mxxxxx

[G-PCC] Profile and Level

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June, 9, 2020

Profile Overview

- MPEG130
  - Discussion and opinion
    - Market of G-PCC has not been launched yet
    - Many tools should be selectable by the market/application
    - Profile for Automotive & 3D map is needed at least

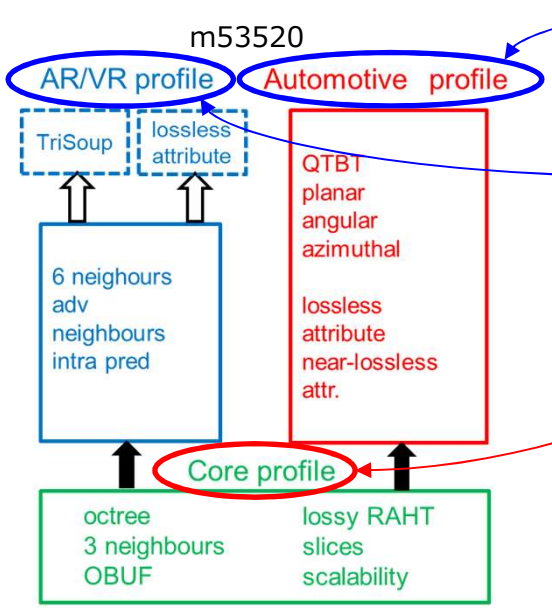
  - Four contributions (m53292, m53520, m53540, m53676) were proposed

- We compare two contributions that propose detail profile and tools
  m53520: Core, Automotive, AR/VR
  m53676: Simple, Simple+, Dense

- Analyze commonalities and differences. -> next page

Analysis

- Commonalities
  - The tools of Automotive and Simple+ are similar
  - The tools of AR/VR and Dense/Semi are similar
- Differences
  - Core or Simple
    - Core : It has backward compatibility
    - Simple: Only one of selectable tools is selected. Minimum configures
  - Attribute coding (lossless-predicting, lossy-lifting, lossy-raht)
  - Minor difference
- Content
  - cat3-fused is included in Automotive or Dense/Semi ?



m53676

Table 1 – Mandatory (y) and optional (x) profile features

	Simple	Simple+	Dense/Semi	Trisoup
Dictionary occ coding	y			y
Bitwise occ coding		y	x	
QTBT	?	x	x	
N6			y	
N3	y	y		y
IDCM	y	x	x	x
Intra occ prediction			x	
Adjacent child neighbours			x	
Planar			x	
Angular		x		
(Azimuth)		x		
Geometry quantisation	x (if shift)	x	x	
Duplicate points	x	x	x	x
Parallel octree levels			x	
Trisoup				x
Entropy bypass stream	y	x/y?	x	
Lifting		?	x	x
Predicting	y	x	x	x
adaptive prediction	x	x	x	x
intra lod prediction	y	y	x	x
inter component prediction	x	x	x	x
LoD generation using distance			y	y
LoD generation using decimation	y	y		
scalable LoD generation				
RAHT		x	x	x
RAHT transform domain prediction			x	x

Proposal: Profile design

- Profile structure
  - Core Profile
    - One basic profile that has backward compatibility
  - Extended profile (sparse / dense / dense+)
    - Contain appropriate tools for dense / sparse point cloud
    - Target content
      - Dense: cat1-a, cat2-b, cat3-fused
      - Sparse: cat3-framed
- Tool
  - Effective tools should be included in core profile
  - Both tools are selected if it’s difficult to select either

Proposal: Structure of the Profile

Profile also support the tools of lower profile.

[Dence+ (AR/VR)profile]

[Geometry]
trisoup

[Attribute]

[Dence profile] Cat1-a,b cat3-fused

[Geometry]
6 neighours
Intra occ prediction
Adjacent child neighbours
Planar
[Attribute]
lifting
(lifting) scalable lod
(raht) transform domain prediction

[Sparse profile] cat3-framed

[Geometry]
QTBT
angular
azimuthal
[Attribute]
lifting

[Core profile]

[Gometry]
octree / predictive coding
(octree) Bit-wise/Byte-wise occ coding
(octree) 3 neighbours
(octree) IDCM
(octree) Geometry quantization
Dupliate points

Entropy_bypss_stream

[Attribute]
predicting / raht
(predicting) adaptive prediction
(predicting) intra lod prediction
(predicting)
LoD generation w/ distance/decimation
(color) inter component predictiond

Proposal: Tools

- Core profile
  - Geometry: Octree / Predictive coding
  - Attribute : LoD with Predicting for lossless/near-lossless
    RAHT for lossy

Geometry

		Core	Sparse	Dense	Dense+ (AR/VR)
Octree		○	○	○	○
Pred geom		○	○	○	○
Trisoup		×	×	×	○
Octree	Dictionary occ coding	○	○	○	○
Octree	Bitwise occ coding	○	○	○	○
Octree	QTBT	×	○	×	×
Octree	Neighbor context (N6)	×	○	○	○
Octree	Neighbor context (N3)	◎	○	○	○
Octree	IDCM	○	○	○	○
Octree	Intra occ prediction	×	×	○	○
Octree	Adjacent child neighbours	×	×	○	○
Octree	Planar	×	×	○	○
Octree	Angular	×	○	×	×
Octree	Azimuth	×	○	×	×
Octree	Geometry quantisation	○	○	○	○
Octree	Duplicate points	○	○	○	○
Octree	Parallel octree levels	×	×	○	○

Attribute

		Core	Sparse	Dense	Dense+ (AR/VR)
lossy-Lifting		×	○	○	○
lossy-RAHT		◎	○	○	○
lossless-Predicting		◎	◎	◎	◎
Predlift	Adaptive prediction	○	○	○	○
Predlift	Intra lod prediction	○	○	○	○
Predlift	LoD generation using distance	○	○	○	○
Predlift	LoD generation using decimation	○	○	○	○
Predlift	Scalable LoD generation	×	×	○	○
Raht	Transform domain prediction	×	○	○	○
	Inter component prediction	○	○	○	○

◎: mandatory (no alternative tool) ○:mandatory(on/off, selectable), ×: not support

Red color: difference from lower profile

Conclusion

- In this contribution, we presented :
  - The analysis of the Commonalities and Differences of MPEG130 contribution
  - The proposal of the profile structure and the tools
- We suggest discussing the profile based on this contribution as a starting point