

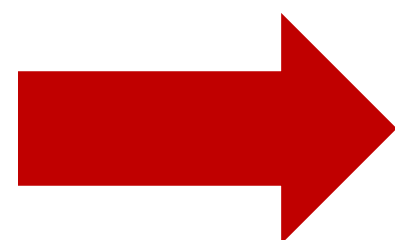
Video Denoising

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Motivation

- Many denoising methods for images
- How about videos?
- Take advantage of similarities between frames

Noisy

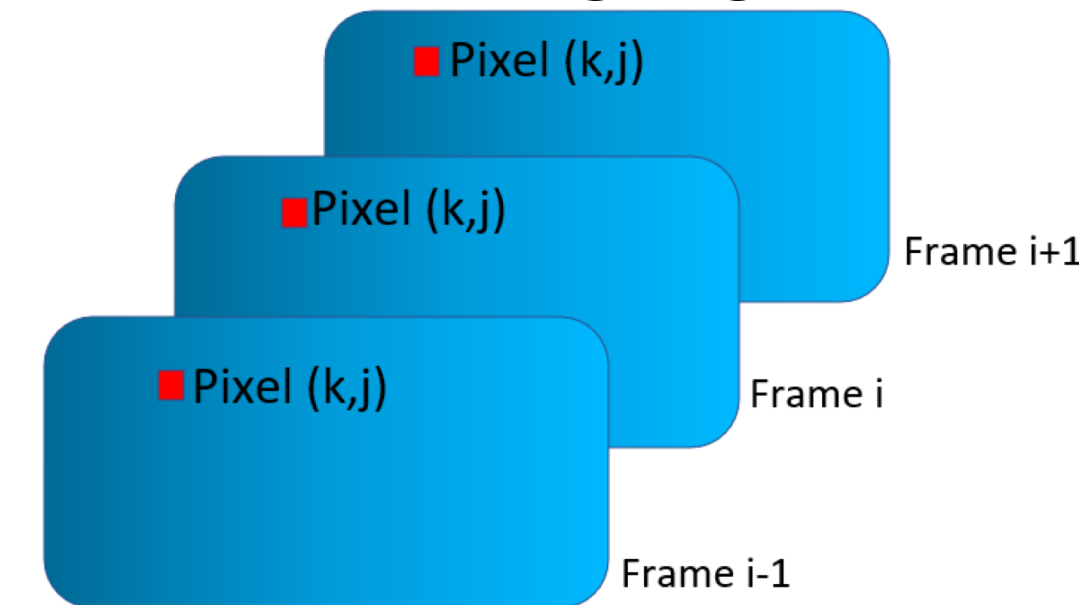


Original

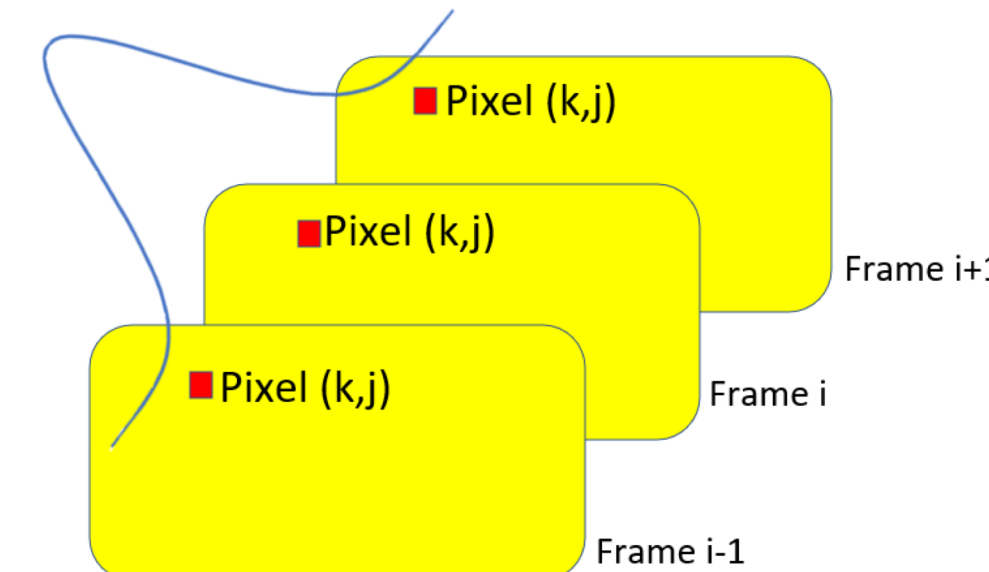


New Techniques

Averaging



Averaging with weights

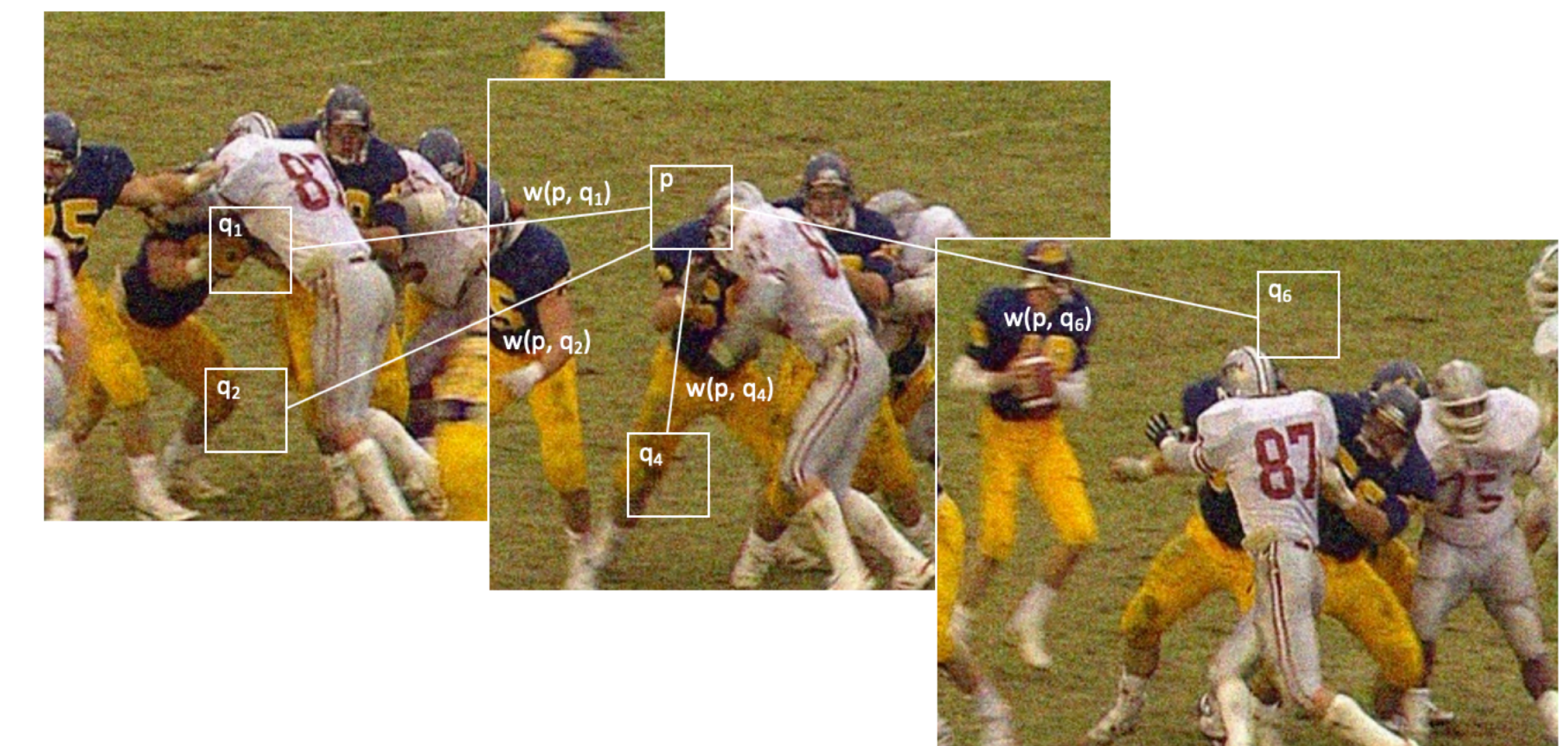


Non-local means
in spatial domain



Image from [1]

Non-local means in spatial
and temporal domain



Related Work

Video BM3D

- Extension of BM3D for images
- Groups similar 2D fragments
- Jointly filters each group
- Returns each fragment to its original position

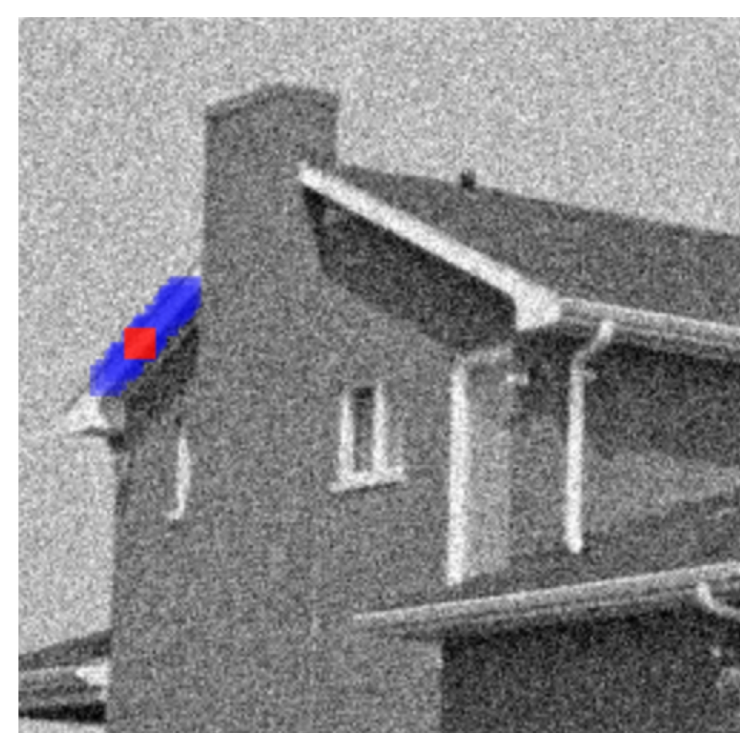


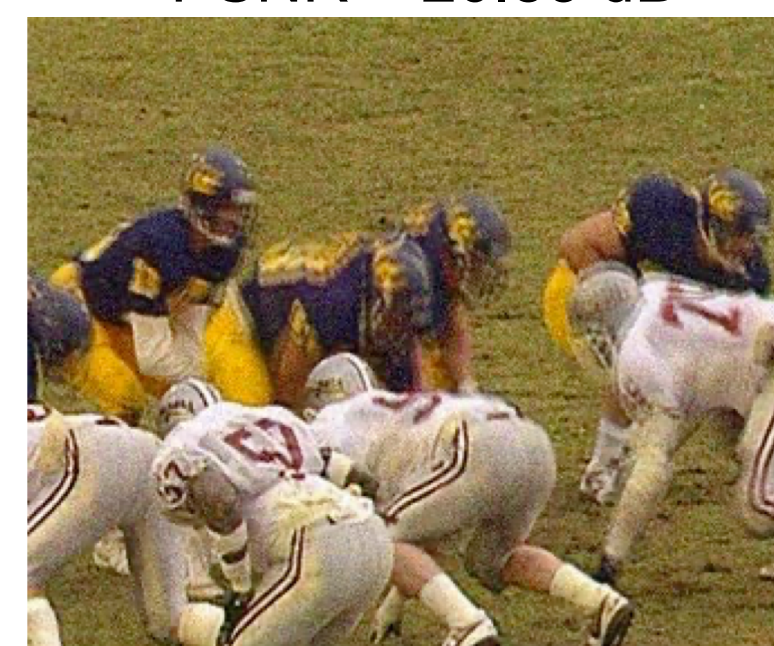
Image from [3]

References

- [1] A. Buades, B. Coll and J. M. Morel, "On image denoising methods," CMLA Preprint, 2004
- [2] K. Dabov, A. Foi and K. Egiazarian, "Video denoising by sparse 3d transform-domain collaborative filtering," European Signal Processing Conference, 2007
- [3] Department of Signal Processing, Tampere University of Technology, <https://webpages.tuni.fi/foi/GCF-BM3D/>

Experimental Results

Averaging
PSNR = 20.83 dB



Averaging with weights
PSNR = 21.61 dB



Non-local means
in spatial domain
PSNR = 28.14 dB



Non-local means
in spatial and
temporal domain
PSNR = 27.35 dB



Video BM3D
PSNR = 30.99 dB

