15th Radiance Workshop - Padua

IMAGE COMPOSITING
AND
VISUALIZATION DATA WITH AN OPEN-SOURCE DATA ANALYSIS AND
VISUALIZATION APPLICATION.

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Sometimes the Radiance images are not appreciated by the owner since it appears lose of some architectural detail.
This image shows the 3D model made with Rhinoceros® 3D
IMAGE COMPOSITING

Here the Radiance image of the annual solar irradiation on the external surfaces

Some of façade detail (windows frame) are not visible
How can we make more visible this details on the Radiance image?
Step 1
Example with Diva4Rhino

The Rhino viewport image size must be the same on Diva4Rhino image size.
Step 2
Set the Rhino display mode showing only the surfaces/mesh edges

The Rhino display mode "Radiance_Surface_edge.ini" is available on radiance on-line
Step 3
Set the Rhino display mode showing only the surfaces/mesh edges and save to file (*.png) the captured viewport.
IMAGE COMPOSITING

Step 4
Open GIMP and import both Radiance and Rhino viewport image files by means of “Open as Layers” command

Rhino viewport image

Radiance simulation image
Step 5
Convert the background gray color of the Rhino viewport file to Alpha channel (transparency)
Step 6
Scale (if necessary) and combine the two images with this final result
How we can show the data from rtrace with Paraview a scientific visualizer data?
PARAVIEW® VISUALIZE DATA

For more information of Paraview: http://www.paraview.org
Rhino -> 3D model
+ Honeybee -> mesh pts

Grasshopper 3D
It is used as interface to prepare vtk file using mesh data informations (vertex, type of face, etc) and radiance data calculation.
Unstructured Grid

The unstructured grid dataset consists of arbitrary combinations of any possible cell type. Unstructured grids are defined by points, cells, and cell types. The \texttt{CELLS} keyword requires two parameters: the number of cells \( n \) and the size of the cell list \( \text{size} \). The cell list size is the total number of integer values required to represent the list (i.e., sum of \texttt{numPoints} and connectivity indices over each cell). The \texttt{CELL_TYPES} keyword requires a single parameter: the number of cells \( n \). This value should match the value specified by the \texttt{CELLS} keyword. The cell types data is a single integer value per cell that specified cell type (see \texttt{vtkCell.h} or \textbf{Figure 2}).

\texttt{DATASET UNSTRUCTURED_GRID}
\texttt{POINTS n dataType}
\hspace{1cm} P_{0x} P_{0y} P_{0z}
\hspace{1cm} P_{1x} P_{1y} P_{1z}
\hspace{1cm} ... \hspace{1cm} P_{(n-1)x} P_{(n-1)y} P_{(n-1)z}
PARAVIEW® VISUALIZE DATA

A detail of the Grasshopper 3D file

<- Left image shows the contraction of each steps of unstructured VTK file format

Right image shows the final VTK text to be save -> manually with *.vtk file extension
Final step:
- Use Rhino to export all the 3D model as *.wrml or *.obj file format
- Open Paraview
  - Import .vtk file saved from Grasshopper 3D
  - Import 3d building model
Paraview final Images
For further information:

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