

A Great Impact of Green Video Signals on Tele-Healthcare in Daily Life, Especially for Rural or Disaster Areas

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Abstract— In this symposium, it will be indicated that green video signals taken by an ordinary video camera or a past video file have an extensive possibility to extract pulse wave information for tele-healthcare of people in daily life, especially for rural or disaster areas.

I. INTRODUCTION

ALTHOUGH two years have passed at present from the date 3.11 of the Great East Japan Earthquake, more than 300 thousand people are still forced to live as refugees in Japan. Almost all temporary houses after the earthquake and tsunami are fully equipped with basic facilities such as air conditioners and TV sets. However, they are not always conveniently located in terms of public transportation and medical facilities. Especially, it is difficult for elderly people to control their health-care in daily life.

It is true that telemedicine using information and communication technology (ICT) is very suitable for improvement of such poor medical environment not only in disaster areas in Japan but also in remote rural areas all over the world. However, usual telemedical systems need special and expensive devices or sensors, and thus, have not yet spread to ordinary homes.

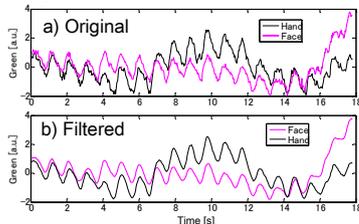


Fig.1 Extraction of pulse waves from a green video signal.

In this situation, the fact that pulse wave information can be extracted from a green signal of a video image of a body surface taken by an ordinary video camera [1], as shown in Fig.1, is an epoch-making discovery that will be extensively applied not only to remote medical check but also to other wide fields.

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II. METHODS

Almost all smart phones or tablet PCs have video cameras and can be connected with the Internet. Therefore, we can easily realize a remote health monitoring system based on pulse wave information using video cameras or smart phones without any other special devices, as shown in Fig.2. We can also estimate the cardiac health condition of any VIP of interest if we can get his uncompressed video file.

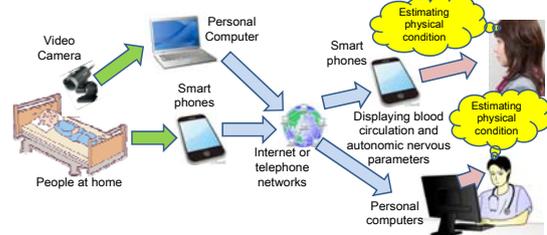


Fig. 2 Remote health monitoring system using video cameras or smart phones based on pulse wave information.

III. RESULTS AND DISCUSSION

Figure 3 shows areas used for extraction of the pulse wave signal shown in Fig.1. The area 3 was used to be subtracted from the area 1: face or the area 2: hand to cancel the noise caused by the automatic gain control. The instantaneous phase difference could be obtained on the basis of the alpha-trimmed mean filtering and Hilbert transform to estimate autonomic nervous function [2] and blood pressure information.

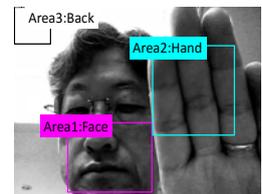


Fig.3 Analyzed areas on a video image.

IV. CONCLUSIONS

For home use, especially in rural or disaster areas, telemedical devices should be compact, less constraint and inexpensive. The proposed methods are possible to be used for estimation of the autonomic nervous function easily even at home.

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