



(12) **United States Patent**  
**Wright et al.**

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(54) **SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA**

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(75) Inventors: **Ken Wright**, Chino Hills, CA (US);  
**Chet LaGuardia**, Rancho Santa Margarita, CA (US)

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(73) Assignee: **Datcard Systems, Inc.**, Irvine, CA (US)

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*Primary Examiner*—Huy T Nguyen  
(74) *Attorney, Agent, or Firm*—Knobbe, Martens, Olson & Bear LLP

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(57) **ABSTRACT**

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(52) **U.S. Cl.** ..... **386/125**; 386/126

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See application file for complete search history.

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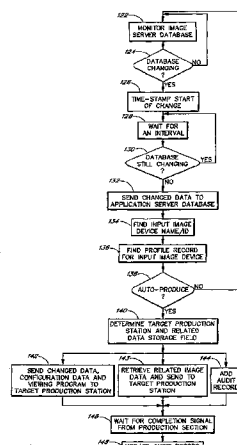
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This application discloses a system for recording medical image data for production on a portable digital recording medium such as CDs and DVDs. This system includes a receiving module, a processing module and an output module, with viewing program for viewing medical image data stored on the portable digital recording medium. It also discloses a method of storing medical image data on a portable digital recording medium, including the steps of receiving the medical image data, processing the data and storing the data on the portable digital recording medium, with a viewing program for viewing medical image data stored on the portable digital recording medium. It further discloses a method of selecting medical image data for recording on a portable digital recording medium, including the steps of connecting a browsing terminal to a computer database that stores the medical image data, selecting a first set of the medical image data from the computer database, and recording the selected first set of medical image data on the portable digital medium, with a viewing program for viewing the medical image data stored on the portable digital recording medium. It also discloses the method and system of retrieving medical image data that are related to the received/selected original medical image data, and recording the original and related medical image data on a portable digital recording medium.

**14 Claims, 5 Drawing Sheets**



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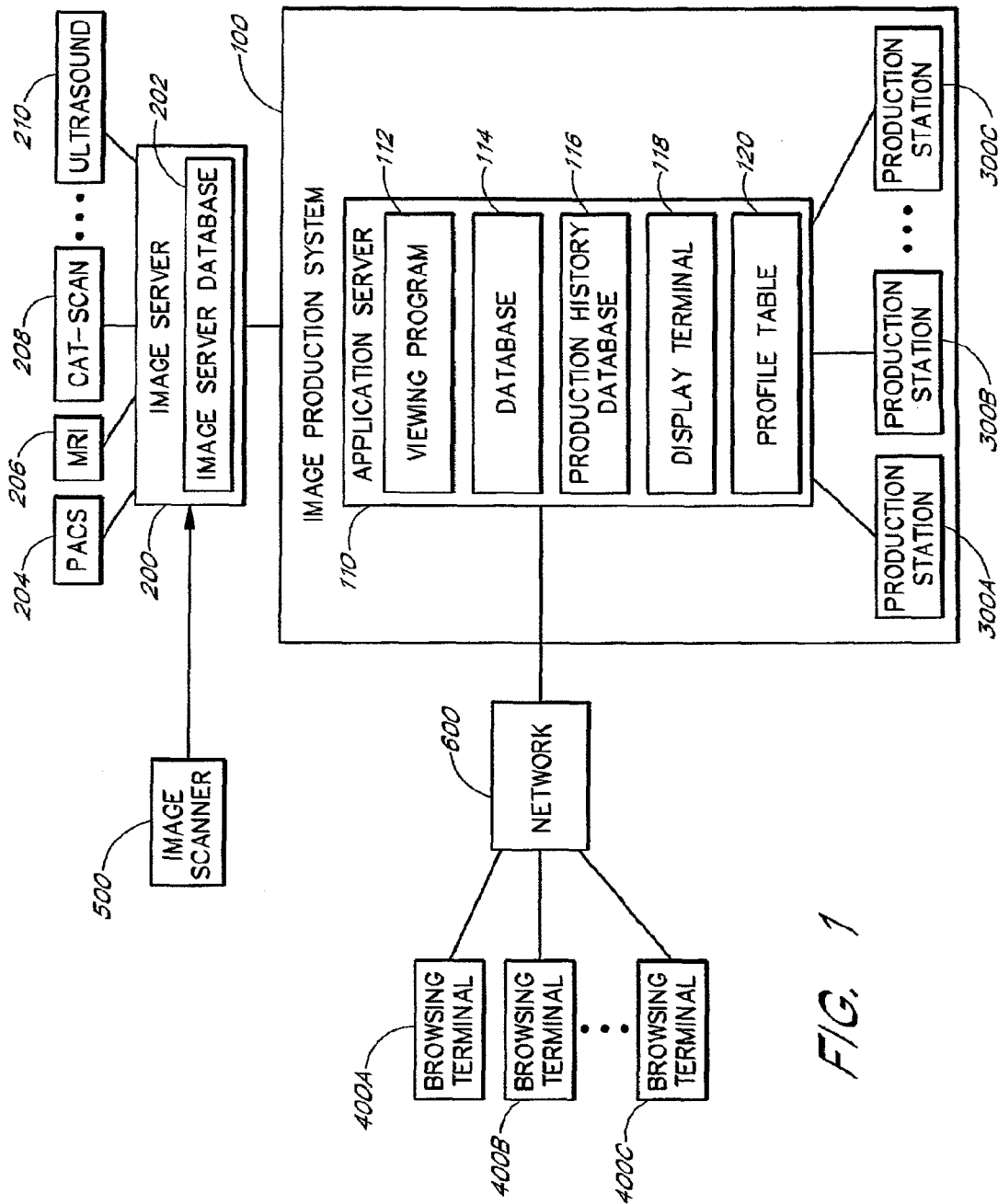


FIG. 1

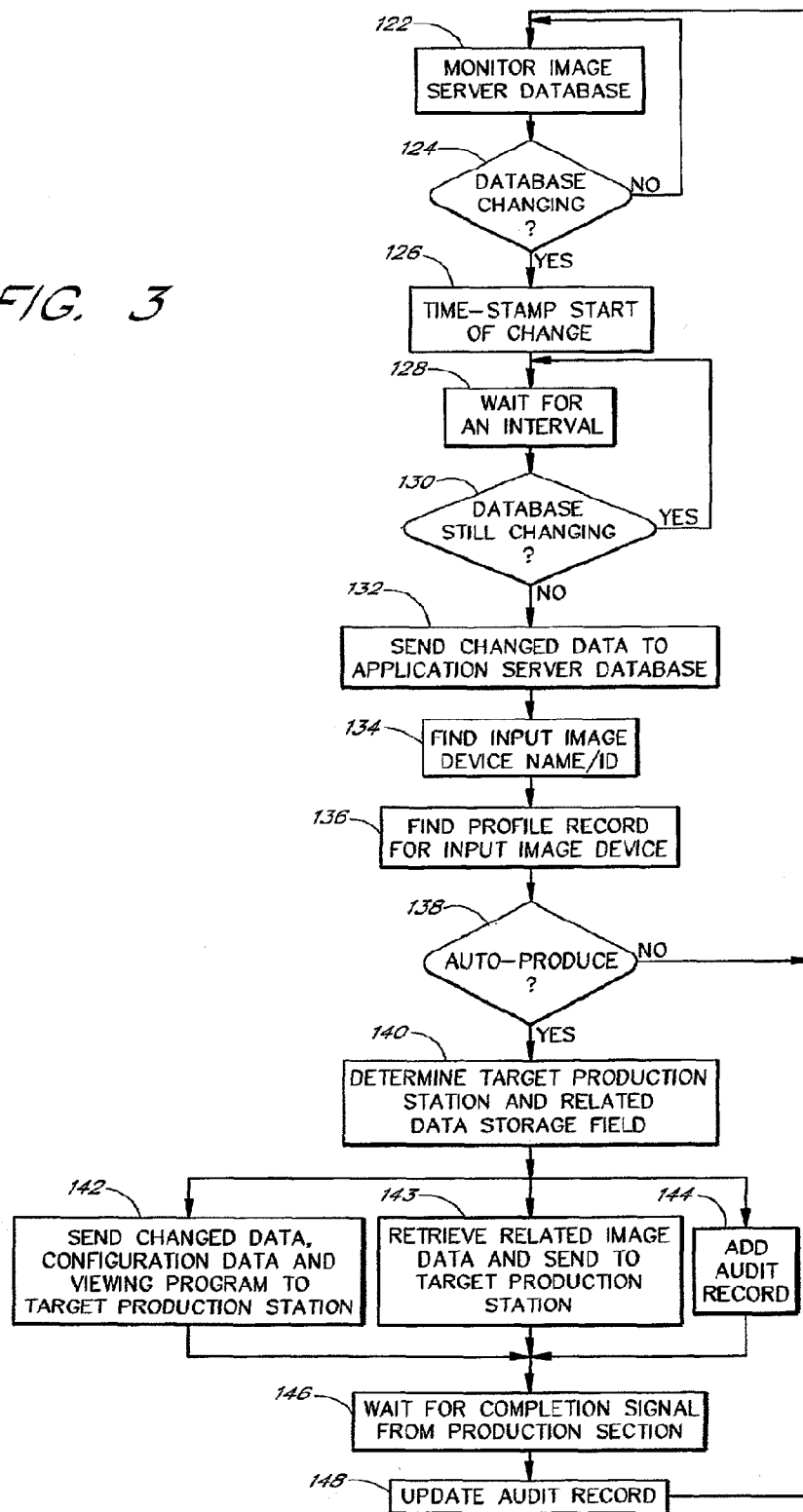


120

250		252		254
IMAGE INPUT DEVICES	FIELDS	AUTO-PRODUCE 1	TARGET PRODUCTION STATION	RELATED DATA STORAGE
MRI MACHINE I		YES	PRODUCTION STATION A	PACS 1
MRI MACHINE II		NO		
ULTRASOUND MACHINE I		YES	PRODUCTION STATION B	PACS 1, PACS 2

FIG. 2

FIG. 3



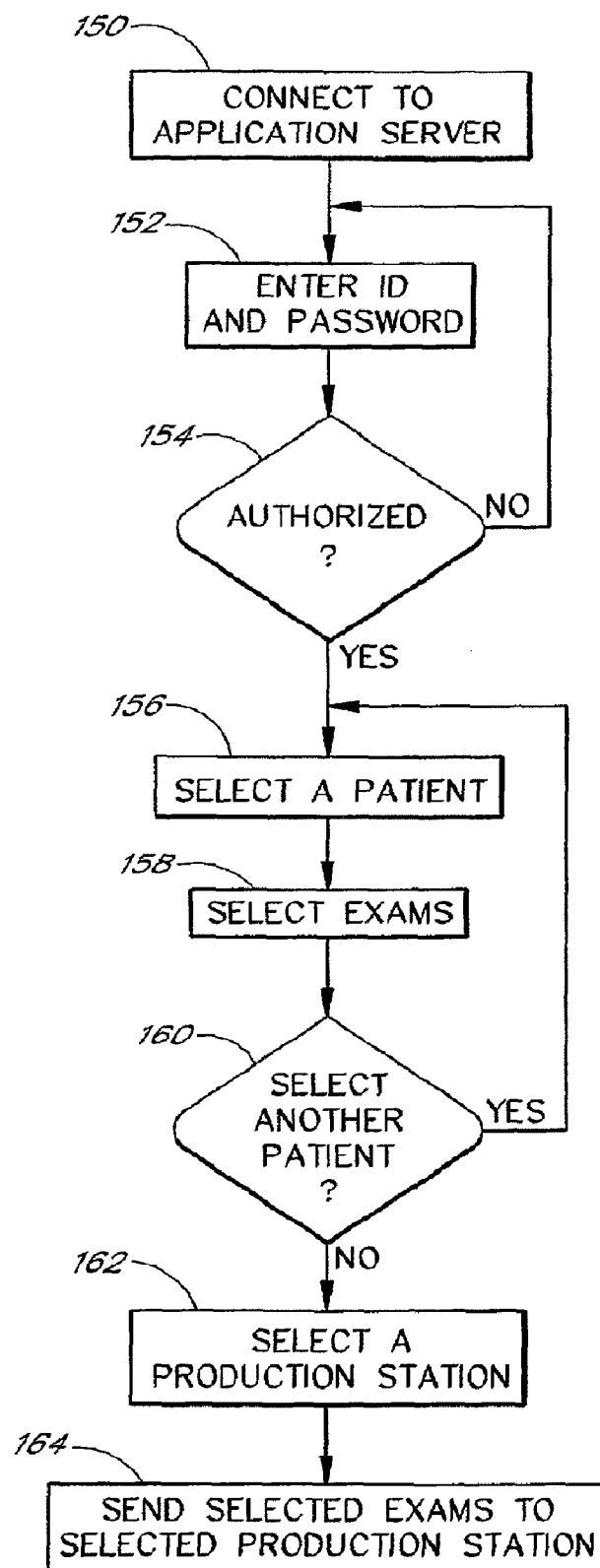


FIG. 4

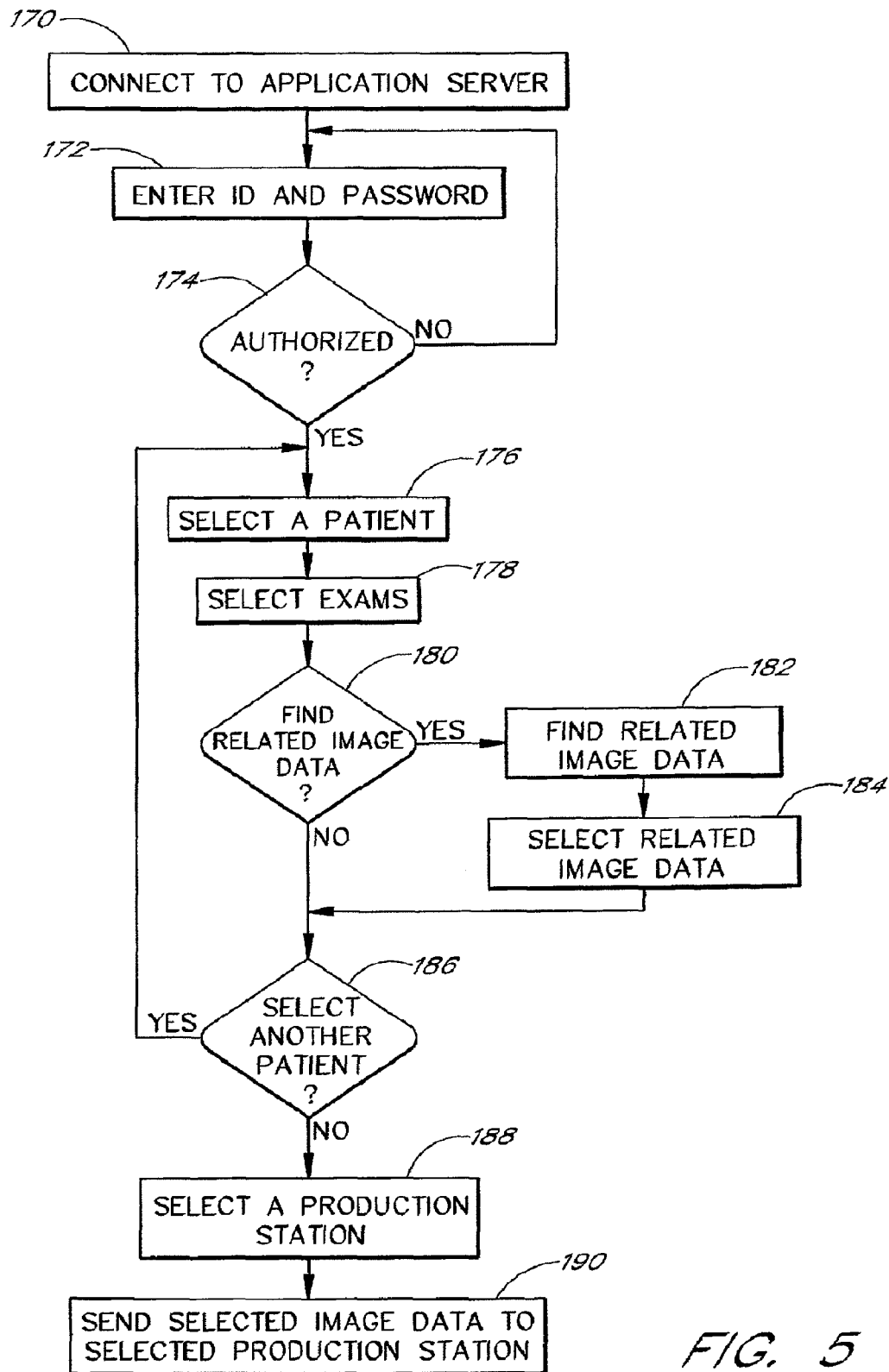


FIG. 5

# SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA

## CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 11/942,630, filed on Nov. 19, 2007, which is a continuation of U.S. patent application Ser. No. 09/761,795, filed on Jan. 17, 2001, now U.S. Pat. No. 7,302,164, issued Nov. 27, 2007, which claims priority to U.S. Provisional Patent Application 60/181,985, filed on Feb. 11, 2000. The entire disclosures of these applications are hereby incorporated by reference herein in their entirety.

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

This invention relates to a system and method for the production of medical image data on portable digital recording media such as compact discs. More particularly, it relates to a system and method for receiving medical image data, processing medical image data, and transmitting medical image data to be recorded on a portable digital recording medium.

### 2. Description of the Related Art

Since the invention of the x-ray film, film has been the predominant multipurpose medium for the acquisition, storage, and distribution of medical images. However, the storage and distribution of film often requires considerable expenses in labor and storage space.

Today's modern hospitals utilize computer-aided imaging devices such as Computed Tomography (CT), Digital Subtracted Angiography, and Magnetic Resonance Imaging (MRI). These digital devices can generate hundreds of images in a matter of seconds. Many hospitals require these images to be printed on film for storage and distribution. To print complete sets of medical images from these digital devices, the cost in film material, storage space, and management efforts is often very high.

Some radiology departments have installed digital image storage and management systems known as PACS (Picture Archive Communication Systems). PACS are capable of storing a large amount of medical image data in digital form. PACS are made by manufacturers including GE, Siemens, and Fuji.

To ease the communication of data, the DICOM (Digital Imaging and Communications in Medicine) standard was developed by ACR-NEMA (American College of Radiology-National Electrical Manufacturer's Association) for communication between medical imaging devices and PACS. In addition to the examined images, patient demographics, and exam information such as patient name, patient age, exam number, exam modality, exam machine name, and exam date can also be stored and retrieved in DICOM compatible data format. A DICOM file stores patient and exam information in the header of the file, followed by the exam images. PACS store medical image data in DICOM format.

Digital medical image data can be stored on PACS and distributed using the Internet. However, many physicians' offices do not have the bandwidth suitable for fast download

of medical image data. The concerns for medical data privacy and Internet security further reduce the desirability of Internet distribution.

## SUMMARY OF THE INVENTION

The claimed system allows for digital medical image data to be produced on a portable digital recording medium such as a CD. A CD containing the medical image data can be distributed to physicians, hospitals, patients, insurance companies, etc. One embodiment of the claimed system allows for medical image data to be placed on a CD along with a viewing program, so that a user can use any computer compatible with the CD to view the medical image data on the CD. One embodiment of the claimed system allows for searching medical exam data that are related and placing such data on the same CD.

One embodiment of the claimed system comprises a receiving module configured to receive medical image data, a processing module configured to process the received medical image data, and an output module configured to transmit the processed medical image data to a production station configured to produce the transmitted medical image data on portable digital recording medium, such as a CD. In one embodiment, the output module transmits a viewing program configured to view medical image data to the production station so that the viewing program is produced on the same CD as the medical image data. In another embodiment, the CD already contains the viewing program before the medical image data is transmitted to the CD production station.

In one embodiment of the claimed system, the processing module is configured to create and store audit information of the portable digital recording medium produced by the production station.

In another embodiment of the claimed system, the processing module is configured to identify the originating image input device of the received medical image data, and determine, on the basis of the originating image input device, whether to transmit the received medical image data to a production station. The processing module also selects, on the basis of the originating image input device, one of multiple production stations as the target production station.

Yet another embodiment of the claimed system is configured to retrieve medical image data that are related to the received medical image data, and transmit the retrieved related image data to the production station. In one embodiment, exam images of the same patient are considered related. In another embodiment, exam images of the same patient and the same modality are considered related. For example, two x-ray exams on the left hand of the same patient are considered related. In yet another embodiment, exam images of the same patient, the same modality and taken within a specified date range are considered related. For example, two x-ray exams on the left hand of the same patient taken within a two-month period are considered related. A hospital may also determine other scenarios of relatedness.

One claimed method comprises the steps of connecting a browsing terminal to a computer database configured to store medical image data, selecting medical image data from medical image data stored on the database, and recording the selected medical image data on portable digital recording medium. In one embodiment, the claimed method also comprises a step of recording a viewing program configured to view medical image data on the portable digital recording medium.

One embodiment of the claimed method further comprises the steps of finding and retrieving medical image data that are

related to the selected medical image data, and recording related image data to portable digital recording medium.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates one embodiment of an image production system comprising an application server and portable digital recording medium production stations.

FIG. 2 illustrates sample records of one embodiment of an image input device profile table.

FIG. 3 illustrates a process of receiving image data from image server, processing received image data, and transmitting such data to the production station. This process also retrieves and transmits related image data for production.

FIG. 4 illustrates a process of a user selecting and ordering the production of image data stored on the application server.

FIG. 5 illustrates a process of a user selecting and ordering the production of image data stored on the application server, with the option of selecting and ordering the production of related image data.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 illustrates one embodiment of an image production system **100** comprising an application server **110** and one or more portable digital recording medium production stations **300A**, **300B** and **300C**. In the preferred embodiment, the production stations **300A**, **300B** and **300C** are CD (Compact Disc) production stations. Digital portable recording medium comprises CDs and DVDs (Digital Versatile Disc or Digital Video Disc). CDs may comprise CD-ROM (Compact Disc Read Only Memory), CD-R (Compact Disc Recordable), and CD-RW (Compact Disc Recordable and Writable). DVDs may comprise DVD-ROM (DVD Read Only Memory), DVD-R (DVD Recordable) and DVD-RAM (a standard for DVDs that can be read and written many times). Thus, although the following description refers primarily to CDs, those of ordinary skill in the art will understand that any suitable portable digital recording medium can be substituted for CDs.

The application server **110** is connected to one or more physician browsing terminals **400A**, **400B** and **400C** through a computer network **600**. Each physician browsing terminal **400A**, **400B** or **400C** comprises a browsing program such as Internet Explorer or Netscape Communicator. Physicians or their assistants launch the browsing program to access the application server **110** through the network **600** in order to select medical image data stored on the application server database **114** to be produced by a production station **300A**, **300B** or **300C**. In the preferred embodiment, the physician browsing terminals **400A**, **400B** and **400C** are connected to the application server through an Intranet. One embodiment of the Intranet utilizes TCP/IP network protocol. The Intranet can connect one radiology department, multiple departments within a hospital, or multiple hospitals. In another embodiment the browsing terminals **400A**, **400B** and **400C** are connected to the application server **110** through the Internet.

Still referring to FIG. 1, the application server **110** is also connected to an image server **200**. The image server **200** is further connected to image input devices such as PACS **204**, MRI machines **206**, CT-scan machines **208**, ultrasound machines **210**, etc. In the preferred embodiment, the image server **200** is a DICOM image server configured to receive and store medical image data in DICOM format. In operation, the image server **200** receives medical image data from image input devices such as PACS **204**, MRI machines **206**, CT-scan

machines **208** and ultrasound machines **210** and stores such image data in the image server database **202**. A high-resolution image scanner **500** is also connected to the image server **200**, so that medical image data stored on film can be scanned on the image scanner **500**, transmitted to the image server **200** and stored in the image server database **202**. In one embodiment, the image scanner **500** also converts the scanned image to DICOM format. The application server **110** receives input image data from the image server database **202**, processes the received image data, and sends the image data to one of the production stations **300A**, **300B** or **300C** to produce CDs.

The application server **110** comprises a viewing program **112**, an application server database **114** that stores image data received from the image server **200**, a production history database **116** that stores audit records on each CD produced, a display terminal **118** for programming and operating the application server **110** by a programmer or physician, and an image input device profile table **120**.

Still referring to FIG. 1, the viewing program **112** is configured to allow users to read and manipulate medical image data. The viewing program **112** comprises multiple image manipulation functions, such as rotating images, zooming in and zooming out, measuring the distance between two points, etc. The viewing program **112** also allows users to read the patient demographics and exam information associated with the image data. The viewing program **112** used in the preferred embodiment is produced by eFilm Medical Inc. located in Toronto, Canada. The viewing program **112** used in the preferred embodiment is an abbreviated version with fewer functions and takes less storage space, in order to maximize the storage space for image data on a CD. The image server **200** used in the preferred embodiment is also made by eFilm Medical Inc.

The CD production stations **300A**, **300B** and **300C** in the preferred embodiment are produced by Rimage Corporation in Edina, Minn. Details about the Rimage CD production stations can be found in U.S. Pat. Nos. 5,542,768, 5,734,629, 5,914,918, 5,946,276, and 6,041,703, which are incorporated herein by reference in their entirety.

The application server **110** in the preferred embodiment runs on a personal computer running a 400 MHz Celeron or Pentium II/III chip, with Windows 98 or NT as the operating system.

FIG. 2 illustrates sample records of one embodiment of an image input device profile table **120**. The image input device profile table **120** contains a profile record for each image input device. Each image input device's profile record comprises: (1) an "auto-produce" logical field **250** indicating whether medical image data from this image input device should be produced on CD automatically by the image production system **100**, (2) a "target production station" field **252** identifying one of the production stations **300A**, **300B** or **300C** on which medical image data is to be produced, and (3) a "related data storage" **254** field identifying the medical image data storage units in which to search for the related image data. A medical image data storage unit is a storage unit that stores medical image data and is connected to the application server **110**. In one embodiment, a medical image data storage unit is connected to the application server **110** through the image server **200**. In the preferred embodiment, PACS **204** is such a medical image data storage unit.

In FIG. 2, the sample profile table **120** contains profile records for MRI Machine I, MRI Machine II, and Ultrasound Machine I. For MRI Machine I, the "auto-produce" field **250** contains a "yes" value, directing the image production system **100** to automatically produce image data originating from MRI Machine I on portable digital recording medium. Its

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“target production station” field 252 contains a “Production Station A” value, directing the image production system 100 to produce image data originating from MRI Machine I on production station A. Its “related data storage” field 254 is “PACS I”, directing the image production system 100 to retrieve related medical image data from PACS I. For MRI Machine II, the “auto-produce” field 250 is “no”, directing the image production system 100 to not automatically produce image data originating from MRI Machine II on portable digital recording medium. Since image data from MRI Machine II will not be automatically produced, the “target production station” field 252 and the “related data storage” field 254 are irrelevant. For Ultrasound Machine I, the “auto-produce” field 250 is “yes”, and its “target production” field 252 is “Production Station B”. Its “related data storage” field 254 contains a value of “PACS I, PACS II”, directing the image production system 100 to search PACS I and PACS II for related medical image data.

FIG. 3 illustrates a process of the application server 110 receiving image data from the image server 200, processing the received image data, and transmitting such data to the production station 300A, 300B or 300C. The application server 110 continuously monitors the image server database 202 in step 122. In one embodiment, the application server continuously “pings” the network address corresponding to the image server 200 on the network that connects the application server 110 with the image server 200.

Still referring to FIG. 3, the application server 110 determines if the image server database 202 is changing, in step 124. In the preferred embodiment, the application server 110 makes that determination by detecting whether the image server database 202 is increasing in size. If there is no change in the image server database 202, then the application server 110 returns to step 122 to continue monitoring. If there is change in the image server database 202, then the application server 110 proceeds to step 126 and time-stamps the moment that the change started. The application server 110 then proceeds to step 128 and waits for an interval, typically 35 to 65 seconds. After the interval, the application server 110 checks whether the image server database 202 is still changing, in step 130. If the image server database 202 is still changing then the application server 110 returns to step 128 to wait for another interval. If the image server database 202 is no longer changing, then the application server 110 proceeds to step 132 and copies the data changed since the time-stamped moment. This changed data is copied from the image server database 202 to the application server database 114.

The application server 110 proceeds to step 134 and finds the input image device name or identification number from the newly received image data. In the preferred embodiment, image data from the image server database 202 are stored in DICOM format, and the input image device name or identification number is stored in the header of the DICOM format image data file. The input image device name/ID indicates the origin of the newly received data. The application server 110 proceeds to step 136 and uses the found input image device name/ID to find a corresponding profile record in the image input device profile table 120. If the profile record has an “auto-produce” field 250 with a “no” value, the application server 110 returns from step 138 to step 122 to continue monitoring the image server database 202. If the “auto-produce” field 250 contains a “yes” value, the application server 110 proceeds from step 138 to step 140, and determines the target production station 300A, 300B or 300C from the “target production station” field 252 of the profile record. In step 140, the application server 110 also determines the value in the “related data storage” field 254 of the profile record.

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Still referring to FIG. 3, in step 142, the application server 110 sends a copy of the newly received data, along with a copy of the viewing program 112, to the target production station 300A, 300B or 300C identified in step 140. With the viewing program attached, the image data on each CD produced by the target production station 300A, 300B or 300C can be viewed on any computer that accepts the CD, regardless of whether that computer has its own viewing program installed. In one embodiment, the data received in step 132 is stored in the application server database 114 before it is transmitted to the target production station 300A, 300B or 300C in step 142. In another embodiment, the application server 110 transmits the data received in step 132 to the target production station 300A, 300B or 300C, without storing a copy of the data in the application server database 114.

In one embodiment, the application server 110 does not send a copy of the viewing program 112 to the target production station during step 142. Rather, the application server 110 sends a copy of the received medical image data to the production station 300A, 300B or 300C to be recorded on pre-burned CDs. Each pre-burned CD contains a viewing program already recorded onto the CD before step 142.

In step 142, the application server 110 also sends configuration data to the target production station 300A, 300B or 300C. The configuration data comprises a label-printing file comprising the specification for printing labels on top of the CDs, and a “number of copies” value indicating the number of copies of CDs to be produced. A typical specification in the label-printing file may specify information such as patient name, exam modality, hospital name, physician name, production date, etc. to be printed by the target production station as a label on the top of each CD produced.

Still referring to FIG. 3, in step 143, the application server 110 searches the application server database 114 for image data related to the newly received data. The application server 110 then searches the PACS systems identified in the “related data storage” field 254 in step 140 for data related to the newly received data. Some PACS systems each comprise a primary image data storage and an archive image data storage, and the application server 110 searches both the primary image data storage and the archive image data storage on these PACS systems. The application server 110 is connected to the PACS systems through the image server 200. The application server 110 retrieves found related data from the PACS systems and stores a copy of such found related data in the application server database 114. The application server 110 sends a copy of related data that are found from the application server database 114 or the PACS systems to the target production station 300A, 300B or 300C. The medical image data originally received in step 132 and the related medical image data are produced by the target production station 300A, 300B or 300C on the same CDs for comparative study.

For each CD to be produced, the application server 110 adds one audit record to the production history database 116 in step 144. The new audit record comprises the identification number of the CD and other relevant information about the CD, such as the physician who requested the production (if any), and the names of the patients whose exam images are on that CD.

Steps 142, 143 and 144 may be executed immediately before, concurrent with, or immediately after one another.

The target production station 300A, 300B or 300C produces the CDs containing the medical image data and the viewing program sent to it, and prints a label on top of every CD, corresponding to the specification in the label-printing file. The number of CDs produced corresponds to the “number of copies” number sent by the application server 110 in

step 142. When the target production station has produced the CDs, the production station returns a "completed" signal to the application server 110. The application server 110 waits for this signal in step 146.

Still referring to FIG. 3, in step 148, the application server 110 updates the audit records in the production history database 116 that were created in step 144. For each CD produced, the application 110 server updates the date and time of production for that CD's audit record. The application server 110 also updates the status value for that CD's audit storage record from "processing" to "successful". The application server 110 then continues monitoring the image server database 202 as in step 122.

FIG. 4 illustrates a process of a user selecting and ordering the production of image data stored on the application server 110. A user, typically a physician or physician's assistant, accesses the application server database 114 from a browsing terminal 400A, 400B or 400C connected to a network 600. In one embodiment, the user launches a browser such as Microsoft Internet Explorer or Netscape Communicator, and specifies a network address corresponding to the application server 110, in step 150. In another embodiment, the user clicks a pre-defined icon that directly launches a browser connecting to the application server 110. The application server 110 prompts the user to enter a password or an identification name coupled with a password, in step 152. The application server 110 checks if the entered identification/password is authorized in step 154. If the entered identification/password is not authorized the user is returned to step 152 to re-enter the identification/password, or disconnected from the application server 110. If the entered identification/password is authorized then the user is allowed access to the application server database 114 and the application server 110 proceeds to step 156.

Still referring to FIG. 4, in step 156 the user is prompted to select a patient from a list of patients with exam images in the application server database 114. The user is then shown a list of the selected patient's exams, and is prompted to select one or more exams of that patient, in step 158. When the user indicates that he/she has completed selecting all exams for that patient, the user is asked in step 160 whether to select another patient from the list of patients. If the user answers "yes", the user is returned to step 156 to select another patient. If the user answers "no", the user proceeds to step 162.

In another embodiment, when a user selects a patient, all exams belonging to that patient will be automatically selected without prompting for user selection. In yet another embodiment, the user is not prompted to select patients, but is only prompted to select exams from a list of all exams for all patients contained in the application server database 114.

When the user indicates that he/she has completed selecting, the user is prompted to select a production station from a list of production stations 300A, 300B and 300C in step 162. The user is also prompted to enter additional label text to be printed as labels on the CDs to be produced, to supplement the text printed according to the specification of the label-printing file. The user can advantageously select the production station located closest to his/her office. In one embodiment, only one production station is connected to the application server 110, and the lone production station will be the selected production station without prompting for user selection.

In one embodiment, the user is also prompted to select the number of copies of CDs to be produced. In another embodiment, the number of copies is set at one without prompting for user direction. As described above in connection with FIG. 3, in step 164, the application server 110 sends a copy of the

image data of the selected exams for the selected patients to the selected production station, along with a copy of the viewing program 112, and configuration data comprising a label-printing file, additional label text, and a number indicating the number of copies of CDs to be produced. The production station 300A, 300B or 300C then produces one or more CDs containing the selected exams for the selected patients and the viewing program, with labels printed on top of the CDs according to the specification in the label-printing file and the user-entered additional label text.

In another embodiment, a user accesses the application server database 114 not from a browsing terminal 400A, 400B or 400C, but directly from the display terminal 118. In this embodiment the user directly proceeds from step 152. In this embodiment the user is typically a programmer or operator of the image production system 100.

FIG. 5 illustrates a process of a user selecting and ordering the production of image data stored on the application server 110, with the additional option of selecting and ordering the production of related data for comparative study. As described above in connection with FIG. 4, a user connects to the application server 110 from a browsing terminal 400A, 400B or 400C in step 170. The user enters identification information and a password in step 172. Step 174 determines whether the user is authorized to access the application server database 114. If authorized, the user is prompted to select a patient in step 176, and selects exams of the selected patient in step 178. The user is then asked in step 180 if he/she desires to find related data of that patient for comparative study.

If the user answers yes, the application server 110 then searches for related data. The application server 110 finds the image input device profile table 120 profile record corresponding to the image input device from which the selected data originates, identifies the list of PACS systems stored in the "related data storage" field 254, and searches these PACS systems for related data. In another embodiment, once the user has selected a patient/exam combination, the application server 110 automatically searches for related data without asking for user direction. In this embodiment, the application server 110 alerts the user if related data are found. In one embodiment, the application server 110 also searches the application server database 114 for related medical image data.

Still referring to FIG. 5, the user is then prompted to select all or some of the related data from the list of found related data for production, in step 184. In another embodiment, all found related data are automatically selected by the application server 110 for production, without prompting for user selection.

The user is then prompted to select another patient in step 186. After the user has completed selecting all patients, the user is prompted to select a CD production station 300A, 300B or 300C in step 188. The user is also prompted to enter additional label text. In step 190, the application server 110 then sends a copy of the original and selected related data, along with a copy of the viewing program 112, a number indicating the number of copies to be produced, additional label text, and a label-printing file to the selected production station 300A, 300B or 300C for production.

The above paragraphs describe the application server 110 with one database 114 for image data storage. In another embodiment, the application server 110 includes two databases for image data storage: a new data database and a storage data database. The new data database stores only the most recent batch of new data just received from the image server 200. After the data in the new data database is sent to a production station 300A, 300B or 300C, the application



server **110** erases data in the new data database. The storage data database stores all data that has ever been received from the image server database **202**. In the processes described by FIG. 4 and FIG. 5, a user selects images for production from the storage data database.

Several modules are described in the specification and the claims. The modules may advantageously be configured to reside on an addressable storage medium and configured to execute on one or more processors. The modules may include, but are not limited to, software or hardware components that perform certain tasks. Thus, a module may include, for example, object-oriented software components, class components, processes methods, functions, attributes, procedures, subroutines, segments of program code, drivers, firmware, microcode, circuitry, data, databases, data structures, tables, arrays, and variables. Modules may be integrated into a smaller number of modules. One module may also be separated into multiple modules.

Although the foregoing has been a description and illustration of specific embodiments of the invention, various modifications and changes can be made thereto by persons skilled in the art, without departing from the scope and spirit of the invention as defined by the following claims.

What is claimed is:

1. A system comprising:
  - a medical image server configured to receive medical image data generated by one or more imaging modalities, the medical image data being formatted in a standard medical imaging format;
  - a database configured to store medical image data generated by the one or more imaging modalities;
  - a plurality of browsing terminals configured to receive a user selection that defines selected medical image data for a patient;
  - a search module configured to automatically search the database for related data based on the user selection; and
  - a production station that is configured to record all of the following onto a data storage medium:
    - the selected medical image data for the patient, recorded in the standard medical imaging format, the related data, and a viewing program that is configured to allow viewing of medical image data that is recorded onto the data storage medium by a general purpose computer that is not specifically configured with medical imaging software for viewing of medical images formatted in the standard medical imaging format.
2. The system of claim 1, further comprising a configuration data module configured to allow a user to input identifying information relating to the selected medical image data.
3. The system of claim 2, wherein the production station is configured to produce a label for the data storage medium, the label containing the identifying information.
4. The system of claim 1, further comprising an audit module that is configured to automatically provide an auditable trail of the selected medical image data.
5. The system of claim 4, wherein the auditable trail of the selected medical image data includes a record of when the

selected medical image data and the related medical image data were recorded onto the data storage medium.

6. The system of claim 4, wherein the auditable trail of the selected medical image data includes identifying information corresponding to the production station used to record the selected medical image data and the related data onto the data storage medium.

7. The system of claim 1, wherein the data storage medium is an optical disk.

8. A method of recording medical image data and related data onto a data storage medium, the method comprising:
 

- receiving medical image data from one or more imaging modalities, the received medical image data being formatted in a standard medical imaging format;
- storing the received medical image data in a database;
- receiving a user selection that defines selected medical image data for a patient;
- automatically searching the database for related data based on the user selection;
- recording the selected medical image data for the patient and the related data onto a data storage medium using a production station, the selected medical image data being recorded on the data storage medium in the standard medical imaging format;
- recording a viewing program onto the data storage medium using the production station, the viewing program being configured to allow viewing of medical image data stored on the data storage medium on a general purpose computer that is not specifically configured with medical imaging software for viewing of medical images formatted in the standard medical imaging format; and
- labeling the data storage medium with a label that includes identifying information associated with the selected medical image data.

9. The method of claim 8, wherein the user interface is further configured to collect the identifying information from the user.

10. The method of claim 8, further comprising generating an auditable trail of the selected medical image data, wherein the auditable trail includes a record of when the selected medical image data and the related medical image data were recorded onto the data storage medium.

11. The method of claim 8, wherein receiving a user selection comprises selecting one or more patients from a list of patients having medical image data stored in the database.

12. The method of claim 8, wherein the plurality of imaging modalities includes an image scanner configured to generate medical image data in a DICOM-compatible format from film.

13. The method of claim 8, wherein the data storage medium is an optical disk.

14. The method of claim 8, wherein recording the selected medical image data and the related data further comprises selecting a production station from a plurality of production stations that are connected to the database via a computer network.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 7,783,174 B2  
APPLICATION NO. : 12/484100  
DATED : August 24, 2010  
INVENTOR(S) : Wright et al.

Page 1 of 3

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 2, Page 3 (Item 56), Line 17, under Other Publications, change “BringarnRAD:” to --BringhamRAD:--.

In Column 2, Page 3 (Item 56), Line 37, under Other Publications, change “Johnson,” to --Johnston,--.

In Column 2, Page 4 (Item 56), Line 43, under Other Publications, change “at al.,” to --et al.,--.

In Column 1, Page 5 (Item 56), Line 42, under Other Publications, change “EurIPACS,” to --EuroPACS,--.

In Column 2, Page 5 (Item 56), Line 14, under Other Publications, change “DeJamette” to --DeJarnette--.

In Column 2, Page 5 (Item 56), Line 16, under Other Publications, change “Entwickiung” to --Entwicklung--.

In Column 1, Page 6 (Item 56), Line 58, under Other Publications, change “Acculmage” to --Accuimage--.

In Column 1, Page 7 (Item 56), Line 67, under Other Publications, change “HIPPA,” to --HIPAA”,--.

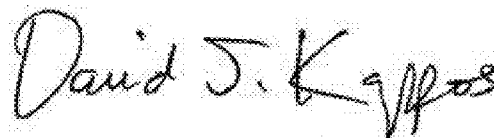
In Column 2, Page 7 (Item 56), Line 1, under Other Publications, change “et all,” to --et al.,--.

In Column 1, Page 10 (Item 56), Line 57, under Other Publications, change “Mitre” to --Mitra--.

In Column 1, Page 10 (Item 56), Line 63, under Other Publications, change “Mitre” to --Mitra--.

In Column 2, Page 10 (Item 56), Line 38, under Other Publications, change “radiographics.rsnajnl.org” to --radiographics.rsnajnl.org--.

Signed and Sealed this  
Twenty-ninth Day of March, 2011



David J. Kappos  
*Director of the United States Patent and Trademark Office*

**CERTIFICATE OF CORRECTION (continued)**

Page 2 of 3

**U.S. Pat. No. 7,783,174 B2**

In Column 1, Page 11 (Item 56), Line 36, under Other Publications, change ““MedlImage” to --“Medimage--.

In Column 1, Page 11 (Item 56), Line 44, under Other Publications, change “Desecription” to --Description--.

In Column 2, Page 11 (Item 56), Line 38, under Other Publications, change “MedlImage” to --Medimage--.

In Column 2, Page 11 (Item 56), Line 43, under Other Publications, change “MBA,,” to --MBA.,--.

In Column 1, Page 12 (Item 56), Line 15, under Other Publications, change “Servise” to --Service--.

In Column 1, Page 12 (Item 56), Line 22, under Other Publications, change “Mitre” to --Mitra--.

In Column 1, Page 12 (Item 56), Line 28, under Other Publications, change “Mitre” to --Mitra--.

In Column 1, Page 12 (Item 56), Line 37, under Other Publications, change “Mitre” to --Mitra--.

In Column 1, Page 12 (Item 56), Line 45, under Other Publications, change “Mitre” to --Mitra--.

In Column 2, Page 12 (Item 56), Line 55, under Other Publications, change “PerfectlImage” to --Perfectimage--.

In Column 1, Page 13 (Item 56), Line 44, under Other Publications, change “Mitre” to --Mitra--.

In Column 2, Page 13 (Item 56), Line 48, under Other Publications, change “BaSed” to --Based--.

In Column 2, Page 14 (Item 56), Line 46, under Other Publications, change “Medial” to --Medical--.

In Column 1, Page 15 (Item 56), Line 4, under Other Publications, change “Gmbh,,” to --GmbH,--.

In Column 1, Page 15 (Item 56), Line 21, under Other Publications, change “MedlImage” to --Medimage--.

In Column 1, Page 15 (Item 56), Line 32, under Other Publications, change “Advertist” to --Adventist--.

In Column 1, Page 15 (Item 56), Line 36, under Other Publications, change “MedlImage” to --Medimage--.

**CERTIFICATE OF CORRECTION (continued)**

Page 3 of 3

**U.S. Pat. No. 7,783,174 B2**

In Column 1, Page 15 (Item 56), Line 38, under Other Publications, change “MedImage” to --Medimage--.

In Column 1, Page 15 (Item 56), Line 40, under Other Publications, change “MedImage” to --Medimage--.

In Column 10, Line 1, in Claim 5, change “medial” to --medical--.

In Column 10, Line 6, in Claim 6, change “medial” to --medical--.

In Column 10, Line 41, in Claim 10, change “medial” to --medical--.