1. Introduction

- Acquisition of nonregular quarter sampled images [1]
  - Low resolution sensor to record high resolution video data
  - Recording of images with four times higher resolution using same amount of pixels
  - Save data-rate and storage space
- Reconstruction before usage
  - Three-dimensional frequency selective extrapolation (3D-FSE) [2]
  - Support area extends along spatial and temporal neighborhood
  - Compensation by adapted spatial weighting function
- Motion blur due to spatial mismatch along temporal axis

2. 3D Frequency Selective Extrapolation

- Iterative generation of model \( \hat{g}(m, n, p) \) of weighted superimposed Fourier basis functions \( \psi_{k,l,m} \) [2]
- Blockwise processing
- Spatial weighting function to steer influence of data points
- All calculations performed in Fourier domain

3. Proposed Motion Compensated Weighting

- Shifting the center of mass of the weighting function according to the motion in the sequence
- Motion estimation using optical flow [3]
  - Averaging motion vector field to one motion vector per block
  - High reconstruction quality in test sequences

4. Simulations & Results

- Test parameters:
  - 50 frames of each sequence of classes C and D of HEVC testset [4]
  - Block-size of 4×4×1
  - \( \rho = 0.7 \), and \( \delta \) are set to 0.5
  - Borderwidth of 14 in all directions

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<td>26.92 dB</td>
<td>28.73 dB</td>
<td>29.36 dB</td>
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5. Conclusion

- Recording of quarter sampled sequences
- Reconstruction of the not directly acquired image areas
- Estimating the average motion per block
- Shifting the spatial weighting function corresponding to the motion
- Compensation of ghosting and blurring caused by motion during the reconstruction
- Highest gains for sequences with much motion
- Gains up to 1.75 dB compared to 3D-FSE

References:
[4] F. Bossen et al., "Common test conditions and software reference con-

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