

# Reduced redundancy of the low complexity entropy coder (LCEC)

*Hisao Sasai*

*Takahiro Nishi*

**Panasonic Corporation**

**Panasonic** ideas for life

## Current HEVC(LCEC)

reference index & inter pred mode  $\rightarrow$  0 ~ 7 symbols

## In HEVC (LCEC):

NoBackPred: ( LIST\_1 prediction is allowed )

- Number of REF\_PIC\_LIST\_0, LIST\_1 = 1  $\rightarrow$  MaxRange : 3 (1+1+1x1)
- Number of REF\_PIC\_LIST\_0, LIST\_1 = 2  $\rightarrow$  MaxRange : 8 (2+2+2x2)

BackPred: ( LIST\_1 prediction is NOT allowed )

- Number of REF\_PIC\_LIST\_0, LIST\_1 = 1  $\rightarrow$  MaxRange : 2 (1+1x1)
- Number of REF\_PIC\_LIST\_0, LIST\_1 = 2  $\rightarrow$  MaxRange : 6 (2+2x2)

$\rightarrow$  redundant table bits in last bits.

## In source code:

PU level VLC table selection has been implemented in HM v1.

$\rightarrow$  redundant calculation in PU level.

## Picture Level

Change the VLC initial tables based on MaxRange

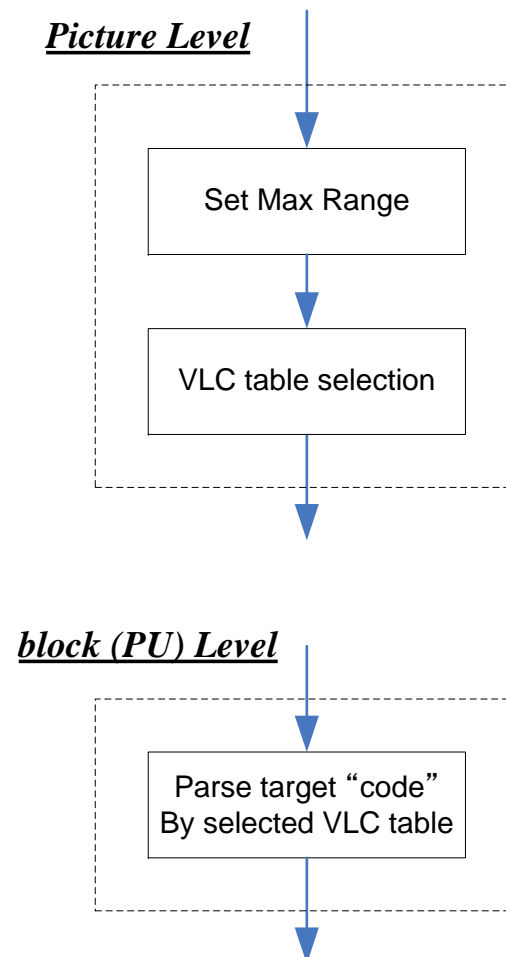
→ The technique seems to be same as JCTVC-141 (1) & (3).

## PU Level

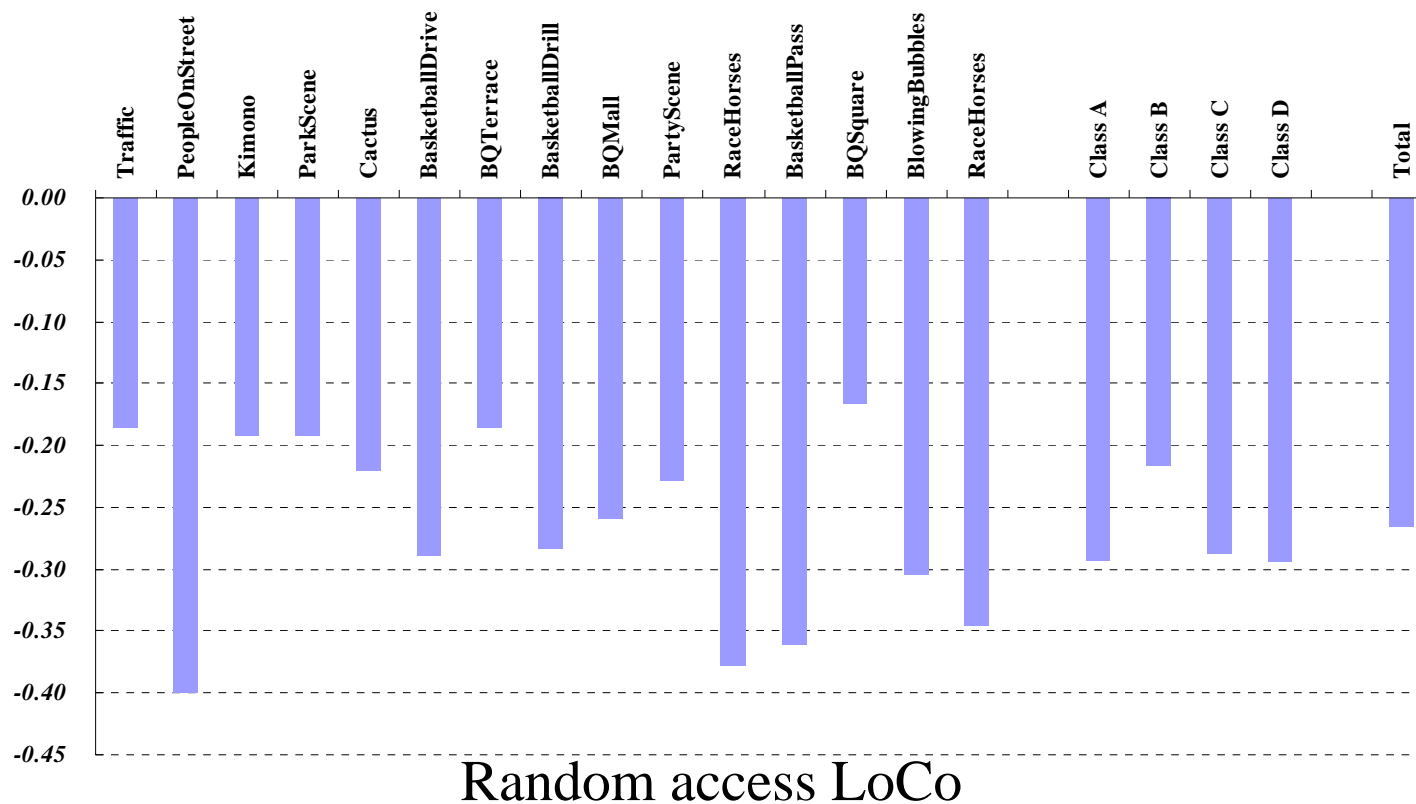
Use the selected VLC table

# Adaptive VLC table is ON

# Adaptive VLC table is OFF



	Random access LoCo			Low delay LoCo		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
Class A	-0.3	-0.1	-0.1			
Class B	-0.2	-0.1	-0.1	0.0	-0.1	0.0
Class C	-0.3	-0.1	-0.1	0.0	-0.1	-0.1
Class D	-0.3	-0.3	-0.2	0.0	0.2	0.1
Class E				0.0	0.1	0.2
All	-0.3	-0.1	-0.1	0.0	0.0	0.0
Enc Time[%]	99%			99%		
Dec Time[%]	98%			99%		



**JCTVC-D141 is independent contribution.**

**Our proposal doesn't contain JCTVC-D141(2) which switches VLC table in case of Direct mode.**

**We implemented that part independently and tested our proposal with switching VLC tables on Direct mode.**

**The results are completely matched with the result of JCTVC-D141 documents (JCTVC-D141\_1.xls) at LowDelay case.**

	Low delay LoCo		
	Y BD-rate	U BD-rate	V BD-rate
Class A			
Class B	-0.3	-0.2	-0.2
Class C	-0.2	-0.2	-0.2
Class D	-0.3	0.1	-0.3
Class E	-0.2	0.0	-0.2
All	-0.3	-0.1	-0.2
Enc Time[%]	99%		
Dec Time[%]	104%		

**Our proposal has been included in JCTVC-D141 (1) & (3) which is verified by D310.**

**We have identical results from our proposal + JCTVC-D141(2), and JCTVC-D141 proposal.**

**→ It seems to be cross-verification of our proposals.**

**It is proposed to adopt both of JCTVC-D141 and JCTVC-D184 in HM/WD of HEVC.**