

# G768: Context reduction for significance map coding of LTU

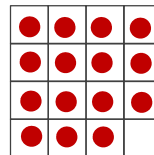
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## Significance map coding in HM4.0

– Same context derivation rule in luma and chroma (88 contexts)

– 4x4 TU

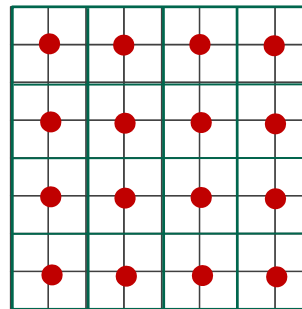
- 15 ctxs/ Luma
- 15 ctxs/ Chroma



T4x4 (15 ctxs)

– 8x8 TU

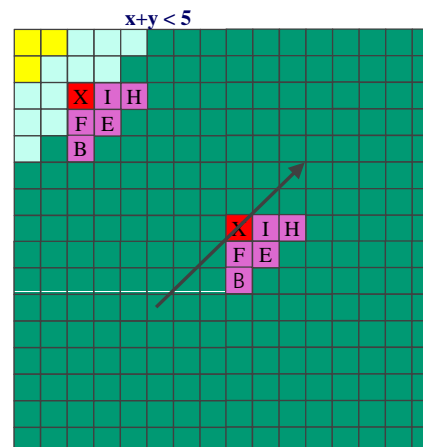
- 16 ctxs/ Luma
- 16 ctxs/ Chroma



T8x8 (16 ctxs)

– 16x16 TU & 32x32 TU

- 13 ctxs/ Luma
- 13 ctxs/ Chroma



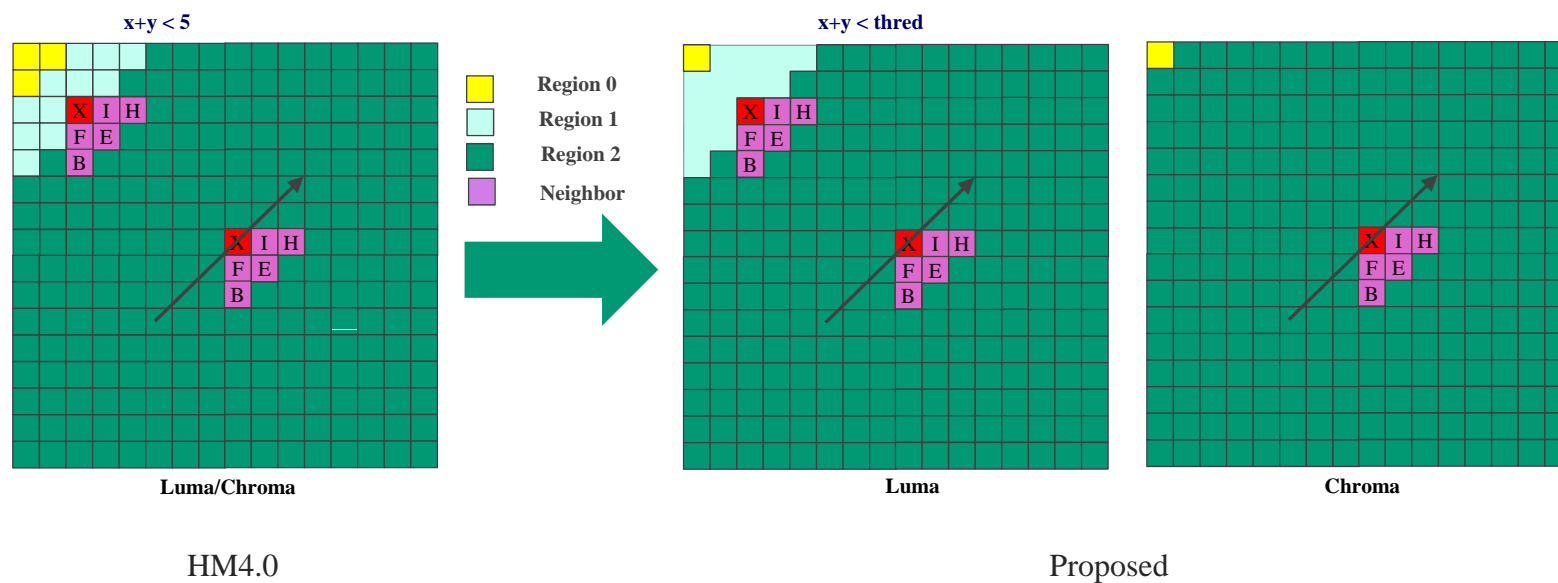
## ● Contexts for LTU significance map

- 3 contexts for region  $x+y < 2$
- 5 contexts for region  $x+y < 5$ 
  - (0) | (1) | (2) | (3) | (4,5) non-zero coefficients in neighborhood
- 5 contexts for region  $x+y \geq 5$ 
  - (0) | (1) | (2) | (3) | (4,5) non-zero coefficients in neighborhood

# Context reduction for LTU significance map

## Proposal

- Remove rarely used contexts
  - Group contexts according to the neighborhood sparsity
  - Classify contexts based on TU size
- Reduce contexts from 26 to 11



## ● **Modification**

- 1 context for region 0(DC only) both in luma and chroma
- 3 contexts for region 1 in luma: (0) | (1,2) | (3,4,5) non-zero coefficients
- 3 contexts for region 2 in luma: (0) | (1,2) | (3,4,5) non-zero coefficients
- 3 contexts for region 2 in chroma : (0) | (1,2) | (3,4,5) non-zero coefficients
- Threshold for partition of region1 and region2:  $\text{thred} = \text{TU\_size} \gg 2$

## Common test configuration

|             | All Intra HE |      |      | Random Access HE |      |       | Low delay B HE |       |       | Low delay P HE |       |       |
|-------------|--------------|------|------|------------------|------|-------|----------------|-------|-------|----------------|-------|-------|
|             | Y            | U    | V    | Y                | U    | V     | Y              | U     | V     | Y              | U     | V     |
| Class A     | 0.1%         | 0.3% | 0.4% | -0.1%            | 0.2% | 0.4%  |                |       |       |                |       |       |
| Class B     | 0.0%         | 0.2% | 0.2% | 0.0%             | 0.1% | 0.3%  | 0.0%           | 0.0%  | -0.2% | 0.0%           | 0.1%  | -0.1% |
| Class C     | 0.0%         | 0.1% | 0.1% | 0.0%             | 0.0% | 0.1%  | 0.1%           | -0.1% | -0.2% | 0.1%           | 0.1%  | -0.2% |
| Class D     | 0.0%         | 0.1% | 0.1% | 0.1%             | 0.2% | -0.1% | 0.0%           | 0.0%  | 0.3%  | 0.1%           | -0.2% | -0.3% |
| Class E     | 0.1%         | 0.0% | 0.1% |                  |      |       | 0.1%           | -0.3% | -0.4% | 0.0%           | 0.1%  | -1.2% |
| Overall     | 0.0%         | 0.2% | 0.2% | 0.0%             | 0.1% | 0.2%  | 0.0%           | -0.1% | -0.1% | 0.0%           | 0.0%  | -0.4% |
|             | 0.0%         | 0.1% | 0.2% | 0.0%             | 0.1% | 0.2%  | 0.0%           | -0.1% | -0.1% | 0.0%           | 0.0%  | -0.4% |
| Enc Time[%] | 100.5%       |      |      | 100.3%           |      |       | 100.3%         |       |       | 100.2%         |       |       |
| Dec Time[%] | 100.8%       |      |      | 99.6%            |      |       | 100.5%         |       |       | 99.3%          |       |       |

## ● **Reduced context for LTU significance map coding**

- Removal of 6 contexts from luma
- Removal of 9 contexts from chroma
- Saved 58% contexts of LTU sigmap coding, equal to 17% of contexts in sigmap coding

## ● **Coding performance**

- 0.04% / AI\_HE, 0.01%/RA\_HE, 0.04%/LD\_HE, 0.01%/LDP\_HE

## ● **Propose adoption of simplified significance map coding of LTU into next version of HM**

*Thank you !*