Case Number : 84

Main Facility : Central CI Clinic

Related Facilities : Hokkaido University Hospital; Teishinkai Hospital

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Number of Facilities : 2

Practicality : Practical

Date of Start : 1996/4

Date of End :

Status : in progress

Outline : CT and MRI images in the Central CI Clinic can be searched and obtained at the terminals of the Hokkaido University Affiliated Hospital and Teishinkai. CT and MRI images that meet the specifications of DICOM 3.0 are transmitted to a 27GB HD server through high-speed switching hubs. The image data sent to the server can be seen from the terminals of the Hokkaido University Affiliated Hospital and Teishinkai.

Technology - Materials : (1) The specifications of image data are DICOM 3.0. (2)CT: Proseed SA of GE Yokokawa, MRI: SignaHorizon 1.5 Tesla of GE Yokokawa, (3) Workstation: Advantage windows of GE Yokokawa, Database: Oracle, Image terminal: FAINWORKS, (4) Recording device: 27GB HD (Primary recording), 16GB tape back-up (permanent recording)

Technology - Communication Lines : Outside hospital: INS64 (64Kbps), Inside hospital: high-speed switching hubs

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Characteristics : The specifications of the system are DICOM 3.0. Because ISDN is used, images can be easily transferred even from remote places.

Evaluation : It takes 17-38 seconds for transmitting or receiving 1 image. It takes 10 minutes to 1 hour for transmitting or receiving the images for 1 patient. Although it is impossible to transmit a large quantity of images, the system has the sufficient function for reference. The system has been used for the reference of images, or the consultation about the cases for whom making a diagnosis is difficult.

Keywords : Image transfer, remote medicine, DICOM 3.0, ISDN

References :

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Date Updated : 1998/4/6

Case Number : 85

Main Facility : Nagoya University Hospital; Nagoya Institute of Technology

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Related Facilities : Nagoya Medical Association Health Center; Kamiiida First General Hospital

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Number of Facilities : 2

Practicality : Experimental

Date of Start : 1995/10

Date of End : 1997/3

Status : finished

Outline : A preliminary experimental project about a future hospital-clinic cooperation system is now underway among Nagoya Industrial College, Nagoya University Medical School, Nagoya Doctors' Association, Kami-Iida Daiichi General Hospital, and Oki Electronic Industry. In the project, the remote diagnosis supporting system that links the 4 institutions with a high-speed broad back-bone network has been run experimentally. Because this project has been performed as a part of the NTT Multi-Media Communication Joint Use Experiment, the communication circuits for the experiment are provided by NTT for free. The experiment was started in October 1995, and will be continued until March 1997. This system provides the environment in which physicians at remote places can make a diagnosis based on the same materials in real time over TV phone as well as the functions of the high-speed transmission and sharing of medical information and TV phone. This system is compatible with ATM and ISDN (INS64) circuits and LAN.

Technology - Materials : (1) Terminal: Macintosh 8100, TV conference equipment: MF2100L (Oki Electronics), (3) 24-inch gray scale monitor: Image Systems Model M24P, (4) Film digitizer: VIDER VXR-12

Technology - Communication Lines : NTT high-speed broad back-bone network (156Mbps and 6.3Mbps are used as a NTT Multi-Media Joint Use Experiment)

Characteristics : A demonstration experiment of high-speed medical image transmission using a high-speed broad back-bone network (ATM method). Collaboration with high definition medical images (remote collaboration). Collaboration over TV phone. Compatible with INS64 and LAN.

Evaluation : The system was experimentally run, and remote diagnoses were made. To make physicians familiar with computer-based diagnosis, an evaluation experiment that compared the diagnosis based on existing films and this system was performed. At the same time, the time required for capturing, transferring, and saving images, manpower, and user interface of the system was modified in response to the requests of physicians.

Keywords : Remote image diagnosis, NTT Multi-Media Communication Joint Use Experiment, ATM

References :

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Date Updated : 1999/2/25

Case Number : 86

Main Facility : Nagasaki-Chuo National Hospital

Related Facilities : "Tsushima-Izuhara Hospital, Kamitsushiama Hospital, Iki-Public Hospital, Kamigotou Hospital, Gotou--Chuo Hospital, Asrikawa Hospital, Narao Hospital, Tomie Hospital, Ojikamaachi-Kokuho Hospital, Uku-Kokuho Hospital, Tsushima National Hospital"

Number of Facilities : 12

Practicality : Practical

Date of Start : 1991/2

Date of End :

Status : in progress

Outline : Nagasaki prefecture has big islands of Tsushima, Goto, and Iki and about 600 remote islands around them in the sea area almost equal to the total area of the Kyushu Island. About 250,000 people (about 12.5% of the population of the prefecture) live in the remote islands. To improve medicine in the remote islands, the local government of the prefecture established 9 base hospitals at the important positions of the remote islands. Moreover, the local government asked the National Nagasaki Central Hospital to support them as a home hospital in the Kyushu Island. To make the relation closer, the local government planed to establish an image transmission network between the Kyushu Island and remote islands. After a 4-month demonstration experiment (New Media Community Plan of the Ministry of International Trade and Industry), image transmission through the network was put into practical use in 1991 with current equipment. Although the network was limited to 2 remote hospitals in the first year, the number of participating institutions has been increasing. Image transmission has been performed for a total of 542 cases.

Technology - Materials : The equipment used was WS-type Photophone (Image Data Corp. USA). Monochrome stationary images were transmitted. Each hospital was equipped with the main equipment, CCD camera for transmission, and NCU. The equipment was installed at the department of radiology and emergency center of the National Nagasaki Central Hospital. Each has an auxiliary device for observing 2 monitors. Its resolution is 292*220 (normal) or 592*440 (high), and its tone is 7 or 8 bit. Images are shown on a 14-inch display. Although images can be transferred on-line from image generating equipment, this system transmits film images taken with the above camera for transmitting them as required. The transmission speed is normally 9600 bps.

Technology - Communication Lines : Analog telephone circuits

Characteristics : Images are transmitted as required. About 75% of images were for emergency cases. In case it is necessary to transfer a patient, a helicopter of the Maritime Self-Defense Force with a physician of the National Nagasaki Central hospital turns out. About half of the cases whose images were transmitted were transferred with a helicopter. The home and remote hospitals always closely cooperate in routine medical care. Another characteristic of the system is a strong back-up of Nagasaki

prefecture.

Evaluation : The equipment is lent to each institution from Nagasaki prefecture (General affairs and planning section, department of welfare and health). The equipment is managed by the Association of Nagasaki Emergency Medicine (maintenance and supply of consumption goods). Physicians in both the Kyushu Island and remote islands considered that transmitting images was quite effective. A questionnaire survey for the home hospital showed that all the 20 physicians who experienced image transmission rated it useful. Although the image quality of the equipment was generally highly rated, it is impossible to closely read transmitted chest X-ray photographs. The transmission time of 15 seconds is practical. The equipment can be easily operated. However, it broke down a little too frequently.

Keywords : Telemedicine, tele-radiology, image transmission, medicine in remote islands, medicine at remote places, emergency medicine

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References : "Yuhei Amamoto et al. : Teleradiology for Medical Support to Isolated Islands. Japan-Kirea Joint Session on Telemedicine; KOSMI annual conference in Seoul, 1996 "

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Date Updated : 1996/12/1

Case Number : 87

Main Facility : "Department of Diagnostic Ultrasound and Medical Electronics, Sapporo Medical University School of Medicine"

Related Facilities : Hakodate Municipal Hospital;

Number of Facilities : 6

Practicality : Practical

Date of Start : 1993/3

Date of End :

Status : in progress

Outline : See the materials in the references below.

Technology - Materials : Photophone (DOS/V). Video-camera for capturing images (NTSC): color images acceptable; stationary images.

Technology - Communication Lines : INS64 (B-channel x 2): Point-to-point communication network using a terminal adapter

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Characteristics : This system has a communication speed of about 10 seconds per image, gray scale of 8 bit, and spacial resolution of about 1 black & white stripe pair per mm at a large angle. It also has a function to show thumbnail images on the display. Bi-directional functions include the dialog through an interphone, the manipulation of arrows, and the selection of transmitted images.

Evaluation : This system is quite useful, and will be further improved for making the best use of it. The system to be introduced next is now being examined. Although it is not necessary to unify models, OS, or specifications, a common standard is required for sharing communication procedures and data. A system that contains electric charts and can be controlled as a case data base is desirable.

Keywords : Medical Multi-Media Communication, remote case examination, remote lecture, life-long education, remote medical curriculum, support of remote medicine, remote diet guidance

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References :

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Date Updated : 1999/2/25

Case Number : 88

Main Facility : "Department of Ophthalmology, Tokyo Dental College"

Related Facilities : Shinjo Eye Clinic; Ikeda Eye Clinic

Number of Facilities : 2

Practicality : Practical

Date of Start : 1996/11

Date of End :

Status : in progress

Outline : This medical support system has been used to follow the post-operative course of the patients referred to our hospital to receive corneal transplantation and give the referring physicians advice about therapeutic methods. The system has also been used to provide the information about the cornea for general patients. Ikeda Eye Clinic took part in the system in October 1997.

Technology - Materials : Tele-meet remote medical support system: Matsushita Intertechno

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Technology - Communication Lines : ISDN 6B (384 kbps)

Characteristics : Because the department of ophthalmology of this hospital has performed a greater number of corneal transplantation than any other hospitals in Japan, patients requiring the surgery are referred from all over the country. However, patients who received corneal transplantation requires following their post-operative course, especially for rejection, and taking appropriate actions as required to achieve good visual function. Because a CCD camera can be directly connected to the slit-lamp microscope used in ophthalmologic care, it is possible to examine patients through a TV monitor in almost the same manner as direct examination. Because not all patients can visit our hospital postoperatively, this remote medical support system is considered useful for detecting postoperative complications in early stage.

Evaluation : Now, the system is accessed about once a month, and is useful for making a diagnosis.

Keywords : Ophthalmology, corneal transplantation, slit-lamp microscope, cataract

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References :

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Date Updated : 1999/3/5

Case Number : 89

Main Facility : Goshiki-cho Health Welfare Center

Related Facilities : Goshiki Clinic; Ayuhara Clinic; Sakai Clinic(municipal clinic); Yanagisawa Clinic; Tsumoto Clinic; Hara Clinic

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Number of Facilities : 6

Practicality : Practical

Date of Start : 1995/5

Date of End :

Status : in progress

Outline : This system is designed to support at-home care in terms of health, medicine, and welfare using the Awaji Goshiki Cable TV in order to reduce the physical and mental burden on patients and their families and improve the welfare of the local community.

Technology - Materials : (1) 7 main devices (medical terminal controlling equipment), (2) 5 stationary terminals (at-home care supporting equipment), (3) 12 mobile terminals (at-home care supporting equipment), and (4) 85 emergency report devices out on loan.

Technology - Communication Lines : CATV 350MHz bi-directional equipment. Optical fiber with a coaxial cable.

Characteristics : CATV circuits are used to connect the institutions of health, medicine, and welfare service with residents in the town.

Evaluation : A total of 33 subjects have used this system for about 1.5 month since it was put into practical use. They consisted of 21 home helpers, 6 public health nurses, and 6 nurses of the visiting care station. The home helpers used the system for a total of 23 times to obtain the advice about the health condition of patients. In all the cases, they used mobile terminals. The nurses of the visiting care station used the system to obtain the advice about the care of terminal patients. The system was found to be more easily operated than expected. Because the mobile terminal weighs about 10kg, further improvement is required to make it lighter and smaller. The patients and their families had an impression that they were relieved to see the physician in charge over the equipment.

Keywords :

References :

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Case Number : 90

Main Facility : NUMATA NEUROSURGERY & HEART DISEASE HOSPITAL

Related Facilities : JYOSAI CLINIC

Number of Facilities : 1

Practicality : Experimental

Date of Start : 1994/9

Date of End : 1995/12

Status : pause

Outline : A remote image diagnosis supporting system was constructed between the 2 hospitals, and an experiment was performed with the system. The Josai Clinic has radiologists who specialize in taking and reading MR and CT images. An image reading center using UNIX was established in this clinic. The system was designed to read images transmitted from medical institutions and help them make a diagnosis. To have compatibility with a future image filing system, the Josai Clinic transmitted MR and CT image files through an Ethernet network so that they could be collected and stored in the format of ACR-NEMA. In the department of circulation organs, Numata Neurosurgical Hospital, the system was connected to a film digitizer for medical information. The workstations of the 2 institutions were connected using an ISDN transmission channel. It was scheduled to employ a relatively easy image input method with a video capturer to gradually increase cooperative medical institutions. However, the Josai Clinic could not keep a place for the system and removed it because an additional MRI device was installed in December 1995. Since then, the experiment has been suspended.

Technology - Materials : (1) Dr. Able (Fujitsu), (2) Workstation: SUN S-4/10, model 40, (3) Film digitizer (Nishimoto Industry), (4) MRI: GYROSCAN NT5 (Philip Medical), (5) CT: Helical scan CT (Toshiba Medical)

Technology - Communication Lines : ISDN64. LAN with Ethernet

Characteristics : The 2 medical institutions using UNIX workstations were connected with an ISDN circuit. Files were collected from each modality and transmitted with Ethernet, TCP/IP, and ACR-NEMA. Infomix was employed as a data base, and SQL as a means to search for data in the data base. High definition medical images were quickly compressed and restored with a 12-bit JPEG compression board. A 21-inch high-resolution monochrome display was employed.

Evaluation : The system was worth attention in that image files could be directly transferred from each modality through LAN.
Disadvantages: (1) Because neither of the modalities had an interface for transmitting images, it took much time and expense to prepare the interface and a software product based on an unified protocol. (2) The manipulation to acquire image data from a MRI device was not practical.

Keywords : (3) The film digitizer was not practical because it was slow and its capacity was limited. (4) The experiment of a video capture board for collecting images with personal computers could

not be performed because its development was delayed. (5) The system was too expensive. (6) It took much time to improve or modify the system because it required the help of the manufacturers of the system. Advantages: (1) The system provides quite good image quality. (2) It is reliable.

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Date Updated : 1999/3/9

Case Number : 91

Main Facility : NUMATA NEUROSURGERY & HEART DISEASE HOSPITAL

Related Facilities :

Number of Facilities :

Practicality : Experimental

Date of Start : 1994/12

Date of End : 1995/1

Status : finished

Outline : An experiment was performed to examine patients at home from a remote place using a video conference system. This was one of the experiments performed with the support of the Ministry of Posts and Telecommunication. Video conference devices were installed at the hospital and the houses of patients, and they were linked through ISDN circuits. Physicians and patients talked over the TV conference system.

Technology - Materials : TV conference system (Fujitsu)

Technology - Communication Lines : ISDN

Characteristics : Use of a TV conference system. Transmission with ISDN circuits of 128 kbps.

Evaluation : Like existing TV phones, the system provided awkward pictures because it did not transmit pictures frame by frame, although it was acceptable for observing patients. It seemed that the color over the system was different from actual color. However, this system has advantages that physicians can observe patients at home, that remote patients who cannot visit hospitals are relieved by directly talking with physicians, and that patients can explain their conditions by gesture as well as by language. It would become more effective for remote diagnosis if it could indicate images and vital signs on the same screen in real time.

Keywords : TV conference, remote diagnosis, at home, ISDN

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Date Updated : 1999/3/9

Case Number : 92

Main Facility : "Hospital Department of Pathology, Kyoto Prefectural University of Medicine"

Related Facilities : Kyoto Prefectural Yozanoumi Hospital; Ayabe Municipal Hospital; Fukuchiyama Munichipal Hospital; National Maizuru Hospital; Yamashiro Hospital

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Number of Facilities : 5

Practicality : Practical

Date of Start : 1992/5

Date of End :

Status : in progress

Outline : Tele-pathologic system by the remote control of automatic microscopes mainly for supporting intra-operative quick diagnosis. It is characterized by the dynamic operation of stationary images. The equipment for the system was jointly developed with Olympus Optic Industries. After experimental trial run, this system has just put into practical use. This project has been performed as one of the activities of Kyoto Tele-Pathology Promotion Workshop.

Technology - Materials : NTSC color signal dependent, non-interlace image disply, utilization of auto-(robotistic) microscope. The system is named PLMICOS.

Technology - Communication Lines : ISDN (INS net 64)

Characteristics : (1) Active (master) system (the system that provides the physicians at remote places with the ability to select diagnostic images); (2) Practical and economical

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Evaluation : The system has been proved useful. The rate of correct diagnoses is more than 98%.

Keywords : ISDN, net64, tele-pathology, robotistic (auto) microscope

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References : "(1)Yasunori Tuchihashi et. al:Remote Control Method of Microscope in Still Image Telepathology System, Proceedings of the16th conference in medical informatics in Japan, 674-675, 1996 (2)Telepathology in Japan and our trials in Kyoto to support Regional Medicine: Cell Vision Vol. 3, No. 6 P457, 1996

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Date Updated : 1999/2/23

Case Number : 93

Main Facility : NUMATA NEUROSURGERY & HEART DISEASE HOSPITAL

Related Facilities : "Department of Radiology, Saitama Medical School"

Number of Facilities : 1

Practicality : Practical

Date of Start : 1993

Date of End : 1994/9

Status : finished

Outline : Thoracic and abdominal CT images taken by the department of circulation organs, Numata Neurosurgery were transmitted to the linked hospital for making diagnoses.

Technology - Materials : Photophone (Kyoritsu Medical Electronics)

Technology - Communication Lines : Analog public telephone circuits

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Characteristics : In the Numata Neurosurgery, medical image films are put on a dedicated sharkastein, and monochrome images taken with a video camera frame by frame were transmitted through analog public circuits. The department of radiology, Saitama Medical College read them, and returned the results by fax.

Evaluation : Advantages: It can be easily used. Any images that can be taken with a video camera can be transmitted. Disadvantages: The quality of transmitted images is poor because they have been taken with a video camera (not suitable for MRI and plain X-ray photographs). The transmission speed is low because analog public circuits are used.

Keywords : Image transmission, diagnostic support, video, analog public circuits

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Date Updated : 1999/3/9

Case Number : 94

Main Facility : Obihiro Daiichi Hospital

Related Facilities : "Shimizu Red Cross Hospital, Hiroro National Health Insurance Hospital"

Number of Facilities : 2

Practicality : Practical

Date of Start : 1993/5

Date of End :

Status : in progress

Outline : (1) When any abnormal findings are obtained in the CT images taken by the linked institutions, they are transmitted to the base hospital to obtain the instruction and advice of specialists. (2) When the linked hospitals encounter serious patients possibly requiring special treatments or emergency surgery, their images are transmitted while they are transferred to the base hospital so that they could receive examination, treatment, or surgery as soon as they arrive at it.

Technology - Materials : Photophone. 592*400 pixels, 128 tones

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Technology - Communication Lines : Public telephone circuits (9600bit/sec)

Characteristics : This system can be used through public telephone circuits.

Evaluation : Although the above purposes are fully attained, there remain the following disadvantages: (1) images cannot be transmitted unless the model of the equipment is the same; (2) the system will not be used for the remote medicine for patients at home because it can be used only for limited purposes and only between medical institutions (due to its high cost); and (3) medical institutions have to pay the cost for transmitting images because medical insurance does not cover it. Moreover, there are several technical problems: the transmission speed is low; no conversation can be made during transmission; and only X-ray images can be transmitted because the images of films are taken with a camera.

Keywords :

References :

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Date Updated : 1997/4/3

Case Number : 95

Main Facility : Department of Community and Family Medicine of Jichi Medical School

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Related Facilities : Kuni Onsen Clinic; Kuze-Mura Clinic; Tsikudc-Mura Clinic; Towa-mura Clinic

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Number of Facilities : 4

Practicality : Experimental

Date of Start : 1997/1

Date of End :

Status : in progress

Outline : Support of remote medicine with a personal computer operated TV conference system (participation in conferences, workshops, and meetings)

Technology - Materials : Phoenix (NTT)

Technology - Communication Lines : INS net 64

Characteristics : The support of bi-directional information transfer with a TV conference system characterized by low cost, various purposes, and easy operation.

Evaluation : This system has been mainly managed by the department of local medicine, the Self-Government Medical College. Joint experiments with NTT have been performed.

Keywords : Remote medicine, TV conference, medical information, communication

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References :

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Date Updated : 1999/3/12

Case Number : 96

Main Facility : Kameda Medical Center

Related Facilities : "Kameda Clinic, Kameda Visiting Nurse Center"

Number of Facilities : 2

Practicality : Experimental

Date of Start : 1995/6

Date of End :

Status : in progress

Outline : The department of dermatology, Kameda General Hospital has performed remote medicine for patients at home using Picsent made by NTT and a remote control CCD camera made by Aishin Cosmos. The department has also received consultation from nurses and public health nurses about the treatment of bedsore and other lesions over a TV phone using an analog circuit.

Technology – Materials : (1) ISDN: Picsent by NTT and CCD camera by Aishin Cosmos Laboratory; (2) Analog circuit: Teleminal by Hitachi and DC2L by Rikoh

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Technology – Communication Lines : ISDN and analog circuit

Characteristics : The use of a TV phone for improving the quality of visiting care. Remote dermatologic examination

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Evaluation : The remote examination of skin diseases with a TV phone through ISDN and a remote control CCD camera was quite smooth, and probably can be put into practical use.

Keywords : Support of visiting care, remote dermatologic examination

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References :

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Date Updated : 1999/3/15

Case Number : 97

Main Facility : Mie Unversity Hospital

Related Facilities : Matsusaka City Hospital

Number of Facilities : 3

Practicality : Practical

Date of Start : 1996/12

Date of End :

Status : in progress

Outline :

Technology - Materials :

Technology - Communication Lines :

Characteristics :

Evaluation :

Keywords :

References :

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Date Updated : 1999/2/19

Case Number : 98

Main Facility : "Department of Radiology, Kanagawa Cancer Center"

Related Facilities : Matsui Clinic; Hatori Clinic

Number of Facilities : 2

Practicality : Practical

Date of Start : 1996/5

Date of End :

Status : in progress

Outline : Image transmission through the Internet. Film images, such as chest simple X-ray photographs and fluoroscopic images of the digestive tract are taken with a scanner into a personal computer, and transmitted as an attached document of E-mail for consultation.

Technology - Materials : Personal computer, scanner

Technology - Communication Lines : ISDN

Characteristics : A simple tele-radiology system using existing devices. It functions well at low cost, and accepts individual users.

Evaluation :

Keywords :

References :

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Case Number : 99

Main Facility : "Department of Radiology, Kanagawa Cancer Center"

Related Facilities : "Seimoh Hospital, National Institute of Radiological Sciences"

Number of Facilities : 2

Practicality : Experimental

Date of Start : 1996/7

Date of End :

Status : in progress

Outline : A system that transmits the images by a CT scanner loaded on a car to specialists for diagnostic purposes with a notebook personal computer and mobile phone is being evaluated.

Technology - Materials : Mobile phone (PHS), notebook personal computer, scanner

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Technology - Communication Lines : Telephone circuits

Characteristics : This system allows field medical staff to consult specialists at home or on a trip at any time. It also allows specialists to consult other specialists. It is expected that the system will enhance the medical level in the forefront with limited manpower.

Evaluation : Although it is impossible to read plain X-ray photographs, CT and MRI images can be read without trouble. It is expected that the quality of liquid crystal will further improve.

Keywords :

References :

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