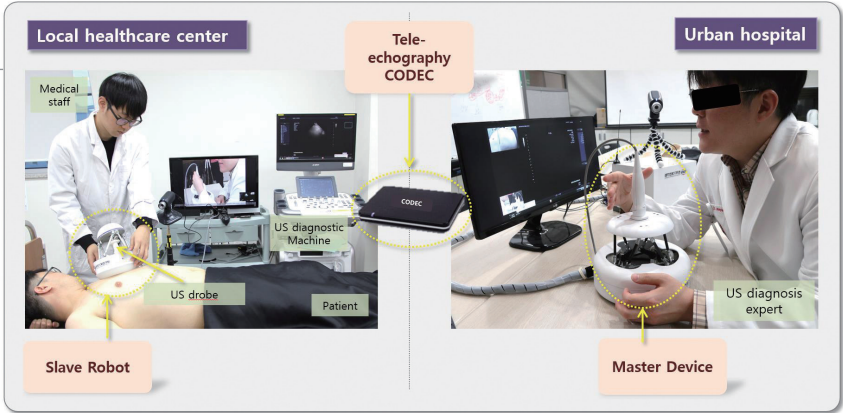


Technology of Robot-assisted Tele-echography System

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- ⇒ Robot-assisted tele-echography system based on slave-master robots integrated with ICT that allows elderly patients living in remote areas to receive advanced medical services such as ultrasound imaging without having to travel long distances to urban hospitals.
- ⇒ When the ultrasound diagnostic specialist in the urban hospital manipulates the probe model of the master device, the remotely controlled slave robot mimics the diagnostic motion to obtain ultrasonic images in real-time.
- ⇒ The system consists of 1) 'Slave robot' that will be applied on the patient, 2) 'Master device' that the specialist will manipulate, and 3) 'Tele-echography CODEC' that will connect slave and master systems though the broadband internet.

System Configuration of the Robot-assisted Tele-echography System



Client / Market

- Remotely controlled ultrasonic diagnosis by an ultrasound specialist for people living in remote areas, military camps, deep-sea fishing vessels with limited access to medical benefit, aged patients who can't travel far distance, emergency patients, and patients in affected areas

Necessity of this Technology

- Currently, a remotely controlled medical system is being provided for patients with limited medical benefits like those in remote areas, military camps, and deep-sea fishing vessels, but mostly it is offered through online counseling or medical examination by audio-visual interview. Diseases and body parts that could be handled remotely area are very limited.

DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

Other



TECHNOLOGY READINESS LEVEL [TRL]



- Ultrasonic image diagnosis is noninvasive, harmless to human, and simple. Because the cross-sectional anatomic image can be acquired in real-time, it can diagnose various diseases and body parts. However, depending on the diagnostic area, there is a specialist, and only experienced and trained ultrasound specialists can read the acquired ultrasound image.
- Recently, ultrasonic diagnostic equipment has become smaller for convenient mobility, but realistically, there is a limit regarding dispatching ultrasound specialists to medically isolated areas.

Technical Differentiation

- Previously, tele-echography systems have been introduced in France and Japan, however the new system is light-weighted (1.2 kg) compared to the existing diagnostic robots and is small enough to carry with one hand. It allows more versatile diagnostic motion (6 DOF + 1 rotation axis) and enables more convenient remotely controlled ultrasonic diagnosis

Excellence of Technology

- The robot can be easily connected to existing ultrasonic imaging device, is light (1.2 kg) and small to be conveniently carried to the medically isolated areas and able to copy the probe movement mimic the motion of ultrasound diagnosis in all directions (6 DOF + 1 rotation axis).
- Maximum pressing force of 5 Kgf; can handle over 1Hz-speed of motion for general ultrasonic diagnosis by specialists
- Upgraded form compared to a commercialized product (Company A of France) with a similar concept (hand-held) which is heavy (3.5 kg) and requires a cradle and has less DOF for movement (4 DOF)
- To minimize operating error that may occur while remotely controlling of the robot movement, a master device with the same structure as the slave was developed for intuitive control.
- Even in remote areas with poor internet connection, the wireless LTE network used for mobile phones can be used to connect to the master site to enable robot control.

Current Intellectual Property Right Status

PATENT

- Remotely Controlled Echography System (KR2017-0106527, US14/966,823), Remotely Controlled Apparatus for Echography

KNOW-HOW

- Robot design technology that can move the ultrasonic probe in 6 degree of freedom while light-weight(1.2 Kg), Hand-held type, pressing force of 5 Kgf.
- Master device design optimized for tele-echography by enabling intuitive remote motion control of slave robot.
- Hardware CODEC technology for transparent robot control and ultrasonic Image transmission in internet/mobile environment
- Technology for real-time remote robot control