

Robust Interpolation for Video Error Concealment using Multiple Description Coding

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Other research activities:

- JPEG Image steganography

currently submitted at WiMob'08

- Statistical modeling of Bit-switching H.264 Video Sequence

S. Colonnese, S. Rinauro, L. Rossi, G. Scarano, “Markov Model of H.264 Video Traffic”, ISIVC 2008

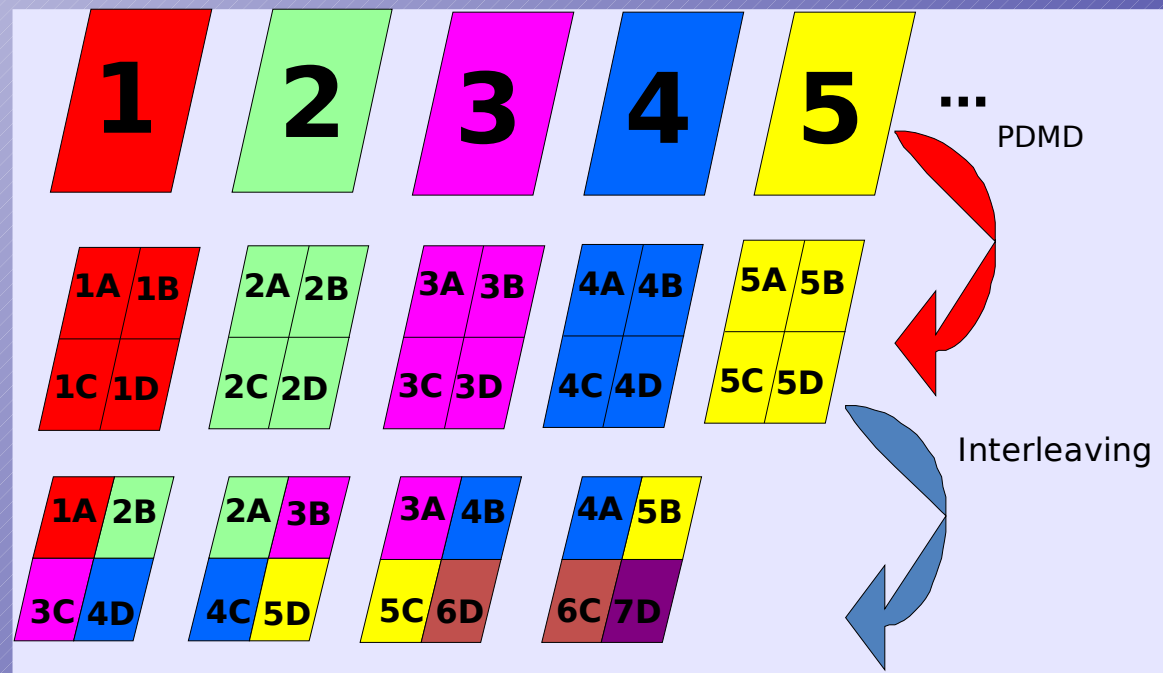
Multiple Description Coding

- Robust Coding of Video Sequence

I.F. Akyildiz, "Cross-Layer design in Wireless Mesh Networks", March 2008.

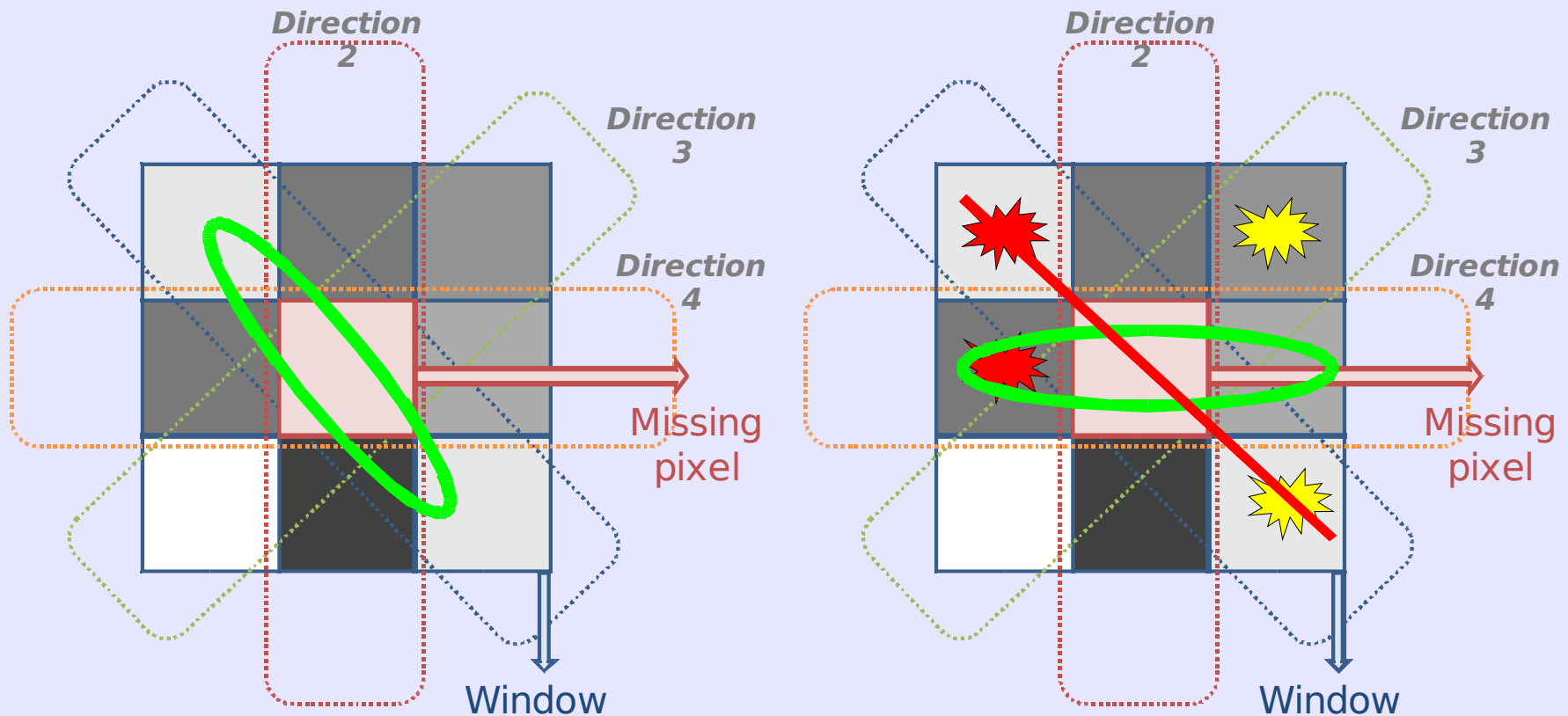
N. Franchi, M. Fumagalli, R. Lancini, S. Tubaro, "Multiple Description Video Coding for Scalable and Robust Transmission Over IP", March 2005.

- Adopted MDC consists in two steps:
 - polyphase downsampling of the video sequence (PDMD)
 - Content domain interleaving
- Packet errors are transformed in isolated errors on luminance samples.

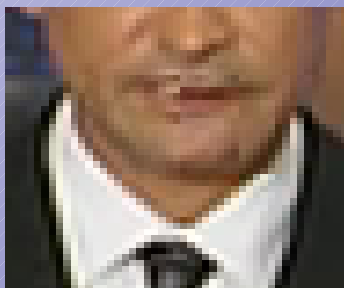
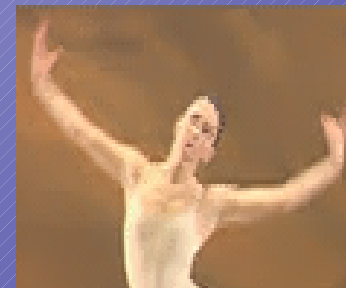
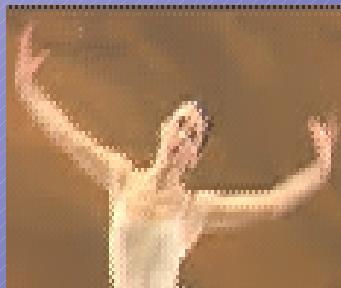
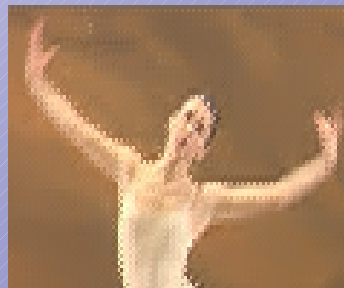
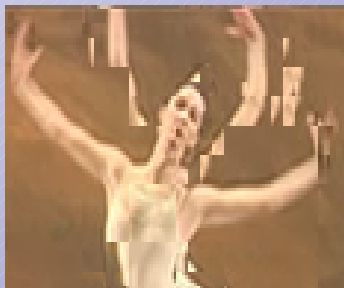


Interpolation: R-ELA

- Adopted MDC coding transforms burst errors in isolated errors
- Interpolation to estimate missing pixels



Numerical Simulations



Single description

Robust MDC

R-MDC + ELA

R-MDC + R-ELA

Forward Work

- Error concealment as interpolation in non-uniform sampling in presence of noise

Marziliano, Vetterli, “Reconstruction of Irregularly sampled discrete time bandlimited signals with unknown sampling locations”, Dec. 2000

Nordio, Chiasserini, Viterbo, “Reconstruction of Multidimensional Signals from Irregular Noisy Samples”, 2008

- Natural image models (Markov fields)
- Image processing on Intermediate Frequency (IF): hypercomplex representation of the image