Light field compression and quality assessment

Multimedia Signal Processing

Background and challenges

- Light field imaging enables post-processing tasks like refocusing and new views synthesizing.
- Rich information results in huge amount of data.
- Fast and efficient coding is needed.
- Pseudo-sequence based methods are efficient light field compression solutions.
- Coding methods have limited access to arbitrary image views.
- High coding time due to complexity of state of the art encoders.

Description and main innovation

Coding efficiency
- Image views are divided into four regions.
- Spatially closer images are selected as references.
- This scheme enables parallel processing.

Random access
- Fast access to an arbitrary image is provided.
- This scheme enables parallel processing.

Complexity
- Depth is predicted to reduce the complexity
- Co-located CTUs are used to predict
- A minimum and maximum depth is determined for each CTU
- For each CTU depth is limited between minimum and maximum
- Using the parallel processing results in more than 85% time saving

Quality assessment
- Compression methods have been compared
- Different metrics have been computed and evaluated using MOS as ground truth

Achievements
- High Efficient Snake Order Pseudo-Sequence Based Light Field Image Compression, data compression conference
- Analysis of motion vectors and parallel computing in pseudo-sequence based light field image compression methods, Applications of Digital Image Processing XLI
- LFQA: Light field compression quality assessment (under submission)
- Random access light field compression (under submission)
- Fast CTU depth decision in light field compression (under submission)
- High efficiency and low-complexity light field compression (under submission)
- Motion estimation with a chessboard strategy (under review)
- WG1N80027-JPEG Pleno Light Field coding common test conditions, ISO/IEC JTC 001/SC 29/WG1, JPEG