



REDEFINING MOBILITY



Geometry motion partition

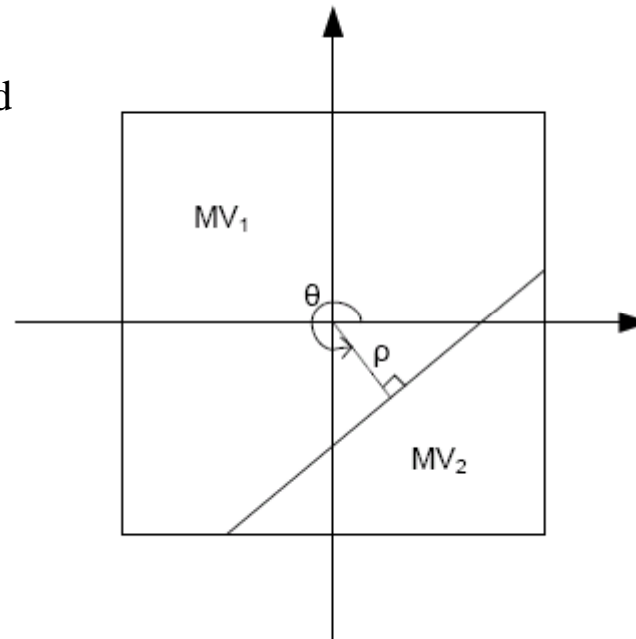
Peisong Chen, Wei-Jung Chien, Rahul Panchal, Marta Karczewicz

Geometry Partitioning

- Geometry used for:
 - 16x16, 32x32 and 64x64 blocks
- Split of the block

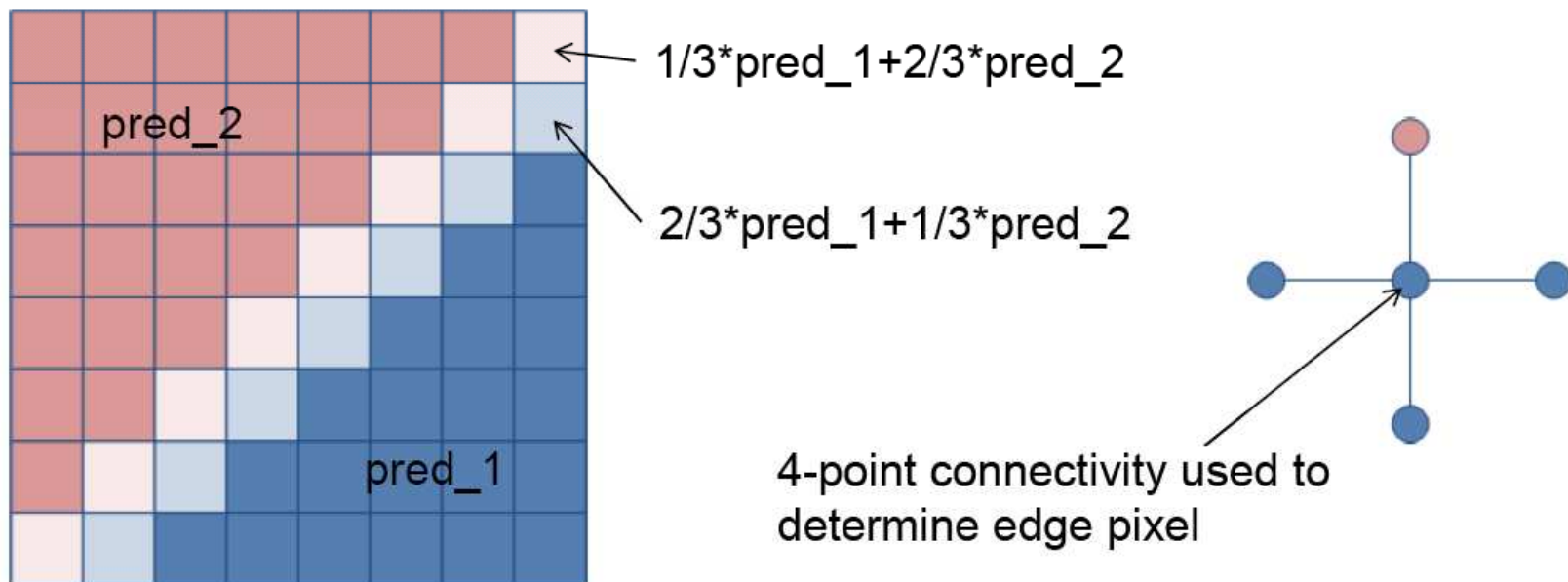
$$y = \frac{-1}{\tan \theta} x + \frac{\rho}{\sin \theta} = mx + c, m \text{ and } c \text{ tabularized}$$

- ρ values:
 - 16x16: 0 to 7,
 - 32x32: 0 to 15,
 - 64x64: 0 to 31.



- θ -0 to 360 degree with step size of 11.25 degree (32 values).

- Transform size: 64x64 and 32x32 partition – 16x16.
- 16x16 partition – 4x4, 8x8 and 16x16 (signaled).
- OBMC used during MC prediction



Encoder Simplification

- Two stage mode decision

- 16x16 blocks:

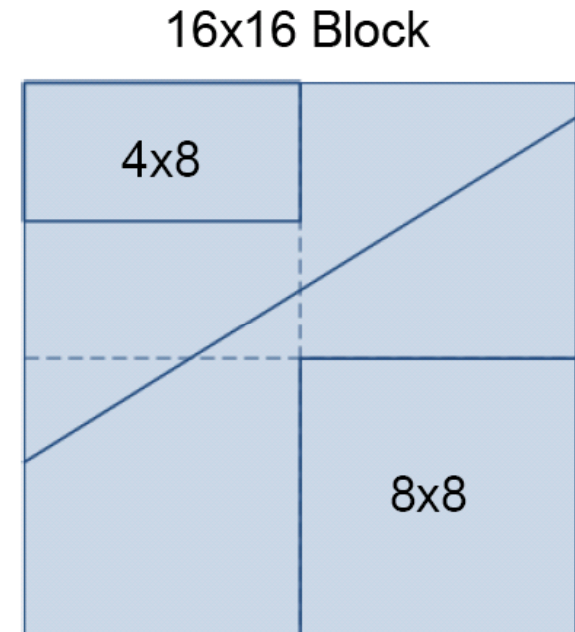
- Preselect 16 best partitions based on SAD
 - Full RD for the best partitions

- 32x32 and 64x64

- Subsample both angle θ and distance p by 2 and select 2 best partitions
 - Estimated motion for 18 partitions – 2 selected ones and their neighboring ones (± 11.25 degrees for θ and ± 1 for p).

- Motion vector reusing

- Motion vectors from block matching are reused to find initial set of best partitions.
 - For the selected partitions, MV are estimated using EPZS.



	IPPP	HierB
WQVGA30_RaceHorses	-6.52	-7.02
WQVGA50_Basketball	-3.68	-3.85
WQVGA50_PartyScene	-4.44	-4.07
WQVGA60_BQSquare	-3.69	-1.92
WQVGA AVG	-4.58	-4.22
WVGA30_RaceHorses	-5.88	-6.43
WVGA50_Basketball	-5.03	-4.38
WVGA50_PartyScene	-3.3	-2.83
WVGA60_BQSquare	-6.67	-8.11
WVGA AVG	-5.22	-5.44
1080p24_Kimono	-2.57	-2.17
1080p24_ParkScene	-4.67	-3.57
1080p50_Basketball	-2.73	-2.45
1080p50_Cactus	-3.75	-2.65
1080p60_BQSquare	-2.42	-1.64
1080P AVG	-3.23	-2.50
AVG (cfp)	-4.26	-3.93

Further Simplification

- For geometry partitions which doesn't cover the minimum block partition(e.g. 4x4), MV of the 4x4 block whose area is covered maximum is chosen as starting MV for that geometry partition and then refinement is done around that MV.
- Motion vectors of geometry partitions are found by refining the MVs of regular partitions (16x16 to 4x4 partitions) contained in that geometry partition.
 - Using refinement (from +/-1 to +/-1/8 pel) instead of EPZS introduces loss <0.5%.

	IPPP	HierB
WQVGA30_RaceHorses	-5.44	-6.3
WQVGA50_Basketball	-4.56	-3.57
WQVGA50_PartyScene	-4.13	-3.72
WQVGA60_BQSquare	-2.94	-1.49
WQVGA AVG	-4.27	-3.77
WVGA30_RaceHorses	-5.07	-5.87
WVGA50_Basketball	-4.53	-4.34
WVGA50_PartyScene	-3	-2.71
WVGA60_BQSquare	-6.06	-7.44
WVGA AVG	-4.67	-5.09
1080p24_Kimono	-2.13	-1.91
1080p24_ParkScene	-4.12	-3.22
1080p50_Basketball	-2.22	-2.06
1080p50_Cactus	-3.37	-2.45
1080p60_BQSquare	-2.13	-1.36
1080P AVG	-2.79	-2.20
AVG (cfp)	-3.82	-3.57

THANK YOU!