Texturing pitfalls in production

Fabrice NEYRET May, 12th, 2015

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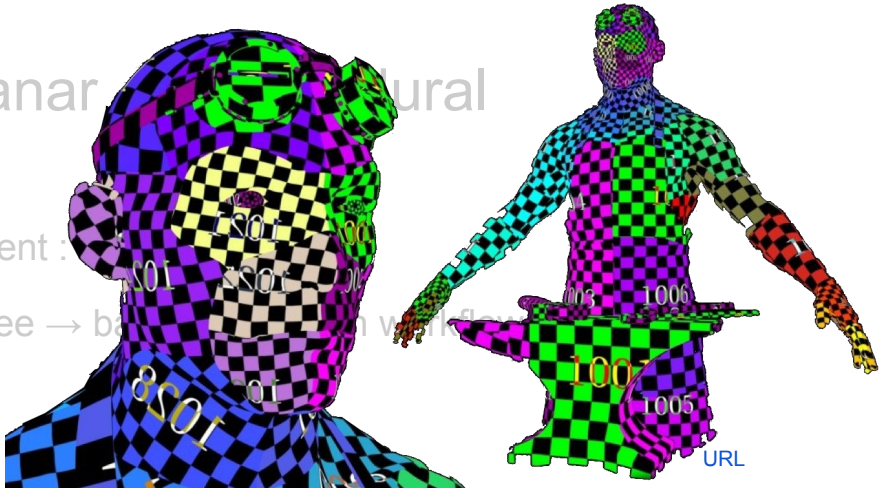
- Plenty of filtering issues

  despite all MIP-mapped (displacement :
- No real workflow (paint → shader tree → ba [illegible] n w [illegible]



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2. Mapping vs filtering issues

- interactive tools (Mari,Zbrush?): painting screenwise appearance
  - What happen on silhouettes ? → Mari: strict screen proj.
  - Multi-component footprint ?
  - Which resolution / spatial spectrum in screen/texture/surface space ?
- reconstruction issues: discont at atlas tile b
  - Mag filter
  - Min filter:

    PB with displ filtering as roughness (Lean/Lead-R)
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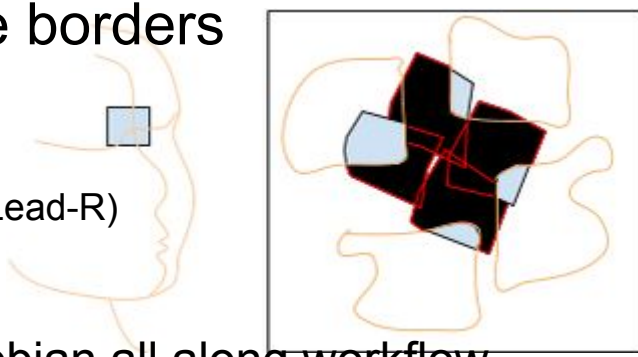

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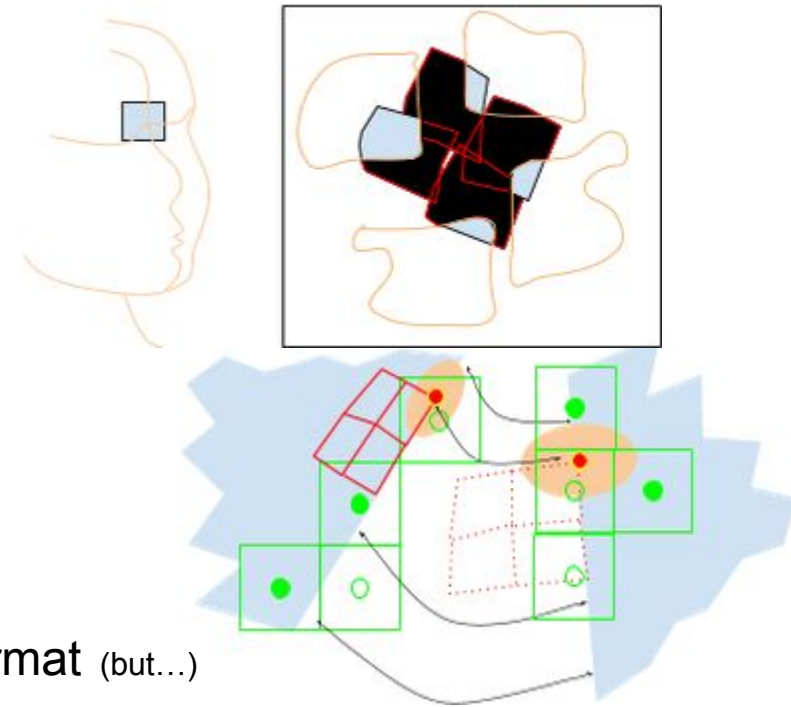


Filtering across atlas tile borders

The Reyes process-per-patch issue

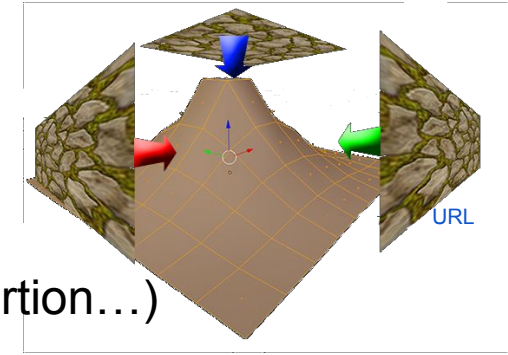
- (The pb with displacement)
- Low filtering
- High filtering
  - and what about curvature ?

Solutions:

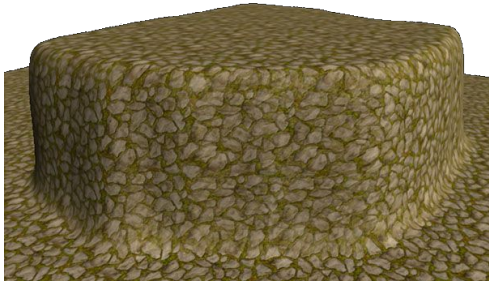
- low: multi-footprint (data structure ?) / Ptex format (but…)
- high: many-footprints / Mapping LOD ?

PB: stick to old-school PRman workflow despite new usages and requirements !

3. Triplanar projection



- Solve all mapping issues (atlas tiles, mapping distortion…)
- Add many new issues:
  - repetition
    → pile-up layers (scale + look)
  - ghosting, overblending, varying contrast
    → more piling-up + masks (+adjust frame)
    → limit possible look



- May rely on mapping anyway:
  - intrinsic orientation (e.g., trees)
  - triplanar/procedural as shader tool vs editing tool

4. Procedural

- When editing/storing/loading are just too overwhelming (landscape)
- Or just editing (scales) : editing tool vs shader tool

Issues:

- Which workflow for artists ? (none → work blindly)
- Limited primitives / harsh PRman compatibility (100% forced locality)
- Displ: compatibility with other CG tools (collisions, flow, …)

→ little & specialized usage

→ more geometry + load + run-time memory

→ mix of procedural and maps/geom

Still, procedural placement is not procedural at rendering if any change (e.g., rocks)
(several notions of instancing)

→ more geometry and loading

5. Look-dev : controlling the overall look

- Several purposes: (NB: not only for textures)
  - Faithful interactive edition (filtering, shaders+combined…)
  - Preview
  - Look validation (client, directors, match real…)
  - Personal workflow (close view / far view , cycling pace)
- Crucial to preview using the final look

  (or artist will mess the data to see what he expect. e.g., displ)
- But too costly (filterings + shading + ambient occlusion + full rendering...)

→ Different tools:

  - Semi-realistic real-time rendering (with 1 or 2 focus: maps, material, light…)
  - “fast preview” (but “fast” might be quite slow)
  - Progressive rendering (good for lighting, bad for textures)

6. More filtering issues

Correlated and non-linear occlusion:

- Border of hidden parts (i.e. hiding through geometry occlusion)
- Colors vs orientation (color+displ, color+geom, displ+geom,...)
- Non-linear transforms (min-max, gamma, clamp…)

Very practical issues:

- Smooth derivatives (which filtering footprint paradigm ?)
- finite differences (displ normals)

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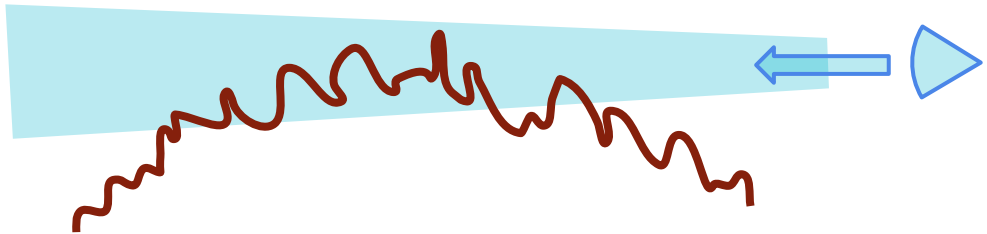
Far filtering: Curvature ? Silhouettes ?

→ deep filtering ⇒ rethink filtering integrating geometry

Filtering displacement map on silhouettes: how ?

→ alternate representation.

Volume ? dedicated silhouette material ?



7. Memory footprint & Internal representation

- Globillu vs memory: Multiple views; can store only 1 version !
  = worst-case MIPmap → no prefiltering → even more rays
- Dewelded vertices, false instances, ½ deferred baking (params)
  → huge duplications, huge wastes of information

→ Rethink whole CG repr (high & low-level) / rendering
in terms of memory occupancy (repr, compr, factor, param, lazy...)

→ Prod not at all convergent with gaming industry