TECHNICOLOR POINT CLOUD RENDERER
PccAppRenderer

18TH OF APRIL 2017

technicolor.com

technicolor

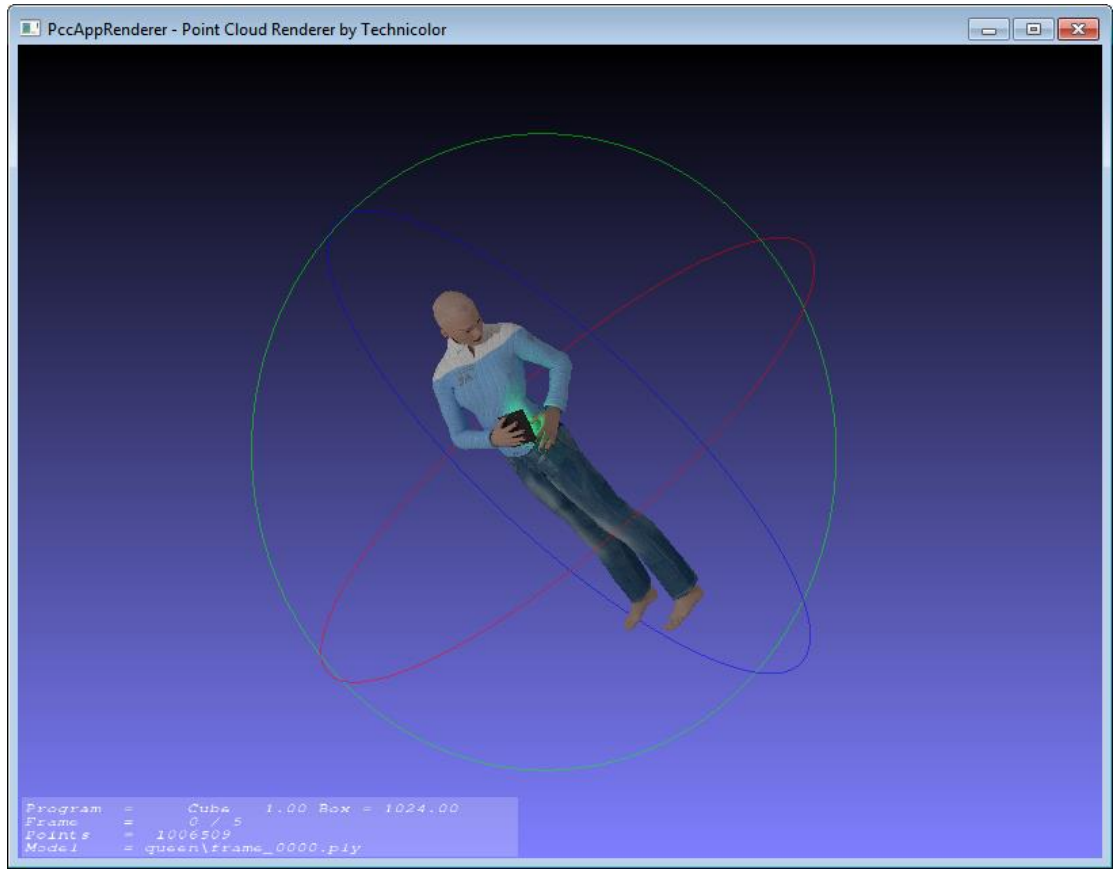
FEEL THE WONDER

Main Functionalities

Render static and dynamic point clouds

Key features

- Basic renderer functionalities
  - Navigation model/video
  - FPS control
  - …
- Camera Path
  - Use a predefined path
  - Register your own path
  - Replay your path with your model
- Output RAW File
  - Register the rendering in a video RGB file
- Synchronization between renderers
- Scriptable



technicolor
FEEL THE WONDER

Input format

- Based on PLY input format
- Format element
  - ascii and binary_little_endian are supported
- Vertex element
  - Other flags than [x y z] [nx ny nz] [r g b a] are skipped
  - [x y z] are mandatory

technicolor
FEEL THE WONDER

Application : Inline Help

```
-v, --version      Print version. (default = 0).
-h, --help         Print help. (default = 0).
-f, --PlyFile      Source filename (default = ).
-d, --PlyDir       Source directory (default = ).
-b, --binary       Create temp binary files (default = 0).
-o, --RgbFile      Output RGB 8bits filename (specify prefix file name) (default = ).
-x, --camera       Camera path filename (default = ).
-y, --viewpoint    Viewpoint filename (default = ).
    --spline       Interpolate the camera path by splines (default = 0).
-n, --FrameNumber  Frame number (default = 1).
-i, --FrameIndex   Frame index (default = 0).
    --fps          Frames per second (default = 25).
-a, --align        Align (0:X, 1:-X, 2:Y, 3:-Y 4:Z, 5:-Z) (default = 0).
    --width        Window width (default = 800).
    --height       Window height (default = 600).
    --posx         Window position X (default = -1).
    --posy         Window position Y (default = -1).
    --size         Point size (default = 1).
    --type         Point type(0: cube, 1: circle, 2: point) (default = 0).
    --monitor      Monitor to display the window (default = 0).
    --background   Window background index (default = 0).
-p, --play         Play the sequences (default = 0).
-r, --rotate       Auto-rotate (speed in [0;4]) (default = 0).
    --overlay      Display overlay (default = 1).
    --box          Bounding box size (default = 1024).
-c, --center       Center the object in the bouding box. (default = 0).
-s, --scale        Scale mode
                    0: disable,
                    1: scale according to the object bounding box.
                    2: scale according to the sequence bounding box.  (default = 0).
```


technicolor
FEEL THE WONDER

Application : Launch PccAppRenderer

Static model

```
PccAppRenderer.exe -f model.ply
```

Dynamic model

Read from a directory	`PccAppRenderer.exe -d your_PLY_directroy -n 0`
Read n first frame of a model	`PccAppRenderer.exe -f model_%04d.ply -n 200`
Read n frame starting from an index of a model	`PccAppRenderer.exe -f model_%04d.ply -n 200 -i 20`
Play the model in loop	`PccAppRenderer.exe -d your_PLY_directroy -p`
Control the FPS	`PccAppRenderer.exe -d your_PLY_directroy --fps=25`

Binary mode

```
PccAppRenderer.exe -f model.ply -b
```

➔ accelerate the launching of the renderer

technicolor
FEEL THE WONDER

Application : Additional Options

Adapt Window Size (Width & Height)	`--width=1280 -height=720 | -w 0`
Choose your monitor identifier	`--monitor=1`
Choose your background	`--background=3`
Define the bounding box size	`--box=0`
Align your object	`--align=2`
Scale your object	
Choose to not scale the model	`-s 0`
According to the object Bounding Box	`-s 1`
According to the sequence Bounding Box	`-s 2`
Choose if the model is center or not	`-c`
Load a camera path	`-x camera.txt`
Output in RGB files	`-o video`
Define size & type of points for the rendering process	`--size=0.05 --type=0`

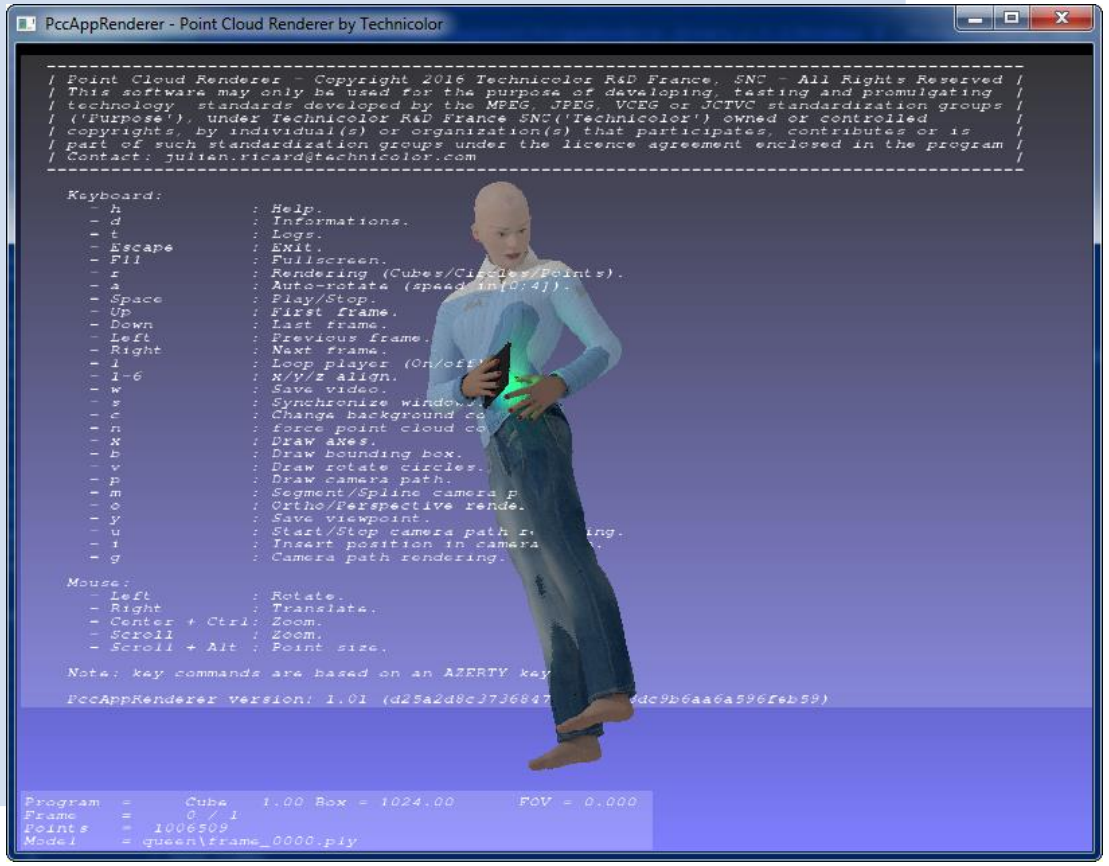
technicolor
FEEL THE WONDER

Embedded Features : Keyboard & Mouse Shortcuts

```
Keyboard:
     - h            : Help.
     - d            : Informations.
     - t            : Logs.
     - Escape       : Exit.
     - F11          : Fullscreen.
     - r            : Rendering (Cubes/Circles/Points).
     - a            : Auto-rotate (speed in[0;4]).
     - Space        : Play/Stop.
     - Up           : First frame.
     - Down         : Last frame.
     - Left         : Previous frame.
     - Right        : Next frame.
     - l            : Loop player (On/off).
     - 1-6          : x/y/z align.
     - w            : Save video.
     - s            : Synchronize windows.
     - c            : Change background color.
     - n            : force point cloud color.
     - x            : Draw axes.
     - b            : Draw bounding box.
     - v            : Draw rotate circles.
     - p            : Draw camera path.
     - m            : Segment/Spline camera path.
     - o            : Ortho/Perspective rendering.
     - y            : Save viewpoint.
     - u            : Start/Stop camera path recording.
     - i            : Insert position in camera path.
     - g            : Camera path rendering.

   Mouse:
     - Left         : Rotate.
     - Right        : Translate.
     - Center + Ctrl: Zoom.
     - Scroll       : Zoom.
     - Scroll + Alt : Point size.

   Note: key commands are based on an AZERTY keyboard.
```



“h” : display online help in log windows

technicolor
FEEL THE WONDER

Basic Embedded Features

Zoom, Translate, Rotate, Auto-rotate

Change background color

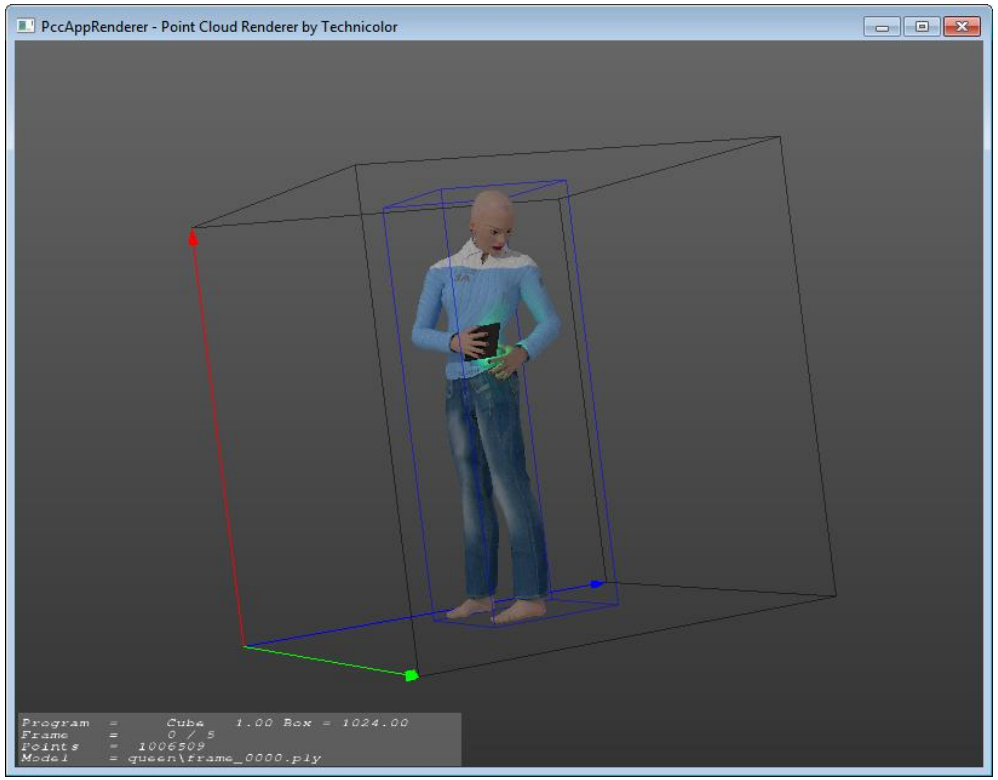
Show axes and bounding boxes

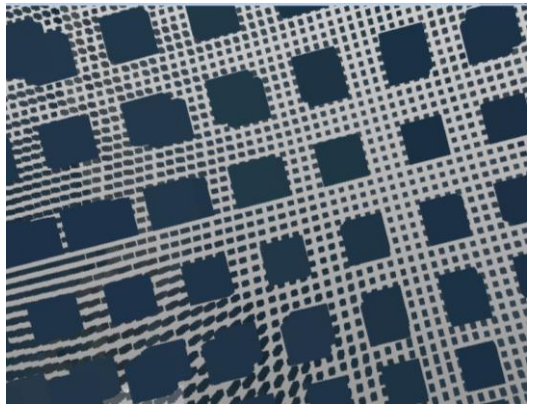
Orthographic and Perspective views

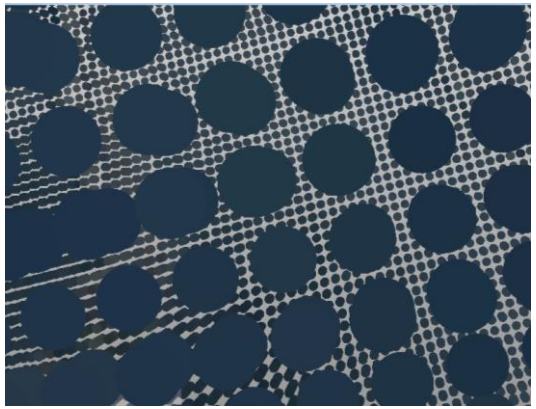
Cubes, Splats, Points with editable size

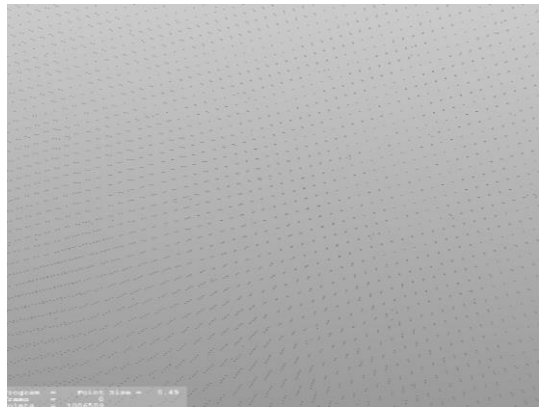
Play/Pause, Loop, Video navigation

Scriptable









technicolor
FEEL THE WONDER

Enhanced Embedded Features

Synchronization between renderer

“a” : Synchronize windows

Camera Path

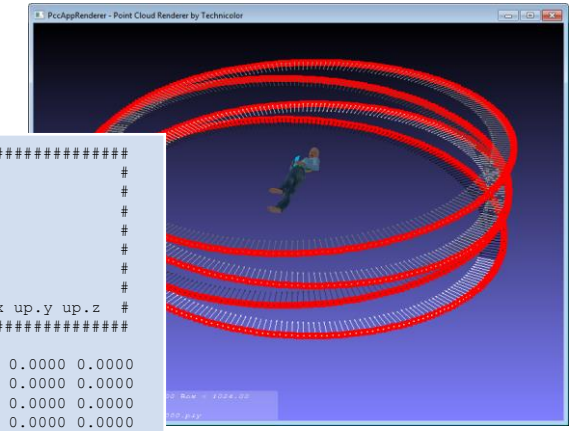
Load a camera path file

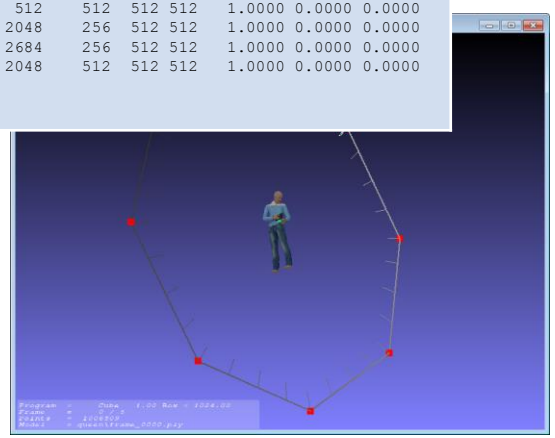
Register your own Camera Path file

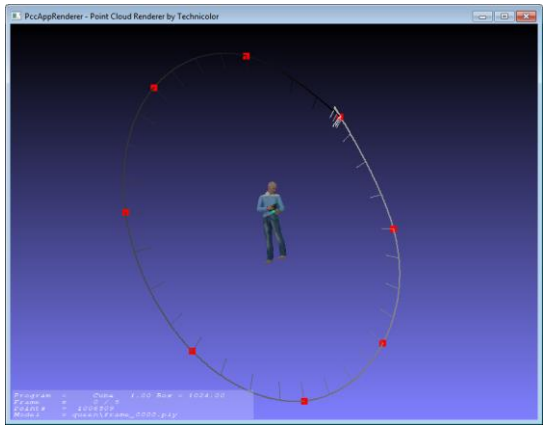
“u” : Start/Stop the recording of the path
“i” : Insert points into the record
“p” : Show the current camera path
“m”: Segment line/Spline mode
“g” : Generate the rendering based on your path

```
#################################################################
#  Camera path file:                                            #
#                                                               #
#    Index: index of the current view                           #
#    pos  : position of the camera                              #
#    view : direction of the camera                             #
#    up   : axis of the camera                                  #
#                                                               #
# Index pos.x pos.y pos.z view.x view.y view.z up.x up.y up.z  #
#################################################################

     0  512   2048   2048    512  512 512   1.0000 0.0000 0.0000
    32  512   2684    512    512  512 512   1.0000 0.0000 0.0000
    64  512   2048  -1024    768  512 512   1.0000 0.0000 0.0000
    96  512    512  -1660    768  512 512   1.0000 0.0000 0.0000
   128  512  -1024  -1024    512  512 512   1.0000 0.0000 0.0000
   160  512  -1660    512    512  512 512   1.0000 0.0000 0.0000
   196  512  -1024   2048    256  512 512   1.0000 0.0000 0.0000
   228  512    512   2684    256  512 512   1.0000 0.0000 0.0000
   255  512   2048   2048    512  512 512   1.0000 0.0000 0.0000
```







Output video RGB file

Available in playing mode

```
PccAppRenderer.exe -d your_PLY_directory -o OutputFile
```

Available with a camera path rendering mode

```
PccAppRenderer.exe -d your_PLY_directory -x cam.cfg -o OutputFile
```

“w” : Record your video file on the fly

technicolor
FEEL THE WONDER

Technical Description

OpenGL	v3.2	M	Cross-language, cross-platform application programming interface (API) for rendering 2D and 3D vector graphics Shaders
GLFW	v3.2.1	M	OpenGL library, is a simple API for creating windows, contexts and surfaces, receiving input and events.

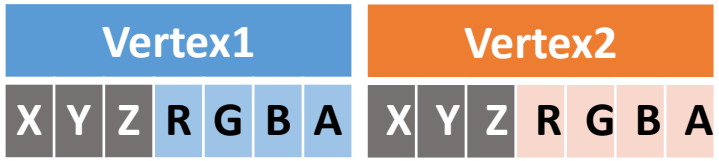
Standalone application (libraries are linked directly in it)

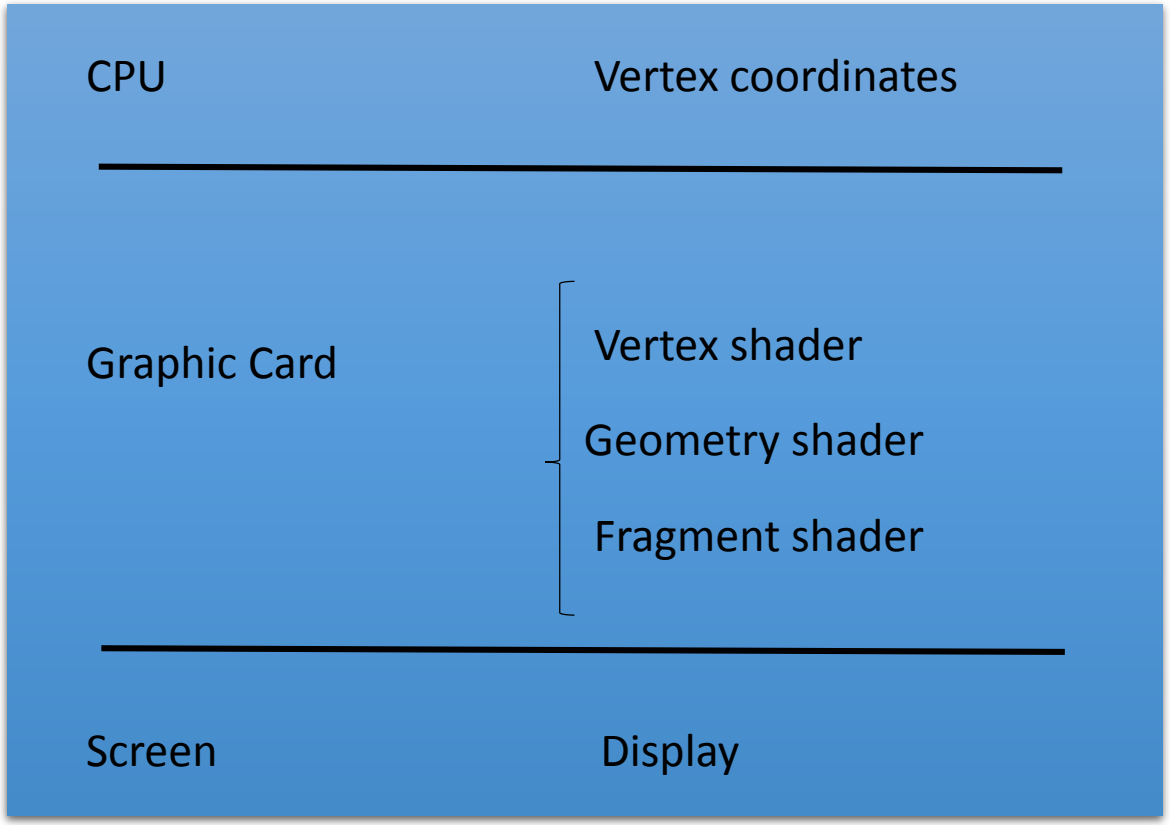
Compatible Windows (Visual Studio 2015) and Linux (Ubuntu 16.04), Cmake based

technicolor
FEEL THE WONDER

Shaders

Vertex Buffer Object organization





Point shaders

- g_pPointVertexShader
- g_pPointFragmentShader

Cube shaders

- g_pCubeVertexShader
- g_pCubeGeometryShader
- g_pCubeFragmentShader

Splat shaders

- g_pSplatVertexShader
- g_pSplatGeometryShader
- g_pSplatFragmentShader

technicolor
FEEL THE WONDER