Corrections to “Transform Coding Techniques in HEVC”
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Abstract—This is a correction to the “Transform Coding Techniques in HEVC” article published in the IEEE Selected Topics in Signal Processing, vol. 7, no. 6, Dec. 2013

Index Terms—Transform coding, correction, entropy coding, residual quadtree, HEVC, H.265, MPEG-H, video compression.

I. CORRECTIONS

In the text below, the corrections are suggested for the article “Transform Coding Techniques in HEVC” by T. Nguyen et al., which was published in IEEE Selected Topics in Signal Processing in vol. 7, no. 6, December 2013 [1].

Correction 1

On p. 982, the Subsection C in Section IV should be substituted by the following text.

For binary arithmetic coding, a given non-binary absolute value $z$ has to be binarized, i.e., decomposed into a sequence of binary decisions (bin string). Two information related to transform coefficient coding are non-binary: the last significant scan position and the absolute levels.

1) Last Significant Scan Position: The binarization of its $x$ and $y$ coordinates is a composition of a truncated unary prefix and a fixed-length suffix. Since the same binarization process is used for both coordinates, the following description uses $z$ as a substitution for $x$ and $y$. Each prefix bin with an index $i$ denotes the decision for $z > z_i$, with $z_i \in \{0, 1, 2, 3, 4, 6, 8, 12, 16, 24\}$. The maximum prefix length $i_{max}$ is constrained by $2 \cdot \log_2 N - 1$ and $N$ denotes the TB size. A suffix is present when the prefix consists of more than four bins, i.e., $z > 4$. This is exactly the case when the difference between two neighbouring entries in $Z$ is greater than one. As a consequence for $4 \times 4$ TBs, the binarization always results in a bin string without suffix. When a suffix is present, the remaining value $z - z_{max}$ is decomposed by the fixed-length scheme with a number of bins equal to $\lfloor (i_{max} - 3)/2 \rfloor$.

2) Absolute Level: The binarization of absolute levels, denoted as $z$ in the following, is a decomposition into four different syntax elements. They are referred to as significance flag ($\omega_{sn}$), absolute level greater than 1 ($\omega_{sr1}$), absolute level greater than 2 ($\omega_{sr2}$), and remaining absolute level ($\omega_{rem}$). At decoder side, $z$ can be reconstructed simply by sum up the values of the syntax elements as denoted in the following.

$$z = \omega_{sn} + \omega_{sr1} + \omega_{sr2} + \omega_{rem}$$

Correction 2

On p. 984, (2), the symbol $max$ should be replaced by $\min$. After the correction, the equation should be as follows:

$$\chi_{sel} = \min \left(1, \omega_{sel}^b + \omega_{sel}^h\right)$$

Correction 3

On p. 984, (4), the corrected calculation for the condition $\sum \omega_{sr1} = C(\omega_{sr1})$ should be $1 + \min \{C(\omega_{sr1}), 2\}$. After the correction, the equation should be as follows:

$$\chi_{sr1} = \left\{ \begin{array}{ll} 1 + \min \{C(\omega_{sr1}), 2\} : & \sum \omega_{sr1} = C(\omega_{sr1}) \\ 0 : & \text{otherwise} \end{array} \right.$$