Radiance + OpenDX

Radiance

Radiance + Unity3D

OpenDX + Octave + Radiance

Radiance Workshop 2006

OpenDX

Radiance workshop 2006

Visualisation with Open DX

Experiences on the use of OpenDX in the Radiance workflow

Arup Lighting

Andrew Mc Neil Giulio Antonutto



Bank Facade Irradiance



Radiance Workshop 2008 UV Mapping / Unity3D

Light maps with Radiance

Giulio Antonutto / ArupLighting / 2008



This is a 3D model with textures





Complicate geometry...





Arup Lighting

Radiance Workshop 2014 Ambient files in OpenDX



model.amb

lookamb -d model.amb > model.data



model.amb

for each point:

Position, vector Direction, vector Lvl, scalar Wt, scalar Rad, scalar Value, vector Pos.Grad: vector Dir.Grad: vector

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🗋 model.data

N²

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1	#?RADIANCE										
2	rpict -av	000-aw0-	-ab 5 -aa 0.	2 -ad 512 -a	s 128 –ar 64	model.oct					
3	SOFTWARE=	RADIANCE 3.7	.2b patch re	elease 22 Aug	2005 by G. N	Ward					
4	CAPDATE= 2	006:10:21 16	:55:09	-							
5	FORMAT=asc	ii									
6											
7	1.444829	-0.003000	1.143601	0.000000	1.000000	-0.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
8	2.042833	0.040565	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	0.994096	0.000000e+00	0.000000e+00
9	2.417329	0.494166	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
10	2.403000	0.890899	3.676275	-1.000000	0.000000	0.000000	4	0.062500	1.031604	1.230469e+00	1.230469e+00
11	2.112890	1.858956	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
12	1.275971	0.513148	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
13	0.616194	1.714890	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
14	-0.003000	1.070503	3.313578	1.000000	0.00000	0.00000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
15	0.315398	0.576173	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
16	3.006708	-0.003000	2.298033	0.000000	1.000000	-0.000000	4	0.062500	2.750283	8.129883e-02	8.129883e-02
17	3.515134	0.449437	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
18	2.949903	1.367571	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
19	3.059524	2.450740	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
20	1.606292	2.707036	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.039802	0.000000e+00	0.000000e+00
21	-0.003000	1.430439	2.520977	1.000000	0.000000	0.000000	4	0.062500	3.220661	0.0000000+00	0.0000000+00
22	-0.003000	0.402504	1.9/52/3	1.000000	0.000000	0.000000	4	0.002500	3.220001	0.00000000+00	0.000000000000
23	1.050824	-0.001480	0./18514	-0.000000	0./0/10/	-0./0/10/	4	0.002500	0.402583	0.00000000+00	0.000000000000
24	2 122024	-0.003000	0.49/218	0.000000	1.000000	-0.000000	4	0.002500	3.220001	0.00000000+00	0.0000000000000
25	4 939491	1 259202	2 602000	0.000000	-0 000000	-0.000000	4	0.002500	3.220001	0.00000000+00	0.0000000000000000000000000000000000000
20	2 0/5802	3 003000	3.003000	0.000000	-1 000000	a aaaaaa	4	0.062500	3 220661	0.0000000000000000000000000000000000000	0.0000000000000000000000000000000000000
28	2,125988	3.003000	2.838016	0.000000	-1.000000	0.000000	4	0.062500	3.220661	0.000000c+00	0.000000000000000000000000000000000000
20	0.417610	3.003000	2.451156	0.000000	-1.000000	0.000000	4	0.062500	3,220661	0.000000c+00	0.000000c+00
30	-0.003000	2.381230	2.897678	1.000000	0.000000	0.000000	4	0.062500	1.881788	0.000000e+00	0.000000e+00
31	-0.003000	0.807509	1.372368	1.000000	0.000000	0.000000	4	0.062500	3,220661	0.000000e+00	0.000000e+00
32	0.400983	-0.003000	0.858902	0.000000	1.000000	-0.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
33	6.003000	0.222461	3,583625	-1.000000	0.000000	0.000000	4	0.062500	0.402583	0.000000e+00	0.000000e+00
34	5.954136	0.335420	2.486929	-1.000000	0.000000	0.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
35	4.935813	3.003000	2.526714	0.000000	-1.000000	0.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
36	4.082895	3.003000	2.807930	0.000000	-1.000000	0.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
37	1.571744	1.710466	1.126777	0.021339	-0.869881	-0.492800	4	0.062500	1.432947	0.000000e+00	0.000000e+00
38	0.904232	3.003000	1.455398	0.000000	-1.000000	0.000000	4	0.062500	1.791816	0.000000e+00	0.000000e+00
39	-0.003000	1.635194	1.312936	1.000000	0.000000	0.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
40	-0.003000	0.192156	0.848389	1.000000	0.000000	0.000000	4	0.062500	2.702290	0.000000e+00	0.000000e+00
41	2.398600	-0.001400	0.399650	-0.707107	0.707107	-0.000000	4	0.062500	0.402583	0.000000e+00	0.000000e+00
42	6.333000	1.858586	1.824589	-1.000000	0.000000	0.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
43	3.203264	3.003000	1.099090	0.000000	-1.000000	0.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
44	2.236240	3.003000	1.453663	0.000000	-1.000000	0.00000	4	0.062500	1.451061	0.000000e+00	0.000000e+00
45	-0.003000	2.439863	0.658485	1.000000	0.000000	0.00000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
46	-0.003000	0.827169	0.322916	1.000000	0.000000	0.00000	4	0.062500	2.774990	0.000000e+00	0.000000e+00
47	1.449350	1.633889	3.603000	0.000000	-0.000000	-1.000000	4	0.062500	3.220661	0.000000e+00	0.000000e+00
48	1.564751	1.197375	3.602625	0.000000	-0.707107	-0.707107	4	0.062500	3.220661	0.000000e+00	0.000000e+00
49	1.873281	1.203000	3.824877	0.000000	-1.000000	0.000000	4	0.062500	1.401789	1.066406e+00	1.066406e+00
50	1.364386	0.250924	0.044629	0.000000	0.000000	1.000000	3	0.125000	3.220661	9.985352e-02	9.985352e-02
51	3.18/285	-0.003000	1.325833	0.000000	1.000000	-0.000000	4	0.062500	3.220661	8.8134//e-02	8.8134//e-02

Line 1 Col 1

bringing all in OpenDX

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1 2 3 4 5 6 7 8 9	<pre>grid = marker "x = " x marker "y = " x marker "z = " header = lines 3 format = ascii interleaving = field majority = row series = 1,1,1,1,1,1,1,1,1,1 field = locations, Direction, Lvl, Wt, Rad, R, G, B, PosGrad, DirGrad structure = 3-vector, 3-vector, scalar, scalar, scalar, scalar, scalar, scalar, 3-vector, type = float, float, float, float, float, float, float, float, float, float end</pre>	3-vector	
11			
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bringing all in OpenDX

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2014 Radiance Workshop Summer Sale

Giulio Antonutto

Arup

Article #1 Script to create grids from rectangles

Prepare an obj file:

- * containing materials
- * with only rectangles
- * with no orphan vertexes

Copy file grigliata.m into working folder

Open Octave

To use type: grigliata('name of the file.obj', pass i in world units, pass j in world units)

As example like this: grigliata('grids.obj',2,2)

Note: triangles will be ignored

000	🔲 gi	rids		R _M
FAVORITES	Name	▲ Date Modified	Size	Kind
💱 Dropbox	grids_001.grd	Today 11:23	27 KB	Document
AirDrop	grids_002.grd	Today 11:23	27 KB	Document
Applications	grids_003.grd	Today 11:23	27 KB	Document
A singi	grids_004.grd	Today 11:23	27 KB	Document
	grids_005.grd	Today 11:23	24 KB	Document
Desktop	arids 007.ard	Today 11:23	24 KB	Document
😍 Downloads	grids_008.grd	Today 11:23	24 KB	Document
🚞 Library	summary.txt	Today 11:23	1 KB	Plain Text
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	9 items, 11.51	GB available		

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Did you check is a rectangle?		
Grid: 001; punti_i= 17; punti_j= 17;	v_i= 0.000000 10.000000 0.000000; v_j: -10.000000 0.000000 0.000000; N= 0.00 -0.00 1.00;	
Grid: 002; punti_i= 17; punti_j= 17;	<pre>v_i= 0.000000 10.000000 0.000000; v_j: -10.000000 0.000000 0.000000; N= 0.00 -0.00 1.00;</pre>	
Grid: 003; punti_i= 17; punti_j= 17;	<pre>v_i= 0.000000 10.000000 0.000000; v_j: -10.000000 0.000000 0.000000; N= 0.00 -0.00 1.00;</pre>	
Grid: 004; punti_i= 17; punti_j= 17;	v_i= 0.000000 10.000000 0.000000; v_j: -10.000000 0.000000 0.000000; N= 0.00 -0.00 1.00;	
Grid: 005; punti_i= 16; punti_j= 16;	<pre>v_i= 0.000000 10.000000 0.000000; v_j: -10.000000 0.000000 0.000000; N= 0.00 -0.00 1.00;</pre>	
Grid: 006; punti_i= 16; punti_j= 16;	<pre>v_i= 0.000000 10.000000 0.000000; v_j: -10.000000 0.000000 0.000000; N= 0.00 -0.00 1.00;</pre>	
Grid: 007; punti_i= 16; punti_j= 16;	<pre>v_i= 0.000000 10.000000 0.000000; v_j: -10.000000 0.000000 0.000000; N= 0.00 -0.00 1.00;</pre>	
Grid: 008; punti_i= 16; punti_j= 16;	<pre>v_i= 0.000000 10.000000 0.000000; v_j: -10.000000 0.000000 0.000000; N= 0.00 -0.00 1.00;</pre>	

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Article #2 Script to convert obj files to OpenDX

Prepare an obj file:

- * containing materials
- * with no orphan vertexes

Copy file **obj2odx.m** into working folder

Open Octave

To use type: obj2odx('name of the file.obj')

As an example try like this: obj2odx('model.obj')

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Article #3

Script to plot polar diagrams out of radiance light sources

Go to working folder containing the file **flux_calc.m**

Copy at this location your radiance light sure (for example an **ies2rad** converted file)

Open Octave

To use type: **flux_calc('file_name.rad')** *Note that the scale is in meters

When the script outputs the light source flux, go to the dx folder and launch **OpenDX**.

Within **OpenDX** select the **Photometry** network.

Run it

You should get a nice chart and flux plotted (Can export the photometry as **vrml** surface to check **replmarks**, etc).

```
As an example try:
flux_calc('Mundial_1KW_V1.rad')
```


Article #4

Script to use UV maps from obj files to create textures in radiance (radiance baking)

*Concept: * use a obj file to derive UV mapping * use an octree file to bake based on UV mapping*

You need to:

- * prepare an obj file with triangles, no orphan vertexes, UV mapping and materials
- * prepare an octree of a scene with the light, colours and materials of your liking
- * edit the **batch_tex** script to indicate name of files and materials
- * run the **batch_tex** script in Octave
- * This will generate images to map back in radiance or in the 3d software of your choice

Usage:

Edit the **batch_tex** file (indicating name of obj and oct files, resolution, etc)

You can run several obj files out of a single octree for baking different maps

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Bonus, how to put back textures in radiance:

How to:

- * prepare a material file
- * convert obj with obj2mesh and use material file
- * load mesh into radiance scene with **mesh** primitive
- * check with **objview**

Example of material file:

```
void colorpict baked
7
red green blue
baked.pic
.
1-A1*((Lu-A3)/A5-floor((Lu-A3)/A5))
1-A2*((Lv-A4)/A6-floor((Lv-A4)/A6))
0
6 1 1 0 0 1 1
```

```
baked glow material
0
0
4 1 1 1 0
```


Common known issues

- * no triangulated polygons or other errors (such as no UV map or no material)
- * there may be issues with normal listed on obj (rhino?)
- * -rx 90 and Y=Z swap Cinema4D style
- * image is swapped -h -v (pflip can help)
- * some triangles are left black, this is because they are too small
- * memory error, too many pixels! I used 4096 x 4096 max.
- * all back! did you check normals? did you check the octree?
- * takes a long time to process polygons, maybe is a good idea to save intermediate steps (requires coding)
- * generally slow, maybe a volunteer to port it to c#?

Suggested uses

- * can use UV to generate regular grids on fluid forms
- * can use baking to bake geometry or small detail (for example the facade of a building)
- * can use baking for animations in radiance and in other software
- * can use baking for video games! such as in the Unity3d platform...

Article #5

Script to create a parametric potato into a radiance scene

Copy genpotato into a working directory, provide appropriate permissions.

Explore the following settings:

-x value [PF along x, for details contact Carsten Bauer] -y value [PF along y, for details contact Carsten Bauer] -z value [PF along z, for details contact Carsten Bauer]

-u value [u subdivisions used by gensurf for maximum accuracy] -v value [v subdivisions used by gensurf for maximum accuracy]

or simply run defaults with

genpotato

Oľ

./genpotato

Note, never forget to add a potato to your renderings!

Article #6

OpenDX map to visualise ambient files

Terms and Conditions

Use as you wish.

The only condition is to share your improvements to the code with the community.

"Take but give back."

For warranty refers to warranty terms.

There is NO warranty!

