, as well as a prompt warning for
record video command to save unsaved video before recording/replacing unsaved video.

[52] A video compression combo box 214 enables the user to select a type of compression
to be used for compressing video data to be saved in a compressed form. A button 218 and a
dialog box 220 may be used for setting particular compression parameters.

[53] When the Audio tab 144 is selected (FIG. 10), the user may enable or disable
capturing audio signals. For example, a check box 222 may be checked to enable audio
recording. A combo box 224 allows the user to select a type of audio compression among
multiple available audio compression types. A bits combo box 226 enables the user to
select various bit lengths for audio files, for example, 8, 16 or 24 bits. An audio frequency
combo box 228 may be used to select a desired audio frequency, and an audio channel combo box 230 may enable the user to record audio data in a stereo or mono format.

[54] When the Still Image tab 146 is selected (FIG. 11), an image folder path text box 232 presents a default folder for saving a captured still image and allows the user to select any folder for storing the still image. An image quality slider 234 enables the user to set a compression amount for still images.

[55] As illustrated in FIG. 12, when the user selects Memo tab 148, a memo directory path text box 236 presents a default directory for storing a memo, and allows the user to change this directory. A memo template path text box 238 enables the user to select a memo template to be used when a memo is created.

[56] When the Voice tab 150 is selected (FIG. 13), the user is enabled to configure operations relating to voice commands. In particular, a check box 240 may be checked to enable voice commands and unchecked to disable voice commands. A disable voice command button 242 may be used to disable or enable specific voice commands (block 244). For example, voice commands to be disabled or enabled may be presented in a list 246. A configure microphone button 248 allows the user to select a desired microphone configuration (block 250), and a train microphone button 252 may be used to select parameters relating to training a microphone for providing speech recognition (block 254).

[57] A load commands button 256 may be used to load a desired set of voice commands into an internal storage 258 of the workstation 12 (block 260). For example, a unique set of voice commands may be created for a particular user and/or a particular medical procedure and loaded into the workstation 12. A save commands button 262 may be activated to save
a customized set of voice commands selected using the configuration setting GUI 130. The workstation 12 may produce a document containing a list of loaded or saved voice commands and their status (block 266).

[58] FIG. 14 illustrates a mechanism for saving video and image information captured during examination. Prior to capturing information, the workstation 12 may access a patient file relating to a patient undergoing examination (block 280). The file may be identified by a patient’s name. When the workstation 12 captures a video signal relating to that patient (block 282), the captured video is temporarily stored as a video file in the storage 44 (block 284) with the respective patient file name appended to the video file. When the workstation 12 captures still images relating to the patient, they are temporarily stored as image files (block 286) with the respective patient file name appended to each image file.

[59] The processing unit 16 supports playback of the temporary stored video file (block 288) and/or preview of the temporary stored image files (block 290). A user is enabled to select whether to save the video file and/or the image files, or to delete them (block 292). Also, the workstation 12 allows the user to transfer captured images to the document generating unit 56 for preparing a text document or memo including the captured images.

[60] If the user selects saving the video file and/or the image files, the files may be selectively renamed and/or annotated (block 294) before activating a saving procedure (block 296). Alternatively, a clearing procedure may be activated to delete the temporary stored files.

[61] FIG. 15 illustrates a media import procedure carried out to incorporate image data into a text document that may be produced based on results of medical examination. As
discussed above, when the workstation 12 performs a video/image saving procedure (block 300), a user is enabled to transfer captured images into the document generating unit 56 for including the images in a text document. The video/image saving mechanism involves programmable launch of a text editor such as Microsoft Word, and loading a text document template having a predefined format (block 302). The text document may be a memo for presenting results of a medical examination. The template may be resaved under a new name, which may include a patient’s name and a date of examination. Also, the patient’s name and the date of examination may be incorporated into the memo.

Using an object linking and embedding (OLE) protocol, selected images captured during examination are transferred into predefined cells of the Word document (block 304). The system may resize the images to match sizes of the cells. The cell sizes may be user-adjustable.

Using voice commands entered via the microphone 24 or keyboard commands, a user may modify the memo (block 306). Then, the user may save the document under a selected name in a selected directory (block 308). Temporarily stored image files corresponding to the images transferred into the text document may be programmably deleted (block 310). Simultaneously, the image files may be saved in the storage 44.

FIG. 16 illustrates an image save dialog window 320 that enables a user to save multiple still images captured during a medical procedure. Each captured image is temporarily stored in the workstation as an image file that may be identified by default by a file name including a patient’s identification information and a date of capturing the image. When a required number of still images is captured, the user may select a save image
command that initiates the image save dialog window 320 on the screen of the video terminal. As shown in FIG. 16, the image save dialog window 320 contains a list of image files corresponding to the captured still images. Each image file may be renamed in a desired manner.

[65] The image save dialog window 320 allows the user to preview each captured image and save it on the disk and/or in the database. Also, the image may be incorporated into a memo representing results of the respective medical procedure. For example, as shown in FIG. 16, the image files may be arranged in a table having columns corresponding to the database (D-Base), memo and disk. A separate column may be provided for clearing captured images temporarily stored in the workstation memory. A user can check one or more boxes in respective columns to define a manner in which the corresponding image file should be saved.

[66] For example, FIG. 16 shows two image files in the dialog window 320 corresponding to two images captured during a medical procedure. The first image file is marked to request incorporating the respective image in the memo and saving the image file on the disk. The second image file shown in the dialog window 320 is marked for saving on the disk and clearing from the temporary storage. The image saved on the disk or incorporated in the memo may be automatically cleared from the temporary storage even if the clear box is not checked. Using a single activation of a save button on the dialog window 320, a user may save the first and second images on the disk, incorporate the first image into the memo and clear the second image from the temporary storage. Hence, a single user's action, for
example, a single click of a mouse button enables a user to perform different saving operations with multiple captured images.

[67] As discussed above, each image by default is identified by patient’s identification information, for example, by a patient’s name. As a result, all images relating to a particular patient are identified with information identifying that patient. To prevent captured images from being associated with wrong patients, unsaved images temporarily stored in the workstation memory may be automatically deleted when an image saving procedure is completed.

[68] Moreover, when a video or image save procedure is completed, a video feed from a video source to the workstation 12 may be automatically disconnected. To re-connect the video feed, a user may be requested to enter a patient’s name. Hence, the user is prevented from using a wrong patient’s name or a wrong media source for a particular medical procedure.

[69] The foregoing description illustrates and describes aspects of the present invention. Additionally, the disclosure shows and describes only preferred embodiments, but as aforementioned, it is to be understood that the invention is capable of use in various other combinations, modifications, and environments and is capable of changes or modifications within the scope of the inventive concept as expressed herein, commensurate with the above teachings, and/or the skill or knowledge of the relevant art.

[70] The embodiments described hereinabove are further intended to explain best modes known of practicing the invention and to enable others skilled in the art to utilize the
invention in such, or other, embodiments and with the various modifications required by the particular applications or uses of the invention.

[71] Accordingly, the description is not intended to limit the invention to the form disclosed herein. Also, it is intended that the appended claims be construed to include alternative embodiments.
What is Claimed Is:

1. A system for conducting a medical examination including:

   an examination tool having a viewing device for producing an image signal representing a captured image of an area being examined, and

   an examination data processing device controllable by voice commands for storing the image signal as digital data representing the captured image.

2. The system of claim 1, wherein the examination data processing device is configured to enable a user to perform hands-free recording of the captured image.

3. The system of claim 1, wherein the examination data processing device is configured to enable a user to perform hands-free recording of examination results.

4. The system of claim 1, wherein the examination data processing device is configured for compressing the digital data.

5. The system of claim 4, wherein the examination data processing device is configured for compressing the digital data while the image signal is being received.

6. The system of claim 1, wherein the examination data processing device is configured for responding to the voice commands customized for a particular user.
7. The system of claim 1, wherein the examination data processing device is configured for responding to the voice commands customized for a particular use of the examination tool.

8. The system of claim 1, wherein the examination data processing device is responsive to a voice command for recording video signals representing captured images of the area being examined.

9. The system of claim 1, wherein the examination data processing device is responsive to a voice command for recording video signals and still images representing the area being examined.

10. The system of claim 9, wherein the examination data processing device is responsive to a voice command for playing back the recorded video signals and still images.

11. The system of claim 1, wherein the examination data processing device is responsive to a voice command for producing a text document representing examination results.

12. The system of claim 11, wherein the text document includes the captured image of the examined area.
13. The system of claim 12, wherein the examination data processing device is configured for setting a size of the captured image in accordance with a size of the text document.

14. The system of claim 1, wherein the examination data processing device is configured for setting system parameters customized for a particular user.

15. The system of claim 1, wherein the examination data processing device is configured for setting system parameters customized for a particular use of the examination tool.

16. A method of conducting a medical examination comprising the steps of:
   capturing an image of an area being examined, and
   by a voice command, operating an examination data processing device to produce digital data representing the captured image.

17. The method of claim 16, further comprising the step of operating the examination data processing device by a voice command to perform hands-free recording of the captured image.
18. The method of claim 16, further comprising the step of operating the examination data processing device by a voice command to perform hands-free recording of examination results.

19. The method of claim 16, further comprising the step of operating the examination data processing device to perform compression of the digital data.

20. The method of claim 19, wherein the digital data is being compressed while the image signal is being produced.

21. The method of claim 16, further comprising the step of customizing voice commands for operating examination data processing device for a particular user.

22. The method of claim 16, further comprising the step of customizing voice commands for operating examination data processing device for a particular user.

23. The method of claim 16, further comprising the step of operating the examination data processing device by a voice command to record video signals representing captured images of the area being examined.
24. The method of claim 16, further comprising the step of operating the examination data processing device by a voice command to record video signals and still images representing the area being examined.

25. The method of claim 24, further comprising the step of operating the examination data processing device by a voice command to play back the recorded video signals and still images.

26. The method of claim 16, further comprising the step of operating the examination data processing device by a voice command to produce a text document representing examination results.

27. A system for conducting an endoscopic procedure, comprising:

an endoscope comprising a camera for producing video signals, and

a voice activated data processing device for performing hands-free recording of the video signals in a digital format.

28. The system of claim 27, wherein the data processing device is configured for compressing data representing the video signals while the video signals are being received by the data processing device.
29. The system of claim 27, wherein the data processing device is configured to perform operations in response to voice commands customized for a particular user.

30. The system of claim 27, wherein the data processing device is configured to perform hands-free recording of the video signals together with at least one still image.

31. An image processing system comprising:
   a voice activated mechanism for hands-free digital recording of video signals, and
   a mechanism for compressing digital data representing the video signals on the fly while the video signals are being received by the recording mechanism.

32. A system for processing medical data, comprising:
   a voice activated mechanism for hands-free recording of received medical data, and
   a mechanism for compressing the medical data on the fly, while the medical data are being received by the recording mechanism.

33. The system of claim 32, wherein the medical data includes video data.

34. The system of claim 32, wherein the medical data includes a combination of video data and still image data.
35. The system of claim 34, further comprising a voice activated text document generation mechanism enabling a user to perform hands-free generation of a text document.

36. The system of claim 31, wherein the text document generation mechanism is configured to generate the text document including at least one captured still image.

37. The system of claim 31, further comprising a voice command customization mechanism configured to customize voice commands for controlling the recording mechanism for a particular user.

38. The system of claim 31, further comprising a voice command customization mechanism configured to customize voice commands for controlling the recording mechanism for a particular medical procedure.

39. A system for processing medical data, comprising:
   a voice activated mechanism for hands-free recording of received medical data, and
   a customization mechanism for customizing voice commands for controlling the recording mechanism.

40. The system of claim 39, wherein the medical data includes a combination of video data and still image data.
41. A medical system for capturing data during a medical procedure, comprising a data source for supplying captured data, and a data processing device having a mechanism for saving the captured data in a memory, and a mechanism for incorporating the captured data into a text document presenting results of the medical procedure.

42. The system of claim 41, wherein the data processing device is configured for enabling a user to save the captured data in the memory and incorporate the captured data into the text document using a single action.

44. The system of claim 41, wherein multiple files represent the captured data.

45. The system of claim 44, wherein the data processing device is configured for enabling a user to save at least one of the multiple files in the memory and incorporate at least one of the multiple files into the text document using a single click of a mouse button.

47. The system of claim 41, wherein the multiple files are identified in accordance with identification information of a patient.

48. The system of claim 41, wherein the data processing device is configured for temporarily storing the captured data in a temporary storage.
49. The system of claim 48, wherein the data processing device is configured for enabling a user to save the captured data in the memory, incorporate the captured data into the text document and clear the captured data from the temporary storage using a single action.

50. The system of claim 42, wherein the data processing device is configured for enabling a user to save the captured data in the memory, incorporate the captured data into the text document and clear the captured data from the temporary storage using a single click of a mouse button.

51. The system of claim 48, wherein the data processing device is configured for automatically clearing the captured data from the temporary storage when a captured data saving procedure is complete.

52. The system of claim 41, wherein a data supply from the data source is automatically disconnected from the data processing device when a captured data saving procedure is complete.

53. A system for capturing image data, comprising a camera for supplying captured image data, and a data processing device having a mechanism for saving the captured image data in a memory, and a mechanism for incorporating the captured image data into a text document.

54. The system of claim 53, wherein the data processing device is configured for enabling a user to save the captured image data in the memory and incorporate the captured image data into the text document using a single action.
55. The system of claim 54, wherein the data processing device is configured for enabling a user to save the captured image data in the memory and incorporate the captured image data into the text document using a single click of a mouse button.

56. The system of claim 53, wherein multiple image files represent the captured image data.

57. The system of claim 56, wherein the data processing device is configured for enabling a user to save at least one of the multiple image files in the memory and incorporate at least one of the multiple image files into the text document using a single click of a mouse button.

59. The system of claim 53, wherein the data processing device is configured for temporarily storing the captured image data in a temporary storage.

60. The system of claim 59, wherein the data processing device is configured for enabling a user to save the captured image data in the memory, incorporate the captured image data into the text document and clear the captured image data from the temporary storage using a single click of a mouse button.
62. The system of claim 59, wherein the data processing device is configured for automatically clearing the captured image data from the temporary storage when a captured image data saving procedure is complete.

63. The system of claim 53, wherein the camera is automatically disconnected from the data processing device when a captured image data saving procedure is complete.
FIG. 1
FIG. 6
Admin Configuration

Configurations: MPEG 4

New  Delete  Save

Settings

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<tr>
<th>Source</th>
<th>Video</th>
<th>Audio</th>
<th>Still Image</th>
<th>Memo</th>
<th>Voice</th>
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<td>Voice Command</td>
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- Configure Mic
- Train Mic
- Command Training

- image save
- playback last
- Reset
- save recorded video
- snapshot
- start video recording
- stop video recording
- turn off voice command
- turn on voice command
- Two Screen View
- video close
- video open

☐ lock configuration  ☐ lock sequence

OK  Cancel

FIG. 7
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
   A61B1/045    A61B1/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
   A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
   EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<td>4,5,11, 12,19, 20,26, 28,31-38</td>
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<tr>
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<td>Further documents are listed in the continuation of Box C.</td>
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* Special categories of cited documents:

*A* document defining the general state of the art which is not considered to be of particular relevance

*E* earlier document but published on or after the international filing date

*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

*C* document referring to an oral disclosure, use, exhibition or other means

*P* document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

*"S" document member of the same patent family

Date of the actual completion of the international search
   24 February 2006

Date of mailing of the international search report
   07/03/2006

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Authorized officer
   Rivera Pons, C

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