

Representation of real-time bio-signals with emergency observation report for inter-operable telemedicine system

Sung Hye Hong, Dong Keun Kim, Sun K. Yoo

INTRODUCTION

IN the emergency telemedicine systems, the exchange of the time-critical bio-signals in real time with corresponding observation report among heterogeneous systems is important because of the inclusion of many heterogeneous agencies [1-3]. Sometimes, many difficulties can be aroused for sharing of emergency information among them due to the lack of the combined implementation of both medical wave format standard and medical record standard. This paper described an adoption of MFER in real-time and XML-based standard document architecture for transferring bio-signals with emergency observation report among heterogeneous emergency telemedicine systems. Throughout the prototype implementation and experimentations, we demonstrate the feasibility that the designed system can interface the emergency observation report with continuous bio-signals to the hospital information system.

MATERIALS AND METHODS

We adopted MFER (Medical waveform format Encoding Rule) that is the part of the ISO/IEEE 11073 standard [4]. Also, for the standard implementation of the emergency observation report, we employed HL-7 based XML structure, which the later support the easy interface to the hospital information system.

For the data transmission test, the WiBro (Wide Broadband), a portable Internet network deployed in Korea urban area with the mean bandwidth of 1 Mbps, was adopted to transmit vital signs in real-time and emergency observation report. As shown in Fig.1, "Bio-Signal Monitor" application in the emergency telemedicine system acquired ECG, blood pressure, respiration and SpO2 waveforms in real-time from the patient monitoring device, and then transmitted at a transfer site as well as displayed the signals at a receiver site.

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Sung Hae Hong is with BK 21 projects for medical science, Yonsei University, Seoul, Korea

Dong Keun Kim is with Sangmyung university, Seoul, Korea

Sun K. Yoo is with the Yonsei university College of Medicine, Seoul, Korea, (corresponding author: phone: 82-2-2228-1919; fax: 82-2-363-9923; e-mail: sunkyoo@yuhs.ac

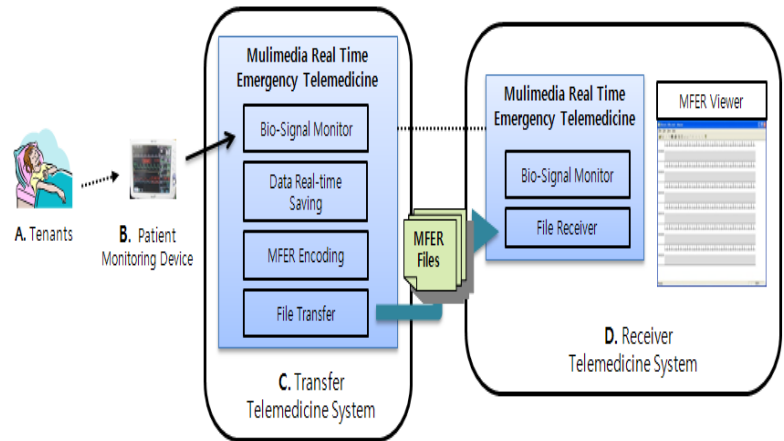


Fig.1 The configuration for MFER based bio-signal transmission

RESULTS

Fig.2 shows the test results received, and decoded at the receiving site by MFER decoding rule. 12 channels patient ECG were transmitted in real-time over Wibro network.

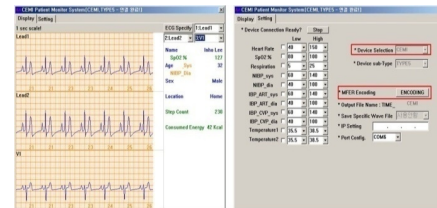


Fig.2 Conformance test: encoded ECG with MFER rule The emergency observation report was generated at the scene, and recorded by emergency medical personnel. It then be encoded as XML format and then transmitted for conformance test.

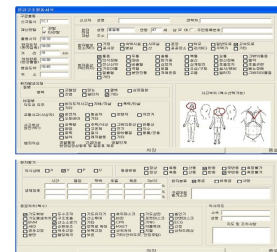


Fig.3 XML-encoded emergency observation report.

REFERENCES

- [1] MFER (Medical waveform Format Encoding Rule) Committee. Medical waveform description format encoding rule MFER Part 1 (Version1. 01-2003)