Upper Coding Unit Depths and Neighboring Blocks Relation based Fast Mode Selection in All Intra Spatial SHVC

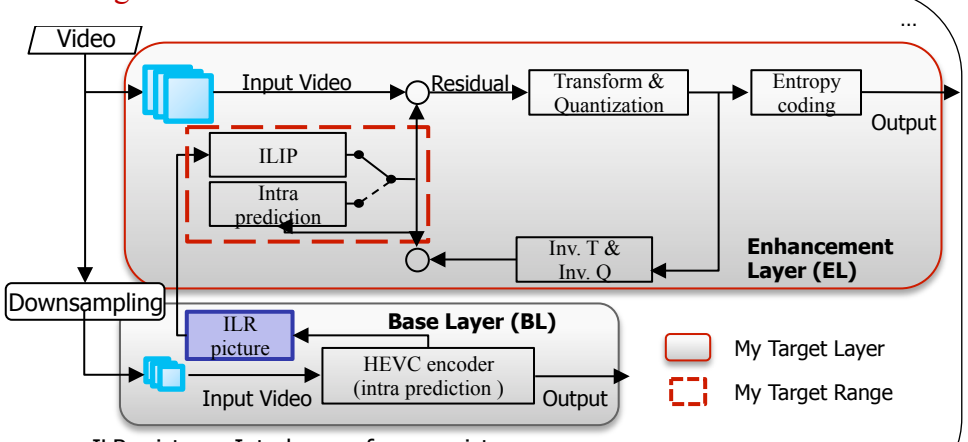
修士課程卒業　刘佩

Background & Target

	HEVC	SHVC (target field)	
Layer	1	Multiple (up to 8)	video → output: Resolution 8 … Resolution 2 … Resolution 1
Scalability	None	Many	Enhancement Layer (EL) … Enhancement Layer (EL) … Base Layer (BL)
Standardized	Apr. 2013	Oct. 2014	**Scalability:** Spatial, quality, bit depth…

HEVC: High Efficiency Video Coding

SHVC: Scalable High efficiency Video Coding

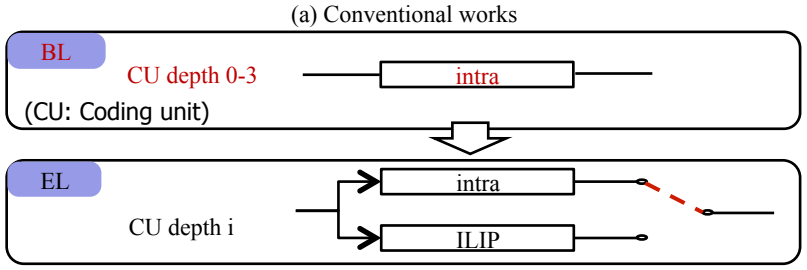


ILR picture: Interlayer reference picture

ILIP: Interlayer inter prediction

Concept comparison between proposal and conventional works

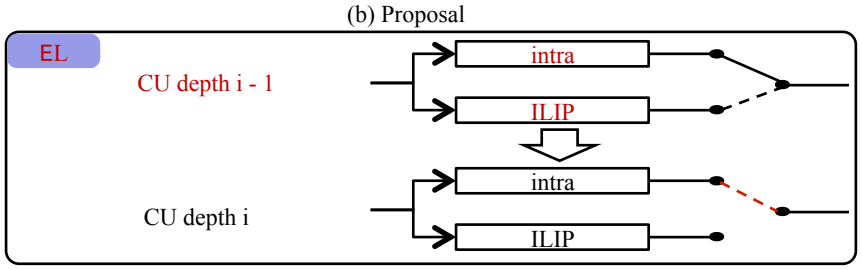
(a) Conventional works



Problems

- Mismatching partition caused by different resolution (both)
- Mismatching modes (Zuo)

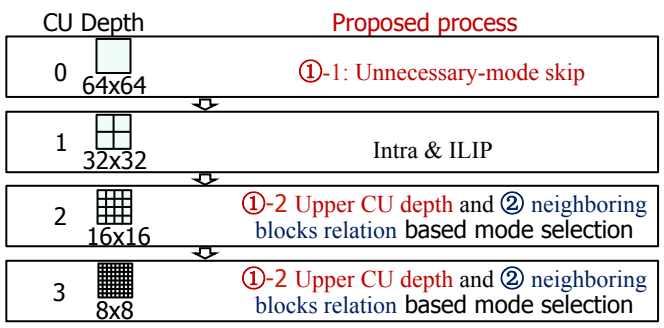
(b) Proposal



Solutions

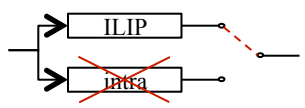
- Using the same layer
- Using upper CU depth and neighboring blocks information

Flow chart and details of proposal



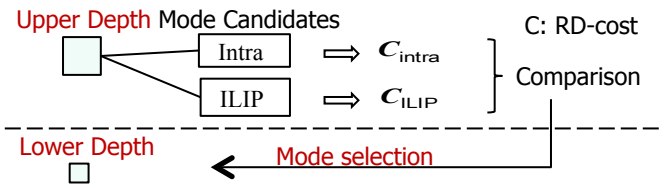
①-1:

Skip intra in CU depth 0 of EL based on statistic data



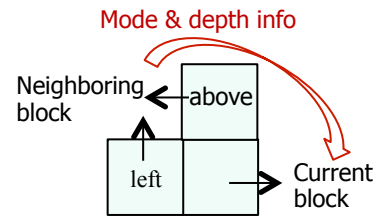
①-2:

Fast select the mode of lower depth based on the RD-cost comparison of upper depth



②:

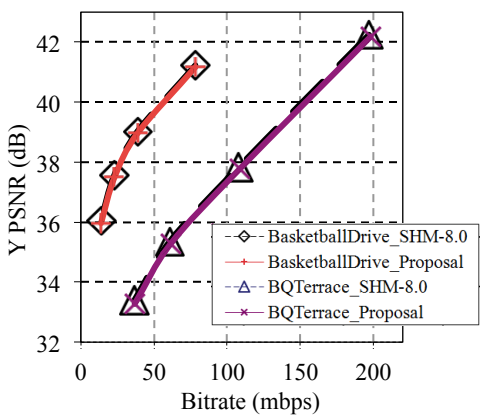
Select the mode of the current block based on the mode and depth information of neighboring blocks



Experiment results and conclusion

Sequences	Zuo's mode selection		Katayama		①		① & ②	
	BD-rate (%)	TS(%)	BD-rate (%)	TS (%)	BD-rate (%)	TS(%)	BD-rate (%)	TS(%)
Traffic	0.1	17	0.4	48.75	0.5	58.75	0.5	60.25
PeopleOnStreet	0.1	16	0.6	55.5	0.7	58.50	0.7	59.5
Kimono	0.5	32	0.1	26.75	0.2	59.25	0.2	61.5
ParkScene	0.3	20	0.1	42.5	0.1	58.75	0.1	59
Cactus	0.5	21.25	1.6	42.5	1.6	58.25	1.6	58.25
BasketballDrive	1.1	27	2.6	35.25	2.7	55.75	2.2	53.5
BQTerrace	0.5	19.25	2.0	46	2.2	57.25	2.1	55
Average	0.44	21.79	1.06	42.46	1.14	58.07	1.06	58.14

RD-curves



Conclusion: Using the proposal in SHVC, over 58% time saving is achieved compared with SHM-8.0, and over 15% more time saving is obtained compared with conventional works, the BD-rate increase is negligible compared with the time saving improvement.

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