HIGH EFFICIENCY VIDEO CODING FOR TELEMEDICINE SYSTEMS OVER WIRELESS COMMUNICATIONS

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INTRODUCTION.

Telemedicine System using the H.265 Codec and 4G Networks: This abstract presents the exploratory stages of a project to develop telemedicine services in the Republic of Kazakhstan (Fig. 1).

METHODOLOGY.

The project intends to take advantage recent technological developments. It proposes a new video encoding scheme as a replacement for other video codecs currently used in telemedicine systems. H.265 is suggested for telemedicine systems because it can support high-quality video streaming for telemedicine systems and at the same time, it requires less bandwidth than its predecessor H.264 (Fig. 2). This perfectly fits within 4G wireless network capabilities such as WiMAX and Long Term Evolution (LTE) networks [1]. The project targets patients whom cannot easily access the hospital to be monitored or be treated by a specialist even though this is needed for patient cases such as rehabilitation, and paraplegics. The proposed system can also be used for cases where patients are in ambulance on route to the hospital, as the system will convey patients' information and status to the hospital ward in order to prepare the necessary medical resources before the arrival of the patient, which increases the 'gold' rescue time. Using LTE and/or WiMAX to form the telemedicine framework means that the system could be used either from the home to monitor the patient or it could be used from mobile devices such as smart-phones, PDAs, or laptops. Future investigations are proposed for optimal streaming of H.265 (Fig. 3) over 4G wireless networks.

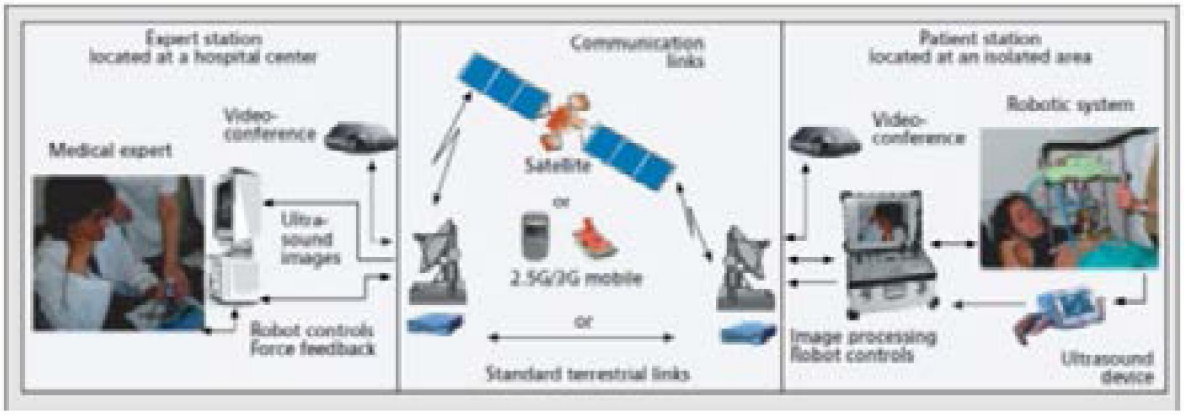

Figure 1. *Examples of telemedicine applications.*

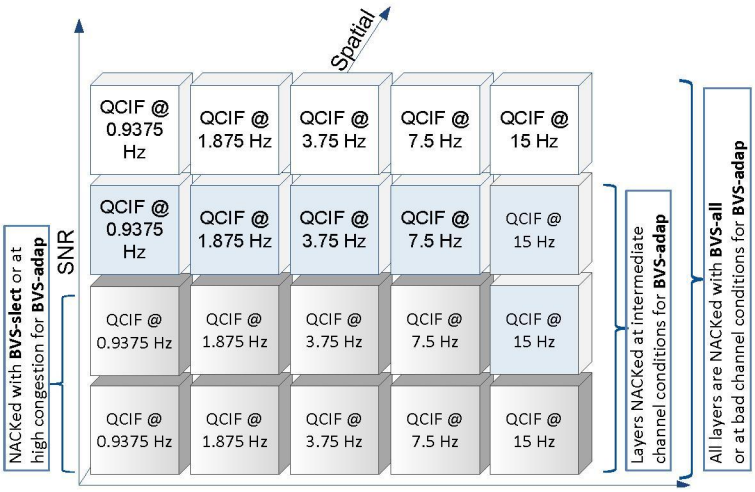

Figure 2. *H.265 SVC mapping to BVS-s. Packets belonging to darkly shaded layers are those that are negatively acknowledged.*

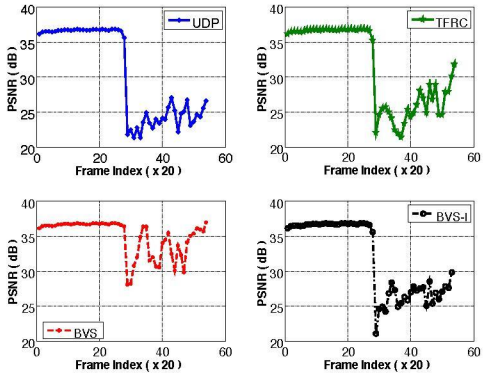

Fig.*3. Frame-by-frame video quality – during vertical handover from IEEE 802.11b to 802.16e*

CONCLUSIONS.

This project proposed using the H.265 codec for streaming patients' biomedical videos via 4G networks. A description of the advantages of H.265 video codec was given and its use in the telemedicine systems over other video encoding schemes was justified. In addition, the need for high-resolution video quality in telemedicine systems was explained and its relation to the clinical diagnosis by medical specialist was described. Finally, the telecommunication infrastructure used for the proposed telemedicine systems is suggested to be based on 4G network, as this is capable of providing the most bandwidth.

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