



哈爾濱工業大學
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Non-CE9 : Motion information derivation of deformable block

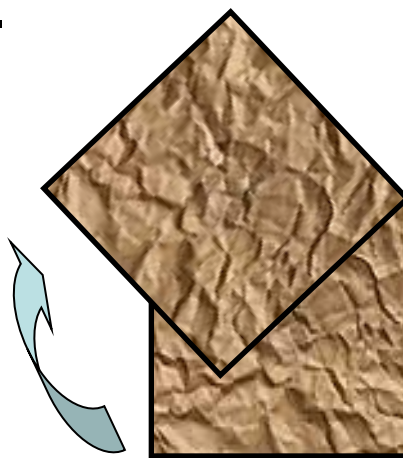
JCTVC-H0655

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Motion Estimation Model in HM4.0

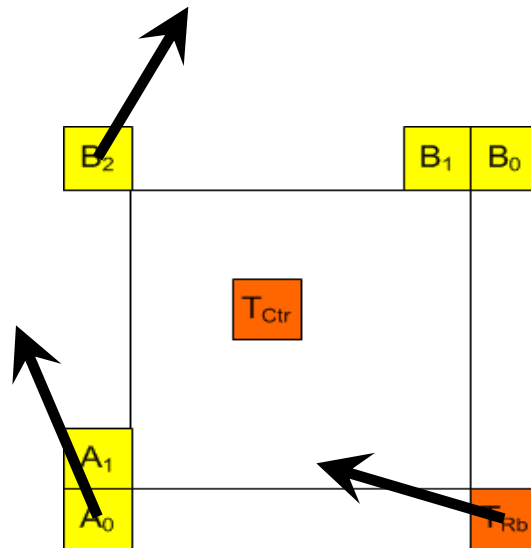
Motivation

- ◆ Block matching motion estimation (BMME)
- ◆ Not efficient for non-translation motion, i.e., rotation, zoom, and etc.



Proposed Method

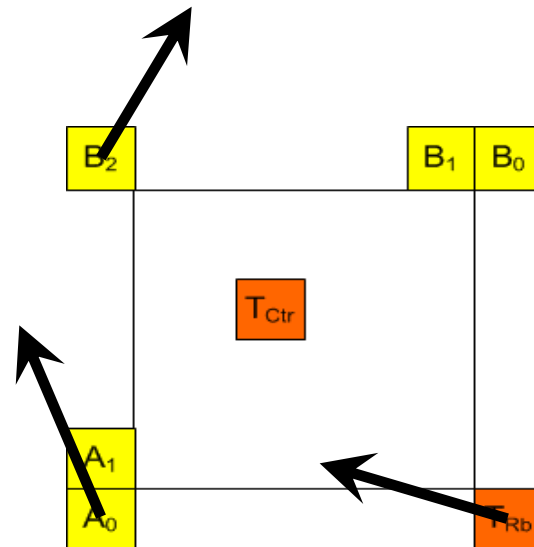
◆ Candidate positions of merge mode in HM4.0



◆ Motion vector interpolation from corners

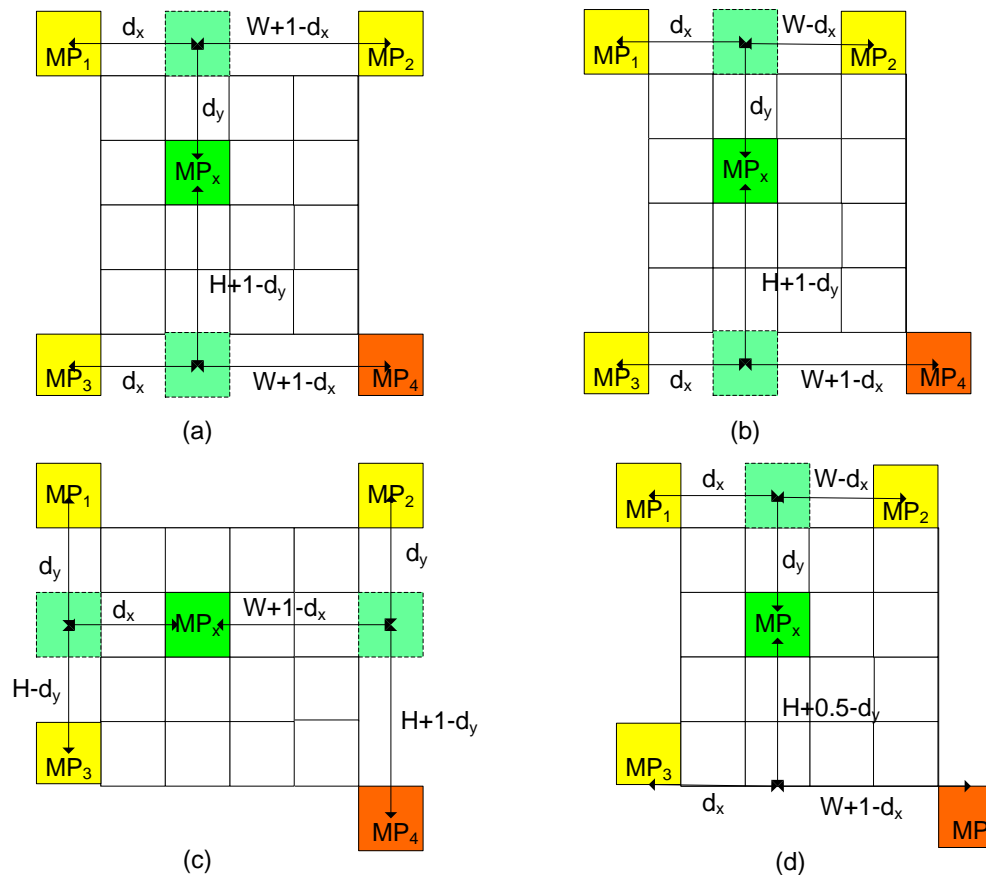
Proposed Method

- ◆ Motion information of each corner can be derived and not identical
 - For above right corner, first check B_1 , then check B_0
 - For below left corner, first check A_1 , then check A_0



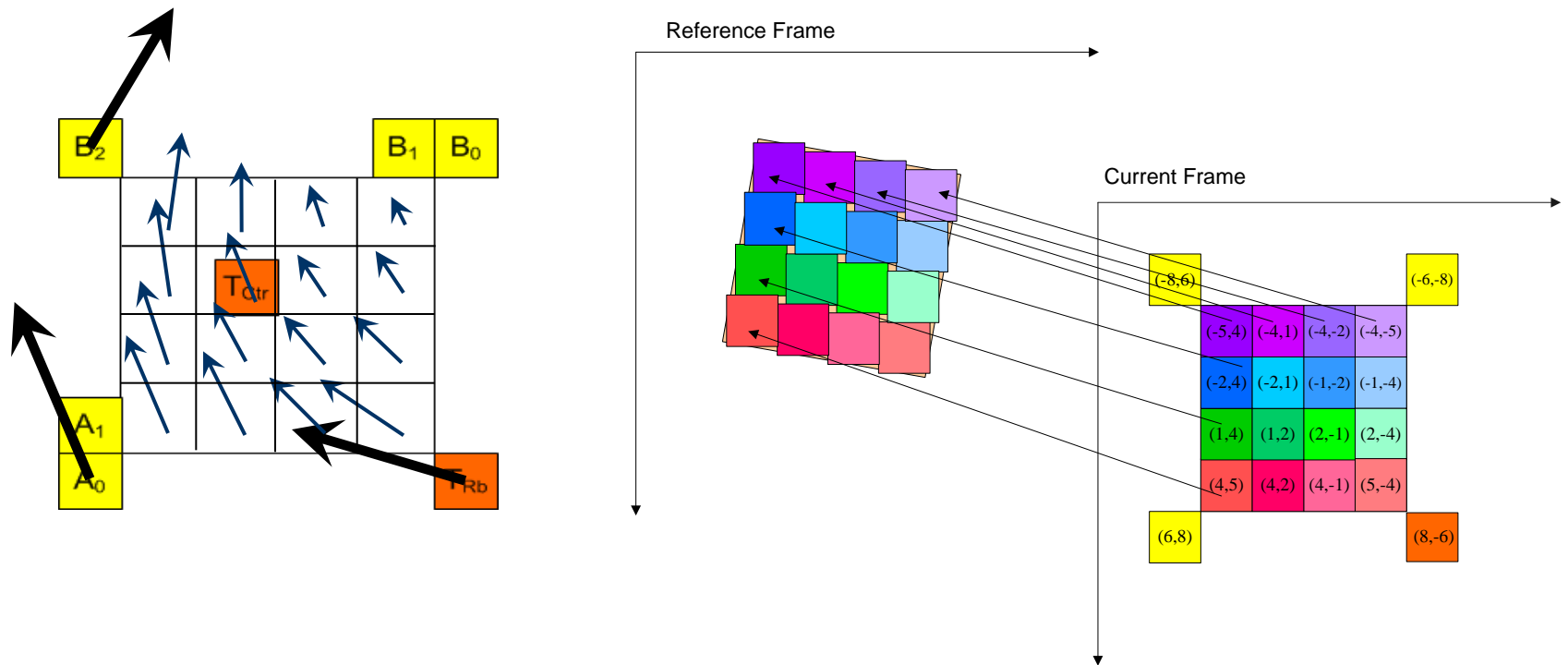
Proposed Method

◆ Motion interpolation for each 4x4 block in a PU



Proposed Method

◆ Motion interpolation for each 4x4 block in a PU



Proposed Method

- ◆ RDO-based decision on whether to use the proposed method, one additional flag
 - If used, the additional flag signaled, and no merge index transmitted (proposed)
 - Otherwise, the additional flag signaled, and merge index transmitted (original merge mode)

- ◆ Only applied to CU using merge mode with size larger than 16×16 and the $SIZE_2N \times 2N$.

Experimental Results

| Sequence | Resolution | Number of frames |
|-----------------|------------|------------------|
| Cactus | 1920x1080 | 300 |
| BlueSky | 1920x1080 | 200 |
| Station | 1920x1080 | 100 |
| Tractor | 1920x1080 | 240 |
| Vidyo3 | 1280x720 | 200 |
| Shields | 1280x720 | 100 |
| Flowervase | 416x240 | 300 |
| BasketballDrive | 1920x1080 | 300 |
| BQMall | 832x480 | 300 |
| BasketballPass | 416x240 | 300 |

Experimental Results

| Sequence | Random Access HE | | | Low delay B HE | | | Low delay P HE | | |
|---------------------------|------------------|--------------|--------------|----------------|--------------|--------------|----------------|--------------|--------------|
| | Y | U | V | Y | U | V | Y | U | V |
| Cactus_1920x1080 | -1.0% | -0.8% | -0.9% | -0.9% | -0.7% | -0.3% | -0.6% | -0.8% | -0.9% |
| BlueSky_1920x1080 | -1.1% | -0.8% | -0.9% | -1.8% | -1.3% | -1.2% | -1.2% | -1.2% | -1.0% |
| Station_1920x1080 | -5.3% | -4.2% | -4.4% | -12.2% | -8.3% | -8.6% | -12.1% | -9.5% | -9.8% |
| Tractor_1920x1080 | -2.2% | -1.2% | -1.2% | -4.7% | -3.3% | -3.3% | -4.5% | -4.0% | -3.7% |
| Vidyo3_1280x720 | | | | -1.1% | -0.2% | -0.7% | -0.6% | -1.3% | -0.4% |
| Shields_1280x720 | -2.1% | -1.7% | -1.8% | -4.7% | -3.2% | -2.7% | -3.6% | -3.0% | -2.5% |
| Flowervase_416x240 | -0.7% | -0.4% | -0.3% | -1.2% | -1.3% | -1.3% | -0.6% | 1.2% | -0.1% |
| BasketballDrive_1920x1080 | 0.0% | -0.2% | 0.0% | -0.1% | -0.3% | -0.1% | -0.2% | -0.1% | -0.1% |
| BQMall_832x480 | 0.1% | -0.2% | -0.4% | 0.0% | -0.3% | 0.5% | -0.1% | -0.6% | -0.2% |
| BasketballPass_416x240 | 0.0% | 0.1% | -0.3% | -0.1% | -0.5% | 0.0% | 0.0% | -0.7% | 0.2% |
| Enc Time[%] | 100% | | | 100% | | | 101% | | |
| Dec Time[%] | 103% | | | 102% | | | 102% | | |

Conclusion

- ◆ Significant coding gain compared to HM4.0 anchor for sequences with complex motion
- ◆ No performance loss for the rest of test sequences
- ◆ The encoding almost identical, decoding time slightly increased

Thank you!