



JCTVC-C037

TE7: Results for mode-
dependent fast separable KLT
for block-based intra coding

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Background: JCTVC-B024

$$Y = C_m X R_m^T$$

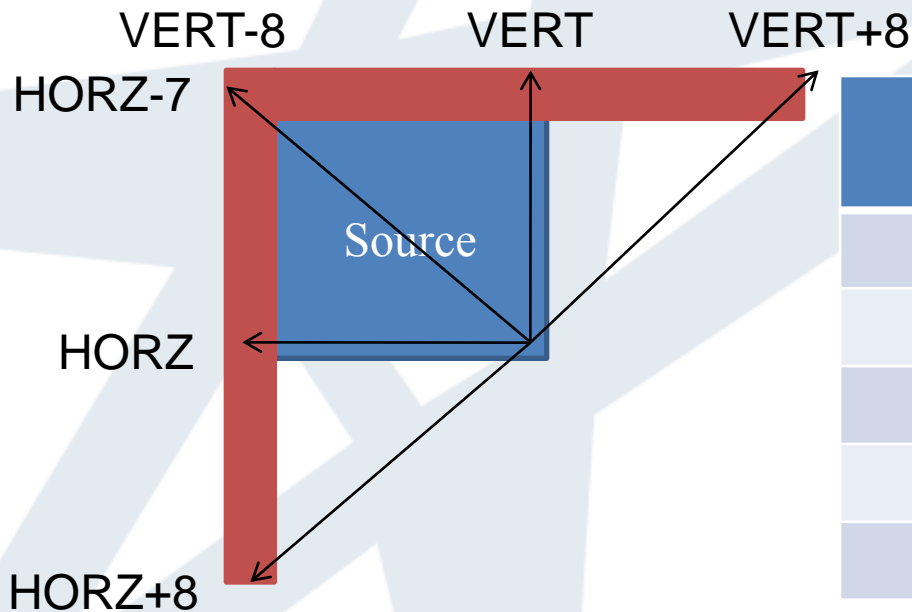
$C_m, R_m \in \{M, C\}$ $\xrightarrow{\text{DCT}}$ Proposed Transform

$$C_{i,j} = \frac{2}{\sqrt{2N+1}} \sin\left(\frac{(2i-1)j\pi}{2N+1}\right)$$

MDDT	Proposal
Requires training to compute KLT	No training required
Needs 18 transforms to be implemented	Needs only 2 transforms
16 muls, 12 adds per tx	8 muls, 10 adds per tx
All modes use KLT	Combination of DCT/KLT

Choice of transforms: JCTVC-C039

- Analysis based on which reference pixels are used for prediction



Mode	Column Tx	Row Tx
DC	DCT	DCT
VERT-8 to VERT-1	KLT	KLT
VERT to VERT+8	KLT	DCT
HORZ-7 to HORZ-1	KLT	KLT
HORZ to HORZ+8	DCT	KLT

Experimental conditions

- Following JCTVC-B300 and JCTVC-B307
 - Test intra high efficiency and random access high efficiency

RD results – Intra

Sequences Class	Proposed map vs anchor BD-Rate(%) [cross-checked]
Class A	0.0
Class B	0.1
Class C	0.0
Class D	0.0
Class E	0.0
All	0.1

RD results – Random access

Sequences Class	Proposed map vs anchor BD-Rate(%) [cross-checked]
Class A	0.0
Class B	0.1
Class C	0.0
Class D	0.0
All	0.0

Complexity

- Operations count for KLT
 - 4-point: 8 multiplies, 10 adds
 - 8-point: 64 multiplies, 56 adds
- Requires two transforms
- Otherwise same as MDDT in TMuC

Training

- No training required to derive KLT matrix

Conclusions

- TE7 results for I²R's MDDT simplification proposal
 - No significant difference in coding performance from anchor
 - Two transforms, no training required
- Recommend adoption into TM/TMuC