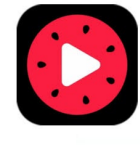


JVET-AE0238

# AHG11: A unified design of NN-based loop-filters at low and high operation points

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# Introduction

- There are two sets of neural network-based in-loop filters entitled low operation point (LOP) filter and high operation point (HOP) filter in NNVC common software base (NNVC-5.1)
- Common operations can be observed in the HOP filter and the LOP filter, such as residual scaling, on/off control in slice level, on/off control in CTU level.
- The main difference lies in that the LOP filter utilizes multiple neural network-based models, whereas the HOP filter only involves one neural network-based model for inference.

# Proposed Method

- This contribution proposes to unify the implementation of NN-based loop-filters at the low operation point (LOP) and the high operation point (HOP). The unified design is conducted based on the interface of HOP.
- Model selection in slice level is introduced into the implementation of the HOP filter such that the LOP filter could share a unified design as the HOP filter.
- The models of LOP filter are same as those in NNVC-5.1, and SADL is utilized to perform the inference of the LOP filter.

# Simulation results (cont.)

- Anchor: NNVC-5.0 VTM anchor
- QP for anchor and test: 22, 27, 32, 37, 42

	AI				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-6.96%	-8.30%	-8.28%	174%	4017%
Class C	-7.29%	-9.65%	-9.82%	164%	3010%
Class E	-10.16%	-9.07%	-8.70%	172%	4407%
<b>Overall</b>					
Class D	-7.44%	-7.56%	-9.14%	157%	2886%
Class F					
Class TGM					

	RA				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-6.40%	-5.14%	-6.40%	133%	5695%
Class C	-6.89%	-9.12%	-8.64%	127%	5718%
Class E					
<b>Overall</b>					
Class D	-8.33%	-6.26%	-8.78%	123%	5525%
Class F	-3.22%	-5.09%	-4.61%	147%	2140%
Class TGM					

# Simulation results (cont.)

- Anchor: NNVC-5.0 anchor
- QP for anchor and test: 22, 27, 32, 37, 42

	AI				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.08%	0.29%	0.46%	98%	85%
Class C	0.05%	0.11%	0.09%	99%	82%
Class E	0.14%	-0.05%	0.15%	98%	84%
<b>Overall</b>					
Class D	0.14%	0.55%	0.20%	98%	76%
Class F					
Class TGM					

	RA				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.11%	3.14%	1.16%	96%	73%
Class C	-0.29%	1.50%	0.97%	98%	84%
Class E					
<b>Overall</b>					
Class D	-0.82%	3.38%	0.98%	97%	78%
Class F	-0.16%	0.81%	0.32%	95%	23%
Class TGM					

# Conclusion

- This contribution presents a unified design for HOP and LOP filters. It is recommended to further study the unified design in EE1.