JCTVC-J0150: Removal of zigzag scan from scaling list coding

Masato Shima

Canon Inc.

Summary

- Remove zigzag scan from HEVC design by applying existing scan methods to quantization matrices coding
- Using diagonal scan (both 4x4 and 8x8) for scaling list coding
  - Scans used for significant_coeff_group_flag
  - Effects (benefits)
    - 0.6% quantization matrices coding bits reduction
      - Using past CE4 test matrices for measurements
    - HEVC text reduction by about half an page
    - HM software code reduction by about 50 lines
- Thank ETRI for crosscheck (JCTVC-J0205)

HM7: zigzag scan
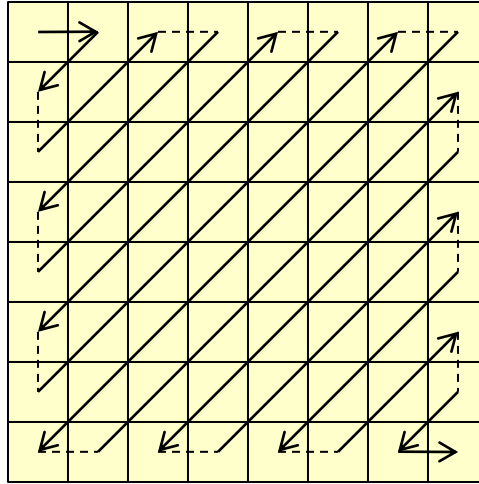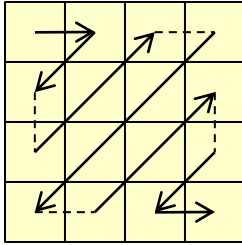
Proposed: Diagonal scan
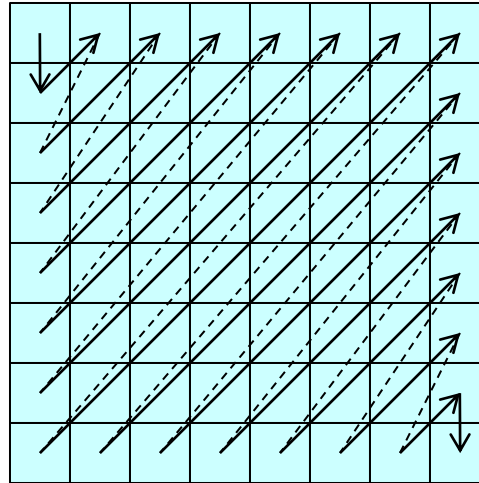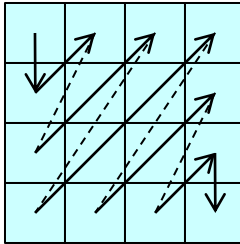
Coded bits	sym1	sym2	sym3	sym4	sym5	sym6
Zigzag	2067	1255	2593	2565	1899	2089
Option1	2067	1255	2593	2565	1899	2089
Diff (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Coded bits	asym1	asym2	asym3	asym4	asym5	asym6
Zigzag	2377	1397	2873	3859	2165	2315
Option1	2345	1371	2861	3829	2127	2293
Diff (%)	-1.3%	-1.9%	-0.4%	-0.8%	-1.8%	-1.0%

4

Modifications to HEVC text

- Removal of subclause 6.5.3 "Zig-zag scanning array initialization process"
  - about half a page reduction
- Modification to subclause 7.4.2.5 "Scaling list semantics"
  - Replacing zigzag scan with up-right diagonal scan
- Modified texts are provided in the contribution document

Modification to HM software

- Modification of scan table used for scaling list coding
  - 1 line change in encoder and decoder
- Removal of unused zigzag scan tables and their initialization, etc.
  - About 50 lines of code reduction
- Software patch was also provided as a part of contribution

Conclusion

- Using diagonal scan (both 4x4 and 8x8) for scaling list coding
  - Removing zigzag scan
  - Effects (benefits)
    - 0.6% quantization matrices coding bits reduction
      - Using past CE4 test matrices for measurements
    - HEVC text reduction by about half an page
    - HM software code reduction by about 50 lines
- Crosschecked by ETRI (JCTVC-J0205)
- Recommends to adopt the proposed changes