Diagnosis over the Net -- The Mshare project

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Abstract

This paper describes a multimedia conference system for medical diagnosis. Medical diagnosis system acts an important role in integrated hospital information system. The system architecture design and implementation are discussed.

Keywords

Multimedia, database, conference system, client/server.

1 INTRODUCTION

The development of medical conference system is a hot area in multimedia applications. Some prototype systems have been developed on workstation with X-Window environment (Peter F. Lemkin, 1993). According to the actual situations of hospitals in P. R. China, a more flexible, easy to use, low cost medical conference system -- Mshare is designed and implemented.

The Mshare project aims to set up a tele-conference system with application in hospitals where doctors at different sites can discuss diagnostic information over the net. This Mshare system

integrates distributed multimedia patient data and give doctors transparent access to it through a single multimedia PC. In conjunction with this integration, this project provides real-time conferencing ability, such as white-board, real-time talking, etc., to diagnose patient information.

2 INFORMATION INTEGRATION

The data used by doctors in patient care is actually multimedia information. For example, diagnostic information can come from a variety of imaging techniques and formats as well as from reports, graphs, charts, reference books, hand-written notes, film and video sequences, audio recording, etc. How to manage and manipulate these kinds of information in digital formats is a big problem doctors are facing. If information are just simply stored in computers without specific management, only computer experts can manipulate them relatively easier. Apparently, an easy-to-use, doctor-friendly, efficient integration environment should be built up -- that is the first goal of Mshare project.

Mshare system use Oracle-7 database system to store all diagnostic information. The version 7 of Oracle database supports LONG RAW data type which can be used to store multimedia information, especially useful for storing audio, video information. Mshare system has a embedded database browser which supports multimedia information retrieval. The tree-style information-sorting system in this browser can be easily understood and manipulated by doctors.

3 COOPERATIVE DIAGNOSIS

The second aim of Mshare is to support cooperative medicine -- expert diagnostic system. To support this desktop conferencing feature, Mshare uses client-server architecture. The client sub-system (front-end) supports information requirement, processing and display, session control and man-machine interactive; the server sub-system (back-end) supports multi-session management, shared information distribution and management, and database retrieval.

Once a client sub-system starts up, it first connects to a server, then it can create a new session, or browse the existing sessions and join one of them, or perform information requirement no matter whether it is in a session or not. Information exchange can be done by using mail sub-

system, white-board sub-system, or directly real-time talking sub-system. Speaker-listener model has been selected to develop Mshare real-time talking sub-system. That is the speaker keeps the power in manipulating all shared information and real-time talking ability, while other listeners listen to and see his ideas, the role of speaker can be changed by the speaker himself.

4 IMPLEMENT OF MSHARE

Mshare project is support by National High Technique Research Project (863 Project) and will be used in the largest hospital in China which locates in Beijing. This Hospital has already developed a text-based electronic documentation system running under TCP/IP LAN environment and been using it for storing text-style diagnostic information. Mshare aims to enhance this existing system by adding multimedia feature -- MRI and X-ray image, film and video sequences, audio recording, etc.

Mshare system is implemented under Microsoft Windows for Workgroup(WfW) 3.11 except that the multimedia database is running in a remote machine with SCO UNIX operation system. WfW supports group working environment and basic device sharing ability and suitable for developing a easy-using low-cost conferencing system. The diagram of Mshare system is shown in Fig. 1.

Figure 1 MShare System Architecture.

The client sub-system is running on a standard Multimedia PC (MPC) with soundblaster card

to support audio input and output ability. As Audio Control Manager (ACM) and Video Control Manager (VCM) is standard of MS-Windows running in MPC, it is very easy to add custom control method (especially compression method) to release communication pressure in distributed conferencing system. Mshare uses broadcast method to support multi-listener ability and will use multicast method as in MBONE(M. R. Macedonia, 1994) and RTP protocol (H. Schulzrinne, 1996) to support remote multi-talking ability. The interface of client sub-system is shown in Figure 2.

The server sub-system is running on a more powerful PC with MS-Windows environment, and will be transported to MS-Windows NT Environment and UNIX environment to take advantage of their multi-thread features. The main function of server sub-system is session management. all session information are kept in server sub-system and this system also acts as an information exchanging center for information sharing.

Figure 2 Interface of client sub-system.

5 CONCLUSION

Mshare system as a easy-to-use, doctor-friendly, low cost multimedia information integration environment and cooperative diagnostic system has shown its potential in the computerization of hospitals. It is a easy way to build a cooperative medicine working environment with Mshare system and make all works going on more smoothly and efficiently.

6 REFERENCES

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