



Vidyo®
Personal Telepresence

JCTVC-N0209 SHVC SKIPPED PICTURE INDICATION

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Introduction

- SVC supports skipped slice in enhancement layer
- A useful feature in SVC product
 - Encoder that is CPU or bitrate starved
 - Decoder or middle box for error resiliency
- Propose skip_picture_flag syntax element for SHVC slice segment header
 - Skip all enhancement layer slices in a picture
 - Syntax and semantics are proposed
 - Decoding process is proposed

Proposed slice header syntax element

| | Descriptor |
|---|------------|
| slice_segment_header() { | |
| ... | u(1) |
| if(nuh_layer_id > 0 && NumDirectRefLayers[nuh_layer_id] > 0) { | |
| skip_picture_flag | u(1) |
| if(!skip_picture_flag) { | |
| inter_layer_pred_enabled_flag | u(1) |
| if(inter_layer_pred_enabled_flag && NumDirectRefLayers[nuh_layer_id] > 1) { | |
| if(!max_one_active_ref_layer_flag) | |
| num_inter_layer_ref_pics_minus1 | u(v) |
| for(i = 0; i < NumActiveRefLayerPics; i++) | |
| inter_layer_pred_layer_idc[i] | u(v) |
| } | |
| } | |
| } | |
| if(NumSamplePredRefLayers[nuh_layer_id] > 0 && NumActiveRefLayerPics > 0 && !skip_picture_flag) | |
| inter_layer_sample_pred_only_flag | u(1) |
| if(sample_adaptive_offset_enabled_flag) { | |
| slice_sao_luma_flag | u(1) |
| slice_sao_chroma_flag | u(1) |
| } | |
| if(slice_type == P slice_type == B && !skip_picture_flag) { | |
| num_ref_idx_active_override_flag | u(1) |
| if(num_ref_idx_active_override_flag) { | |
| num_ref_idx_l0_active_minus1 | ue(v) |
| if(slice_type == B) | |
| num_ref_idx_l1_active_minus1 | ue(v) |
| } | |
| } | |
| ... | |
| byte_alignment() | |
| } | |



Proposed semantics

skip_picture_flag equal to 1 specifies that slice_segment_data() is not present for the current slice, and the decoding process for skipped picture with nuh_layer_id greater than 0. skip_picture_flag equal to 0 specifies that slice_segment_data() is present for the current slice. When skip_picture_flag not present, it is inferred to be equal to 0. It is a requirement of bitstream conformance that skip_picture_flag shall be the same for all slices of a coded picture. When skip_picture_flag is equal to 1, it is a requirement of bitstream conformance that NumMotionPredRefLayers[nuh_layer_id] and NumSamplePredRefLayers[nuh_layer_id] shall be greater than 0.

alt_collocated_indication_flag equal to 0 specifies that a collocated picture for temporal motion vector prediction is indicated by collocated_from_I0_flag, when present, and collocated_ref_idx. alt_collocated_indication_flag equal to 1 specifies that a collocated picture for temporal motion vector prediction is indicated by collocated_ref_layer_idx. **When alt_collocated_indication_flag is not present, it is inferred to be equal to skip_picture_flag.**

It is a requirement of bitstream conformance that the value of alt_collocated_indication_flag shall be the same for all slices of a coded picture.

Proposed Slice Segment layer RBSP

| | Descriptor |
|------------------------------------|-------------------|
| slice_segment_layer_rbsp() { | |
| slice_segment_header() | |
| if (!skip_picture_flag) | |
| slice_segment_data() | |
| rbsp_slice_segment_trailing_bits() | |
| } | |

Proposed decoding process

- To decode a skipped picture, motion compensated prediction is performed by applying the re-sampled motion field from the closest reference layer to the temporal reference pictures in the current layer's DPB
 - Prediction residual is set to zero
 - For intra coded blocks, re-sampled texture from the closest reference layer is used
- Decoding of a skipped picture uses existing modules in SHVC WD2 and single layer HEVC
- Proposed decoding process text is included in N0209.
- The quality of such reconstructed picture is better than up-sampled base layer picture
 - Reduced flickering artifacts when alternating between coded and skipped pictures

Conclusion

- Skipped slice was supported in SVC
- A useful feature for SVC products
- skip_picture_flag syntax, semantic and decoding process are proposed to skip all slices in a picture for SHVC
- Recommend to adopt the proposal