

# Decoder-Side Motion Estimation with Modified Reference List

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## Introduction

## Bidirectional True Motion Estimation

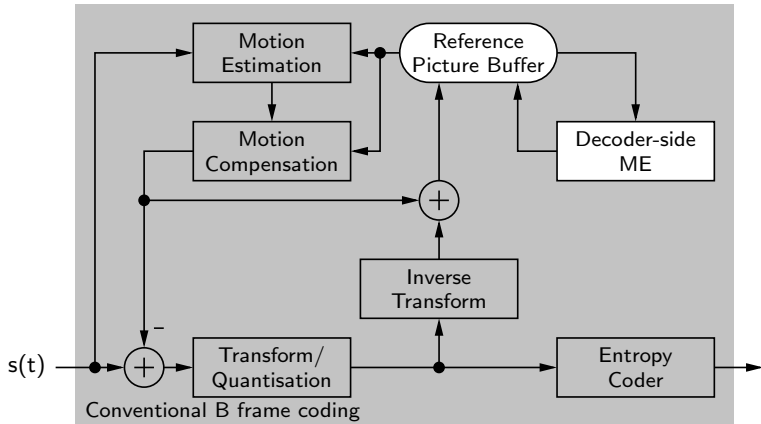
## Performance Evaluation

## Conclusions

## Motivation

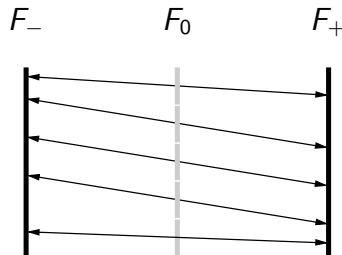
- ▶ Reduce data rate of side information
    - ▶ Exploit statistics at the decoder
  - ▶ Reduce data rate of residual
    - ▶ Better prediction at object borders
- ⇒ Estimate motion at the decoder

# DSME Architecture



# Constraints

- ▶ Linear motion
  - ▶ Large GOP structure impairs this assumption
- ▶ Occlusion
  - ▶ Detection is very complex and time consuming



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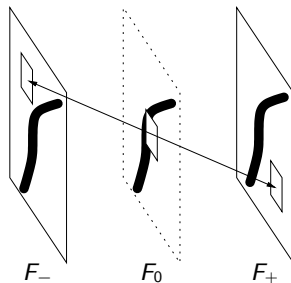
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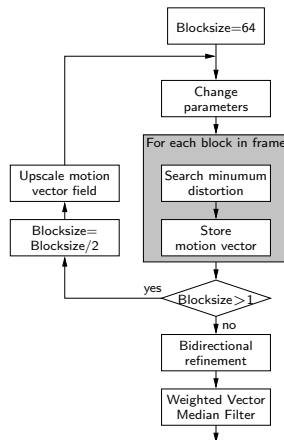
## Problems

- ▶ Performance is directly affected by the interpolation quality
- ▶ Assumption of linear motion not always true
- ▶ Wrong motion leads to significant quality loss of the interpolated frame



## Hierarchical Motion Estimation

- ▶ Iterative motion estimation with decreasing block size
- ▶ Search range, accuracy and OBME parameter are set depending on the block size





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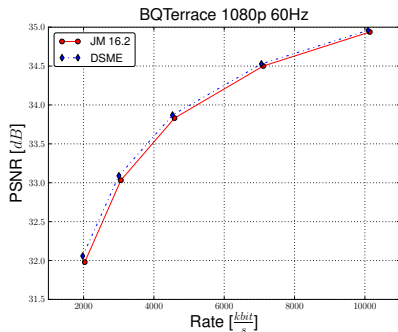
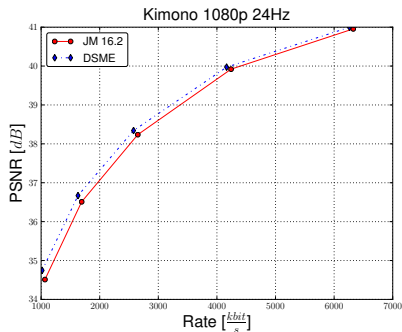
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## Implementation / Configuration

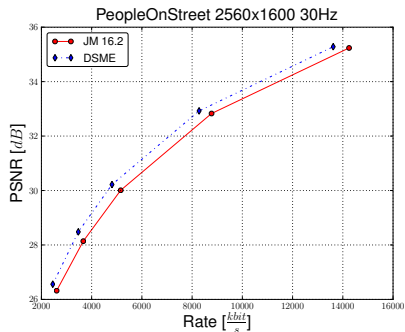
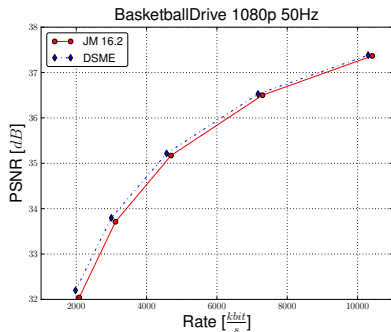
- ▶ Based on JM 16.2
- ▶ Identical configuration as alpha anchors from CfP<sup>1</sup>
  - ▶ Hierarchical B frames
  - ▶ GOP size 8
  - ▶ Same QPs as alpha anchors

<sup>1</sup>ISO/IEC JTC1/SC29/WG11 MPEG, "Joint call for proposals on video compression technology," in ISO/IEC JTC1/SC29/WG11 MPEG Output Document N11113, Kyoto, January 2010.

## RD Performance



## RD Performance



# BD Gain

## Class A

Sequence	BD-PSNR	BD-Rate
PeopleOnStreet	0.59 dB	-10.03%
Traffic	0.34 dB	-8.56%
Mean	0.47 dB	-9.30%

# BD Gain

## Class B

Sequence	BD-PSNR	BD-Rate
BasketballDrive	0.19 dB	-5.25%
BQTerrace	0.08 dB	-4.13%
Cactus	0.21 dB	-6.41%
Kimono	0.26 dB	-6.57%
ParkScene	0.29 dB	-7.48%
Mean	0.21 dB	-5.96%

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## Summary

- ▶ Current frame is interpolated at the decoder
- ▶ Interpolated frame used as reference for prediction

## Performance

- ▶ Rate reduction of 5.96% and 9.30% in average for Class A and B sequences
- ▶ Gain also for complex scenes



