

Improvement of level coding in CAVLC

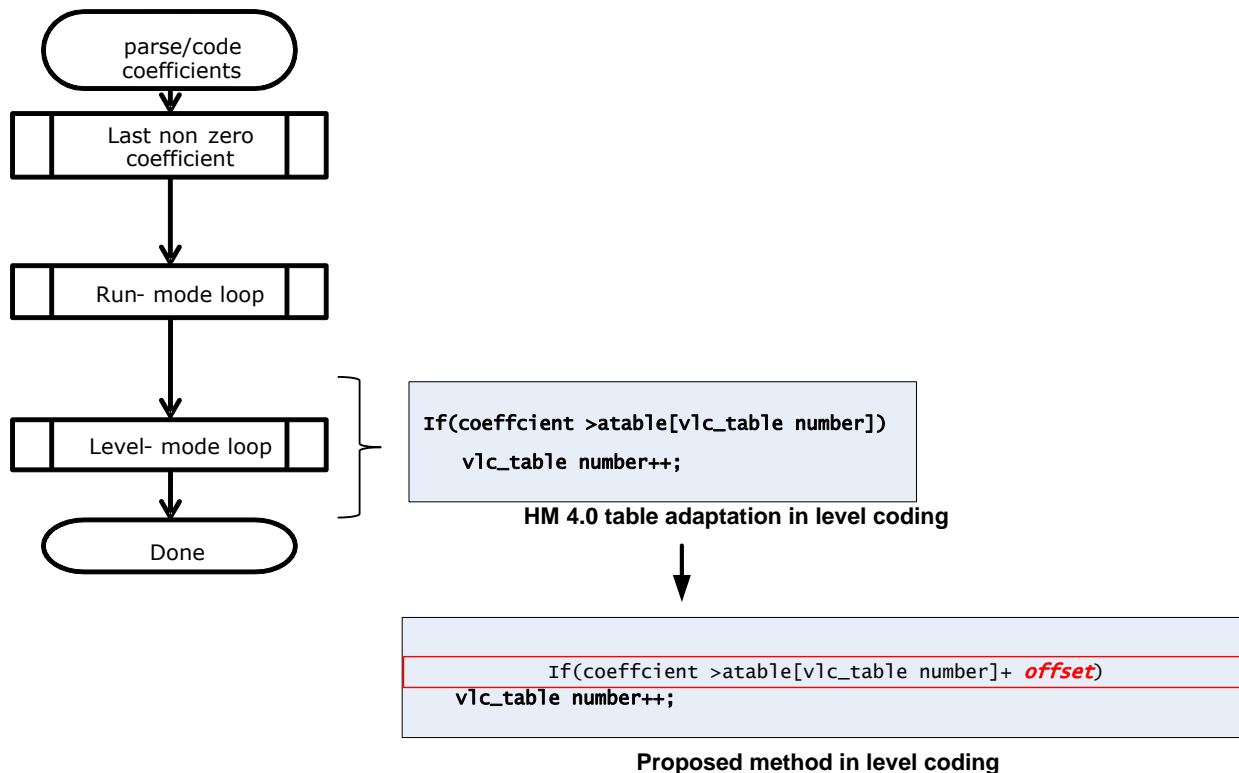
(JCTVC-G537)

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Summary

- ❖ Adjust threshold table for level coding with TU size based information
- ❖ Large offset for large TU size and Inter Prediction blocks.
- ❖ Change:
 - $\text{atable}[\text{vlc_num}] + \text{offset (TU size base)}$
- ❖ Coding efficiency and no complexity increase.
 - -0.1%/-0.1%/0.0% for AI_LC,
 - -0.1%/+0.1%/+0.1% for RA_LC,
 - 0.0%/0.0%/-0.1% for LD_LC
- ❖ Cross-check
 - G801 by Sony

Algorithm description



$$\begin{aligned} \text{offset} &= \text{g_aucConvertToBit}[\text{blSize}] + ((\text{!isIntra}) \ll 1) - 2 \quad \text{or} \\ &= \log_2 \text{TrafSize} - 2 + ((\text{!isIntra}) \ll 1) - 2 \end{aligned}$$

Experimental results

❖ Common condition test

- Simply add offset to threshold for level coding
- No complexity increase

	All Intra LC			Random Access LC			Low delay B LC		
	Y	U	V	Y	U	V	Y	U	V
Class A	-0.3%	-0.2%	-0.1%	-0.4%	0.6%	0.5%			
Class B	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.2%	0.4%
Class C	-0.1%	0.0%	0.0%	0.0%	-0.1%	0.1%	0.0%	0.2%	-0.3%
Class D	-0.2%	0.0%	-0.1%	0.0%	0.1%	0.0%	0.0%	-0.1%	-0.2%
Class E	-0.1%	-0.1%	-0.1%				-0.1%	0.0%	-0.4%
Overall	-0.1%	-0.1%	0.0%	-0.1%	0.1%	0.1%	0.0%	0.1%	-0.1%
	-0.1%	-0.1%	-0.1%	-0.1%	0.2%	0.2%	0.0%	0.0%	-0.1%
Enc Time[%]	100%			100%			100%		
Dec Time[%]	101%			100%			101%		

(a) without F-sequences

	All Intra LC			Random Access LC			Low delay B LC		
	Y	U	V	Y	U	V	Y	U	V
Class A	-0.3%	-0.2%	-0.1%	-0.4%	0.6%	0.5%			
Class B	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.2%	0.4%
Class C	-0.1%	0.0%	0.0%	0.0%	-0.1%	0.1%	0.0%	0.2%	-0.3%
Class D	-0.2%	0.0%	-0.1%	0.0%	0.1%	0.0%	0.0%	-0.1%	-0.2%
Class E	-0.1%	-0.1%	-0.1%				-0.1%	0.0%	-0.4%
Class F	-0.4%	-0.4%	-0.3%	-0.3%	-0.2%	-0.3%	-0.1%	0.0%	-0.2%
Overall	-0.2%	-0.1%	-0.1%	-0.1%	0.1%	0.1%	0.0%	0.1%	-0.1%
	-0.2%	-0.1%	-0.1%	-0.1%	0.1%	0.1%	0.0%	0.0%	-0.1%
Enc Time[%]	100%			100%			100%		
Dec Time[%]	100%			100%			101%		

(b) with F-sequences

Conclusions

- ❖ Different offset for level threshold based on TU size (large offset for large TU size and Inter)
- ❖ Coding efficiency impact:
 - -0.1%/-0.1%/ 0.0% for AI_LC,
 - -0.1%/0.1%/0.1% for RA_LC,
 - 0.0%/0.1%/-0.1% for LD_LC
 - Higher gain is observed in A-sequences (F-sequences has higher gain)
- ❖ We recommend the proposed scheme to be adopted into next HM for improvement coding gain without complexity impact.