Next Generation Video Coding

Body:

Motivation

The techniques to compress the videos have been an interesting topic since the emergence of digital video in the 1980s. The coding standard HEVC has avoided the transfer of the repeated information by some prediction methods, spared the color information by utilizing the inferior sensitivity of human eyes for color. Considering the requirements of the upcoming 5th generation wireless systems, the project is aiming at improving on the current standard and achieve both better compression ratio and subjective visual quality.

Challenges & Highlights

It is observed that texture information requires the majority of the bit rate. Vector quantization (VQ) has been proven to exploit non-linear statistical dependencies in the video signal. Therefore applying VQ in video coding can lead to an enhancement in compression efficiency.

To further improve the compression rates we model parts of the human visual system (HVS) which automatically separates relevant and irrelevant information. We develop an algorithm where a large region of similar texture (e.g. a homogenously textured wall) is represented by a small patch extracted from that region.

Potential Applications & Future Issues

The main application of our method is the prediction error coding in future video coding standards. Thereby, the bit rate which is needed for the coding of texture information can be considerably reduced. In consequence, higher video quality and lower bit rates are enabled. Furthermore, 5G networks will benefit from reduced video bit rates. To promote our technologies into the next generation video coding standard, we will contribute to the ISO/MPEG standardization process.

Project abstract:

Video is playing an important role in our life nowadays. Applications can be seen everywhere, ranging from live-streaming on mobile devices, the offline Blu-ray for the entertainment at home to the latest 3D films in the cinema. Due to the constraint data transfer or storing capacity of the media and limited capacity of 4G and 5G mobile networks, we study video coding.

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Video Coding

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http://www.tnt.uni-hannover.de/project/video_coding/
Research Area:
Next Generation Internet
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