

CE11: Reduced neighboring dependency in context selection of significant_coeff_flag for parallel processing (JCTVC-F128)

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Texas Instruments Inc.

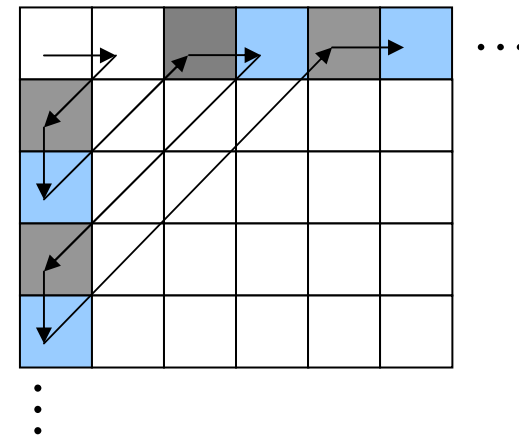
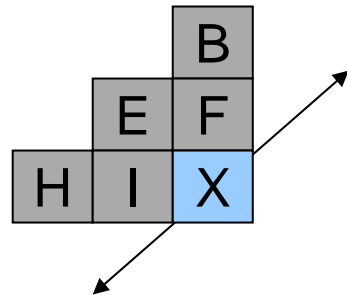
**Joint Collaborative Team on Video Coding (JCT-VC)
of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11**

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Motivation

- Increase throughput of CABAC while maintaining high coding efficiency
- For parallel multi-bin decoding, minimized dependency across bins
 - Dependencies require speculative computations
- For transforms larger than 8x8
 - use zig-zag scan
 - context selection depends on neighbors

JCTVC-D260 (adopted in HM-2.0) – eliminated diagonal dependencies; context selection of X (blue), depends on neighboring values (grey)

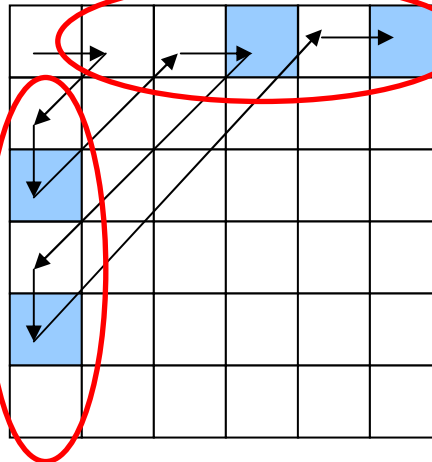
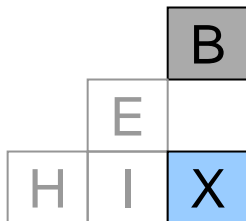


Process blue and grey in parallel at edges; remove dependency on most recently processed neighbor

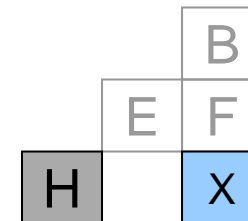
Reduce Dependency

- Remove dependency on immediate top or left neighbor when processing first column or row of transform, respectively
 - Reduces speculative computations in context selection for parallel bin processing

First column: Context selection not dependent on F. Note: H, E, and I do not exist for these positions.



First row: Context selection not dependent on I. Note: B, E, and F do not exist for these positions.



Experiment Results

- HM-3.0 under common conditions
- Simulation platform is LSF equipped with Intel(R) Xeon(R) CPU X5570@2.93GHz 64 bits Linux machines
- Results cross-checked by HHI (F451), Sony (F311), Cannon (F185)

Coding efficiency impact for High Efficiency

Intra	Random Access	Low Delay
0.1	0.1	0.0

Conclusions

- Reduce context dependency at edges of transform to reduce speculative computations for parallel processing
- Coding efficiency impact of only 0.1%
- Recommend for adoption into HEVC test model
 - Draft text available in contribution

Outline

- Introduction
 - Process multiple bins in parallel for increased throughput
 - Need to minimize dependency between bins that will be processed in parallel.
 - Current context selection method for higher coding efficiency
 - Dependency between bins are edges of transform
- Approach
 - At edge of transform, reduce dependency
 - Helps even when more than 2+ bins in parallel (delay exponential growth)
- Coding Efficiency
- Conclusion