Automatic Texture Mapping for Large-Scale 3D City Model by Temporal Height Image (THI)

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Our goal is to make texture mapping onto large-scale 3D city model automatically. The main issue is to extract buildings from urban actual image stably. To solve this issue, we propose a novel expression of space-time volume, called “Temporal Height Image (THI)”. Assigning a gray value in proportion as height to all the objects in the space-time volume, we can obtain THI by looking the volume above. The THI has similar concept as EPI (Epipolar Plane Image), whereas, THI can overcome the shortages of EPI (i.e. edges inside the building disrupt result, different EPIs with different slice heights). Then, making THIs from urban actual image and digital map, we can align buildings between the two THIs by DP-matching. Using DP result, texture of target building model can be found automatically. We tried our method in two scenes and they were both well done.

Publications


Processing Flow:

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<th>Real image</th>
<th>Digital map</th>
<th>Input</th>
<th>THI with recognized bands</th>
<th>Corresponding result</th>
<th>Textured result</th>
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THI:

Capturing scene → Spacetime Vol. → THI

DP Matching:

Experimental result:

Komaba area

Shinjuku area