

JCTVC-B067

DCT-based noise filtering for intra prediction samples

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Outline

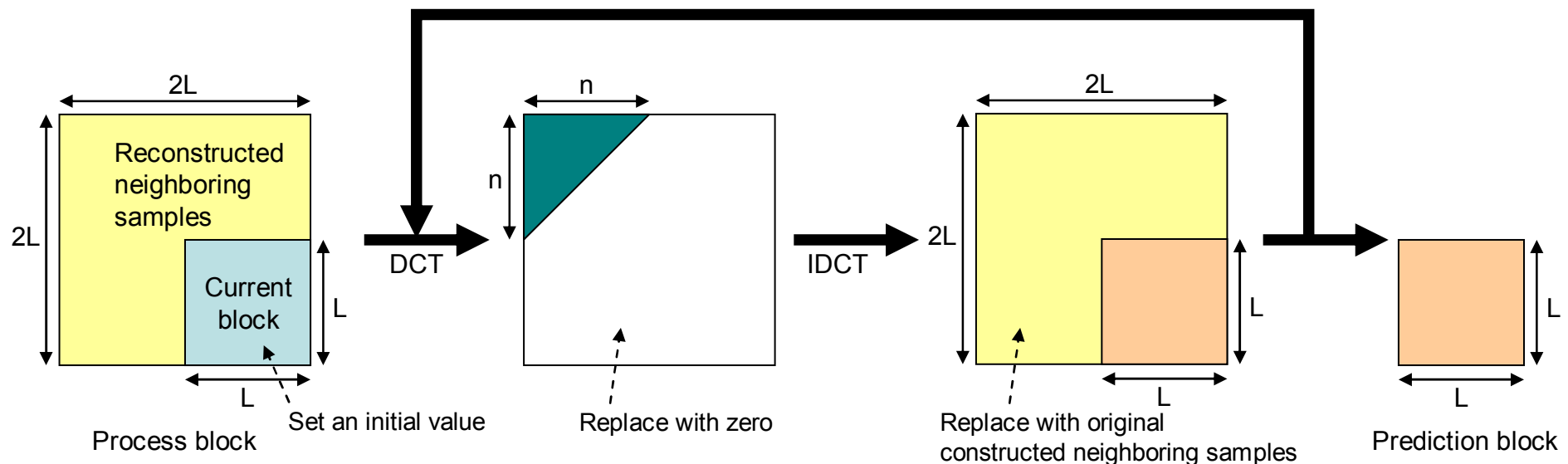
- Background
- Proposed method
- Performance evaluation
- Conclusion

Background

- ***TMuC intra coding***
 - Spatial prediction (angular, planar) + large transform
- ***Reduction of prediction mismatch for intra angular prediction***
 - Especially around bottom-right area of larger prediction unit
 - Further coding performance improvement expected

Proposed method

- Use ***Iterative Adjustment Intra Prediction (IAIP)*** scheme as post-filter for intra angular predictor
 - IAIP: Proposed in JCTVC-A122/B027
 - Similar effect to adaptive reference smoothing can also be expected



IAIP Configuration for the proposed method

- DCT iteration
 - only once, no iteration operations
- Up to $L = \text{MaxTUSize}/2$
 - For re-using transform basis for residual coding
- PU adaptive on/off signaling

Performance Evaluation

- Software: A124
 - Different angular prediction for 8x8 PU from that of TMuC
- Test conditions

Test sequence	SHV sources, Class A, B sequences
GOP structure	Intra-only Coding
Number of encoded frames	SHV: first 10 frames @ 8Kx4K resolution Class A,B: First 2 sec
Largest Coding Unit	64x64
CU partitioning depth	4 levels
QP	17, 22, 27, 32, 37
Base coding tools	ALF, ADI, IBDI

Simulation Results

Sequence	BD-rate (4 low-rate point)		BD-rate (4 high-rate point)	
	ADI + proposed filter	ADI + ARSS	ADI + proposed filter	ADI + ARSS
Kimono	-0.441	-0.664	-0.691	-0.664
ParkScene	-2.107	-1.832	-2.183	-1.699
Cactus	-2.239	-2.019	-1.926	-1.551
BasketballDrive	-1.838	-1.435	-2.752	-2.338
BQTerrace	-1.812	-1.226	-2.117	-1.514
Traffic	-2.437	-1.932	-2.834	-1.886
PeopleOnStreet	-3.525	-3.074	-4.078	-2.906
Steam locomotive train	-1.704	-0.862	-1.523	-0.637
Nebuta festival	-4.407	-1.844	-3.570	-1.204
<i>Avarage</i>	-2.279	-1.654	-2.408	-1.600

Example of visual improvement

- Better predictor can be selected by reducing noise component from angular prediction samples



ADI + ARSS



ADI + proposed noise filtering

Conclusion

- Application of IAIP scheme as de-noising filter for intra angular prediction has been evaluated
 - Coding gain can be expected in TMuC framework
 - Should also include similar effect to adaptive reference smoothing technique
- Propose to establish a formal experiment for further study toward test model definition