

Archived Material

Historical Purposes Only

Archive - Potential NGI Applications

Real-time Telemedicine:
sponsored by The National Institutes of Health

Categories

Medicine, Collaboration

Vision

Provide a means of remote medical consultations through the use of real-time analysis of medical diagnostic procedures involving motion.

Why NGI?

For accurate medical diagnosis, real-time telemedicine would require 75 Mbits/sec transmission speeds for video sequences such as echo-cardiography. In addition, latency must be maintained at a constant rate to prevent errors in diagnosis.

Description

Medical diagnosis is often based on the real-time observation and analysis of objects in motion. These situations tend to be in the realm of different medical specialists which are not conveniently available in many communities. Telemedicine consultations would be very useful and practical in these circumstances. Such situations might include orthopaedic gait analysis, monitoring nystagmus (vibrations of the eye) during a neurological examination, viewing the echo-cardiogram during a cardiology examination or looking through the endoscope during an endoscopy procedure.

Rationale

The mission of the National Institutes of Health is to provide for advances in medical care. Many of these advances will be dependent on the presence of a high speed, low latency, secure digital information infrastructure as represented in the NGI program.

Medical advances discovered by the NIH have traditionally been transitioned to the private sector for further development.

Requirements

Bandwidth:

This category of medical diagnosis usually requires VHS quality video images, minimally 75 Mbits/second.

Latency:

Absolute latency is not a factor in these applications. In order to maintain a feeling of interactivity, the latency should be less than 250 msec. However, whatever the latency is, it must be kept constant through the consultation as real-time motion analysis is the goal of this telemedicine consult. Very often the motion being looked at is not very smooth and the irregularities in the motion are often a clue to the diagnosis. Introduction of a variable latency may lead to erroneous diagnosis. Fortunately most biological motions are of relatively low frequency and so a variation in latency of less than 5 msec would probably be acceptable.

Security:

These applications involve the transmission of real patient data which the patient may consider sensitive. It requires a high level of transmission security to be sure that it cannot be viewed or altered during transmission.

Reliability:

The network should be highly reliable but absolute reliability is not a requirement for most of these applications as lack of network reliability will not result in life threatening situations. If there is a network problem, although it is inconvenient for all concerned, the patient and care giver can reschedule their appointment together. However, some real-time applications require that the data being transmitted be collected by invasive means such as endoscopy or colonoscopy. These special applications require as close to 100% network reliability as possible.

Scalability:

This group of applications tend to be point to point applications and so will initially not require scalability. However, if viewed as a successful telemedicine applications, the bandwidth available on the network should be scalable so that the capacity can be increased in the future in response to potential increases in demand. Likewise, in the future additional interactive monitoring sites may be added so that such telemedicine consultations can also serve a useful teaching function which will require a degree of network scalability.

Partners and Potential Partners

Academic and private sector medicine.

URLs

<http://www.nlm.nih.gov/research/telfront.html>