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Title **On MCTS based tile extractor implementation**

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Abstract

This contribution presents a software implementation of temporal motion-constrained tile sets (MCTS) based tile bitstream extractor on VVC. The software extracts the target tile from the original bitstream and generate the tile bitstream which is compatible with the existing VVC decoder. The modifications are implemented based on the VTM 7.3 reference software.

1 Proposed additions

The proposed extractor checks every NAL units of original bitstream. If PPS NAL unit is found, the extractor copies the parameters related to tiles, as shown in Figure 1. Then, the first CTU address in the target slice is computed using the aforementioned parameters. For example, the width and height of target tile are computed as follows:

targetTileIdxInCol = targetTileIdx % numTileCols

targetTileIdxInRow = targetTileIdx / numTileCols

targetTileWidth = tileColWidth[targetTileIdxInCol] * CtuSize

targetTileHeight = tileRowHeight[targetTileIdxInRow] * CtuSize

Where targetTileIdx stands for the target tile index. If a slice which has the same CTU address is found from the original bitstream, the extractor copies the original parameter sets and replace them according to the target tile. For example, in SPS NAL unit, the following parameters are replaced:

maxWidthInLumaSamples = targetTileWidth

maxHeightInLumaSamples = targetTileHeight

Likewise, in PPS NAL unit, the following parameters are rewritten:

noPicPartitionFlag = true

picWidthInLumaSamples = targetTileWidth

picHeightInLumaSamples = targetTileHeight

numExpTileRows = 1

numExpTileCols = 1

numTileCols = 1

numTileRows = 1

In PH NAL unit, the number of CTUs is replaced with the number of CTUs in target tile slice. Further, all of the CTU addresses in the target tile slice have to be reset.

After the replacement of parameter sets, they are coded and appended to the output bitstream. Finally, the input target tile slice is converted to the output NAL unit, and appended to the target bitstream.

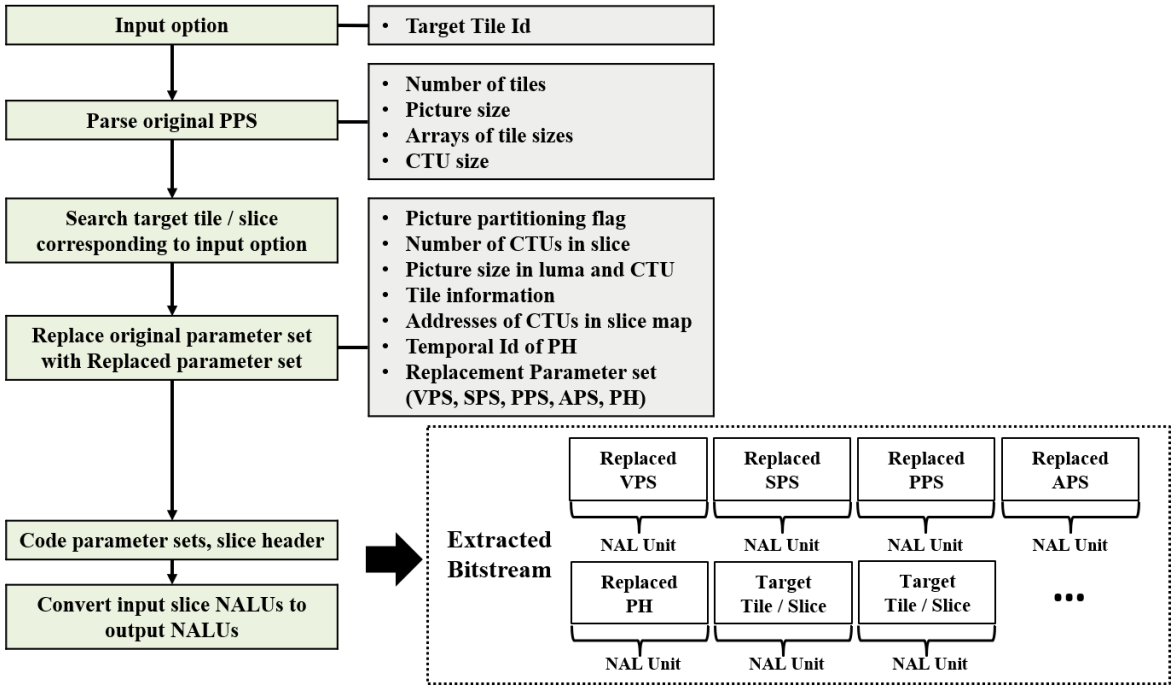

Figure 1 Functional flow chart of the proposed tile extractor

2 Conclusion

This contribution presents a MCTS based tile extractor for VVC. There are advantages of the tile extraction method:

- Compatible with existing VVC test model
- No additional parameters including SEIs are required
- Saving bandwidth with selective tile-based streaming

The proposed software is available on the gitlab server at:

https://gitlab.com/mcsl.skku/vvcmctsextractor

To obtain access to the VVC tile extractor please contact one of the software coordinators:

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Patent rights declaration(s)

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