

Inverse Transform Using Linearity

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<Reviewer 2>

“The authors should accurately address the below comments.”

We would like to thank the reviewer for the thorough review and very helpful comments. The revised manuscript was reviewed and substantially modified by a native speaker. According to a reviewer’s comment, we included two new Tables, Table 3 and Table 4, so that the table indices were changed accordingly.

In answer to the specific comments:

Comment) Keywords : We suggest that the authors should replace keywords such as “video coding” and “transform” because these keywords are already found in the article title. It is better that they replace them with other keywords to increase the reach of the manuscript.

Answer) According to the reviewer’s comment, we modified and added some keywords as follows:

We replaced “**Keywords:** VVC; HEVC; video coding; transform; computational complexity”

With

“**Keywords:** VVC (Versatile Video Coding), HEVC (High Efficiency Video Coding, Linear Inverse Transform, computational complexity, DCT (Discrete Cosine Transform), Discrete Sine Transform (DST), BD-rate”

Comment) Introduction: The authors should add the main contribution s briefly at the end of the introduction.

Answer) According to the reviewer's comments, we updated the last paragraph of Section 1 as follows:

We replaced “Section 2 presents a proposed inverse transform using linearity to reduce the computational complexity.”

With

“In Section 2.1, we introduce the transforms used in VVC. And we propose a fast inverse

transform using linearity to reduce the computational complexity in Section 2.2.”

Comment) Methodology Section: It should be structured, sub-headings should be added to facilitate tracking and understanding.

Answer) According to the reviewer’s comment, we divided Section 2 as follows:

2. VVC Transforms and Proposed Method

2.1. Introduction to DCT-II, DST-VII, and DCT-VIII

2.2. Propose Fast Inverse Transform Using Linearity

Comment) The authors should add a section where they discuss comparing their results with those of existing research. Also, they should clarify the limitations of the proposed method. There is a lot of recent research out there that can be used for comparison. As this discussion and comparison can clarify the fairness and rationality of the results of the proposed method.

Answer) According to the reviewer’s comment, we included the following sentence in the end of 3. Experimental Results section on page 11:

~~ “Fast encoding methods only in the encoder side were proposed to reduce the encoding complexity of VVC but all the fast encoding methods increased the BD-rates [29][30][31] in terms of the bit-rate reduction so that the proposed inverse transform using linearity in the decoder side differs from those approaches in that it keeps the BD-rate in VVC while reducing the decoding complexity. If the proposed inverse transform is applied to the VVC standard, the inverse transform of the VVC standard should be changed to include the proposed method. Therefore, the proposed method can be considered in the next-generation video coding standards because it reduces the decoding complexity while the BD-rate is maintained.” ~~

And three new references [29],[30], and [31] in Reference section were included.

Comment) Conclusions: Future directions should be added to the Conclusion Section.

Answer) According to the reviewer’s comment, we added the future directions in the conclusion section as follows:

“The proposed method can be considered in the next-generation video coding standards because it reduces the decoding complexity while the BD-rate is maintained.”

Comment) Figures and Tables: All figures and tables are shown before they are used in the text

Answer) Only Table 6 was shown before it was used. So, we removed the word Table 6 in the

following sentence:

~~. "Table 3 lists the percentages of horizontal and vertical transforms in VTM-8.2 for all test sequences in Table 6 which are to be explained in Section 3—at each Quantization ..." ~~~

Comment) The list of references is recent, and all references are related to the research topic but it is not sufficient for this study. The names of the researchers must follow the style of the journal format. The double quotation should be omitted from the research titles in the list of references. Some search names in the reference list begin an uppercase letter for each word (such as [4], [5] ... etc.) and others use only an uppercase letter in the first word (such as [2], [9] ... etc.), authors should standardize style. All journal names should be italic. Some references do not contain enough information such as [16], [18] ... etc. Some links do not work in the reference list like [22] ... etc. The list of references requires an extensive check

Answer) Thank you for pointing out our mistake. According to the reviewer's comment, we completely updated the list of references as follows:

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Comment) This article requires extensive proofreading. Authors should check the entire article to remove all extensive mistakes (grammatical and typos) and to improve English writing quality.

Answer) According to the reviewer's comment, the revised manuscript was reviewed and substantially modified by an English native speaker.

CERTIFICATE OF EDITING



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