

Region-wise quality indication SEI message

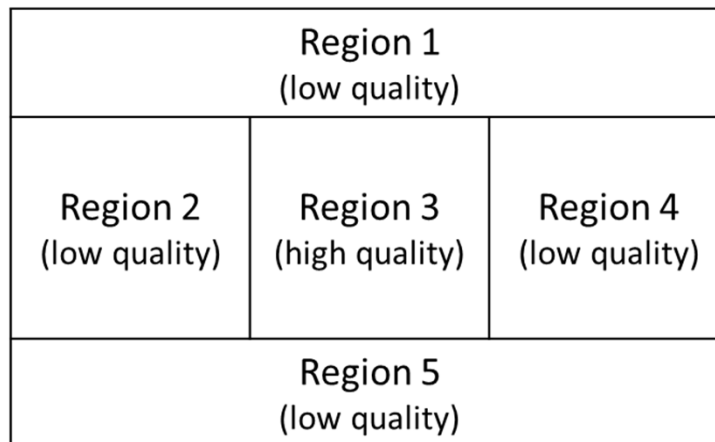
(JCTVC-AA0030)

April 2017, Hobart

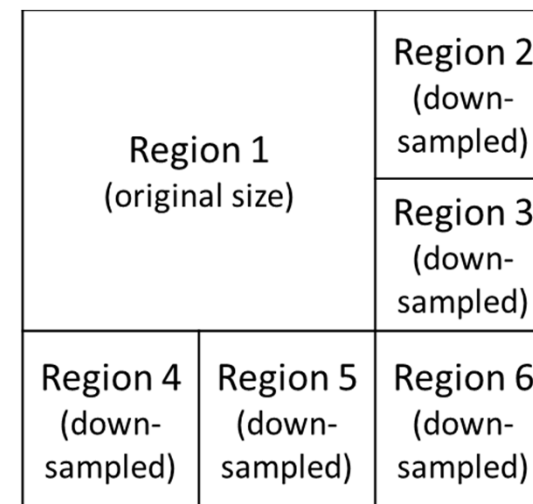
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- In the application of 360 video, a selected region of an entire picture is played on a display.
 - The size of the picture for 360 view is 4K or higher.
- Due to the bandwidth limitation in delivery, region-wise different picture quality is in discussion with regards to the region of interest.
 - Examples
 - region-wise different PQ offset
 - region-wise different spatial resolution
 - Pros and cons
 - Pros: more bits could be allocated for the most interested regions.
 - Cons: unintended artifacts, such as region boundary edges, could be introduced.
- In receivers, picture quality is important regardless of the delivery burdens.
 - Post-processing could be performed to alleviate the unrealistic edges before display the generated viewport on a display.

- Two types of quality degradation is considered for 360 video
 - (a) region-wise quantization
 - e.g. ERP encoded with region-wise difference quantization
low quantization parameter for the central region
higher quantization parameter for the other regions.
 - (b) region-wise spatial down-sampling
 - e.g. down-sampled CMP
original size for the most interested face
down-sampling (spatially degraded) for the other regions.



(a)



(b)

- To improve viewer experience, region-wise processing is needed according to the quality degradation characteristics, such as,
 - type of quality degradation
 - level of quality difference
 - detailed information for quality degradation
- In addition, spherical coordinate is proposed for each rectangular regions to provide a direct relationship between the rectangular region and the corresponding viewpoint.

Proposed region-wise quality indication

JCTVC-AA0030

region_wise_quality_indication(payloadSize) {	Descriptor
region_wise_quality_indication_id	ue(v)
region_wise_quality_indication_cancel_flag	u(1)
if(!region_wise_quality_indication_cancel_flag) {	
region_wise_quality_indication_persistence_flag	u(1)
region_wise_spherical_coordinate_flag	u(1)
quality_indication_type	u(4)
number_of_region_minus1	u(8)
for(i = 0; i <= number_of_region_minus1; i++) {	
region_top_offset[i]	u(8)
region_left_offset[i]	u(8)
region_bottom_offset[i]	u(8)
region_right_offset[i]	u(8)
if(region_wise_spherical_coordinate_flag) {	
region_yaw_center[i]	i(16)
region_pitch_center[i]	i(16)
region_roll_center[i]	i(16)
region_yaw_range[i]	u(16)
region_pitch_range[i]	u(16)
}	
region_quality_indication_level[i]	u(8)
region_quality_indication_info[i]	u(8)
}	
}	
}	

- Proposed to define a new SEI message for region-wise quality indication
 - type of quality degradation
 - level of quality difference
 - detailed information for quality degradation
- In addition, spherical coordinate is provided for each rectangular regions.
- Receivers could improve the image quality when the difference quality of images are seen in a viewport by using the information provided.

Thank you