PyVisi— The Python Visualisation Interface

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Abstract

About this manual

This manual has been split into five parts in an attempt to cover all of the material necessary to be able to use and master **PyVisi**, but also to provide an entry point for novices and experts alike.

Part I is a very simple introduction to **PyVisi**, and discusses how to use **PyVisi** to visualise ones data. Novice users may wish to start with Chapter 1 (Starting from scratch) to help themselves get going with **PyVisi**.

Part II gives user-level information about **PyVisi** and generic ideas behind the interface and how to use it (well, hopefully in the future anyway).

Part III gives specific information about the objects and methods available for use in **PyVisi**. For renderer-specific documenation see either the relevant section of this manual (to come) or the renderer module's own documentation.

Part IV gives developer-level information on what developers of renderer modules need to provide, and how they can do it.

Part V is an appendix and will cover any extra items of interest, and includes the GNU General Public License, and a bibliography.

Tools used to build PyVisi

These are the multifarious tools with which **PyVisi**, its documentation (both handmade and automatically generated) and its web pages, has been made.

- General development tools: cvs, aap, dia, pyscript, pylint

- Editors: emacs, vim

- Linux Distributions: Gentoo Linux, Fedora Linux

- Scripting tools and languages: python [1]

- Documentation tools: LaTeX, latex2html, epydoc, doxygen

- Organisations: sourceforge.net, ESSCC, ACcESS

Feedback

Yes, we want feedback! If you have any comments about **PyVisi** and/or this manual (such as, inaccuracies, possible improvements, new features, what it does well, etc.) then please email one of the current developer or the **PyVisi** web page webmaster. You can find the addresses of both of these people on the **PyVisi** web page: http://pyvisi.sourceforge.net. And please, feel free to mention anything, no matter how small. It would be great to see **PyVisi** improve the way people want, and for it to be documented the way the **PyVisi** user community wants.

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Part I

Tutorial

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Starting from scratch

A first go at a **PyVisi** script.

Part II

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Installation instructions

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Plotting examples

At present, we shall just show some examples. Detailed explanations of the examples will occur at some time in the future.

For the most up to date examples and information, the user is directed to the **PyVisi** web site: http://pyvisi.sourceforge.net.

4.1   plotExample.py

```python
import sys
sys.path.append('../')

# what plotting method are we using?
method = 'pyvisi'

# set up some data to plot
from Numeric import *

x = arange(10, typecode=Float)
y = x**2

# example code for how a user would write a script in pyvisi
from pyvisi import *          # base level visualisation stuff
#from pyvisi.utils import *   # pyvisi specific utils
# import the objects to render the scene using the specific renderer
#from pyvisi.renderers.gnuplot import *   # gnuplot
from pyvisi.renderers.vtk import *        # vtk

# define the scene object
```

```python
# a Scene is a container for all of the kinds of things you want to put
# into your plot for instance, images, meshes, arrow/vector/quiver plots,
# contour plots, spheres etc.
scene = Scene()

# create a LinePlot object
plot = LinePlot(scene)

# add some helpful info to the plot
plot.title = 'Example 2D plot'
plot.xlabel = 'x'
plot.ylabel = 'x^2'

plot.linestyle = 'lines'

# assign some data to the plot
plot.setData(x,y)
plot.render()  # need to tell some renderers to finish up stuff here

# render the scene to screen
scene.render(pause=True,interactive=True)

# save the scene out to file
scene.save(fname="plotExample.png", format=PngImage())
scene.save(fname="plotExample.ps", format=PsImage())
```
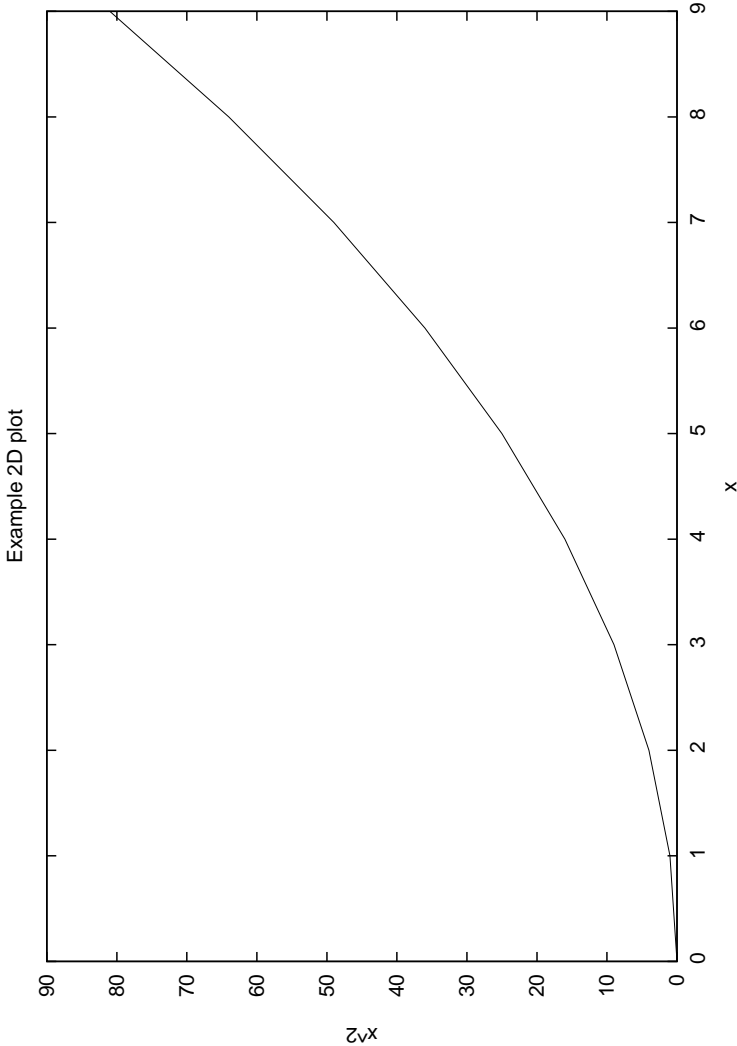
FIGURE 4.1: Output from gnuplot.

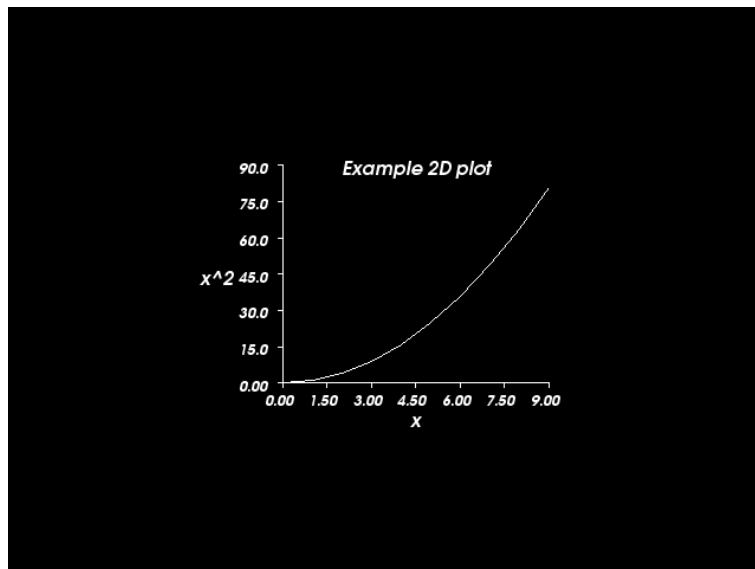Figure 4.2: Output from vtk.

Part III

Reference Manual

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Language Reference

Part IV

Developer Manual

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Developing **PyVisi**

In here should be docs on how people can contribute code, modules, renderers etc to the pyvisi project.

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Objects and methods defined at base level

Developers of **PyVisi** renderer modules need to provide the classes, subclasses and methods described below. They need to be defined with stub classes or methods even if that functionality is not supported by the rendering backend. An error or warning message should be given if the user tries to call these null methods or classes, however they need to be there for completeness.

The most up to date and complete version of this information is contained on the **PyVisi** web site under the documentation page, and then the API link.

7.1 Class structure

The following figure is the class structure of **PyVisi**

7.2 Fundamental objects

7.2.1 Item

render(self)

Render the object

7.2.2 Renderer

addToEvalStack(self, evalString)

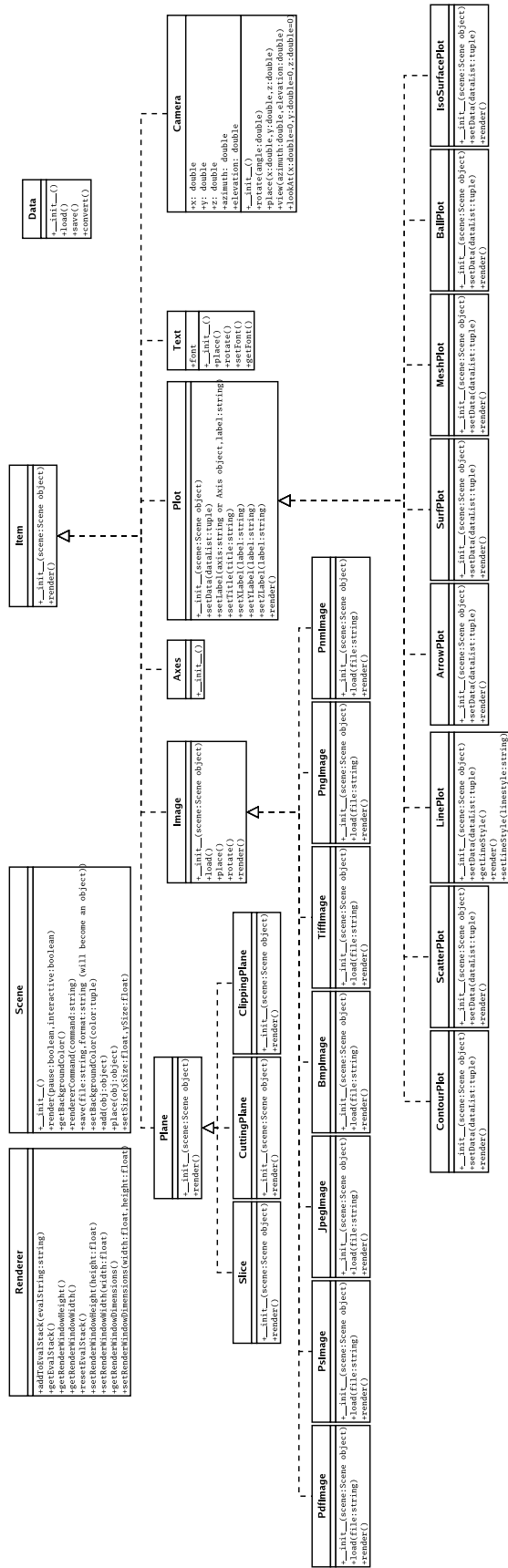Method to add commands to the evaluation stack

FIGURE 7.1: **PyVisi** class structure.

getEvalStack(self)

Gets the evaluation stack as it currently stands

getRenderWindowDimensions(self)

Gets the render window dimensions

getRenderWindowHeight(self)

Gets the render window height

getRenderWindowWidth(self)

Gets the render window width

resetEvalStack(self)

Reset/flush the evaluation stack

setRenderWindowDimensions(self, width, height)

Sets the render window dimensions

setRenderWindowHeight(self, height)

Sets the render window height

setRenderWindowWidth(self, width)

Sets the render window width

7.2.3   Scene

add(self, obj)

Add a new item to the scene

delete(self, obj)

Delete an item from the scene

getBackgroundColor(self)

Gets the current background color setting of the Scene

getSize(self)

Gets the current size of the scene

place(self, obj)

Place an object within a scene

render(self, pause, interactive)

Render (or re-render) the scene

rendererCommand(self, command)

Allows the user to run a low-level renderer-specific command directly

save(self, fname, format)

Save the scene to a file

setBackgroundColor(self, *color)

Sets the background color of the Scene

setSize(self, xSize, ySize)

Sets the size of the scene.

7.3 Derived objects

7.3.1 Axes

7.3.2 Camera

7.3.3 Image

JpegImage

PdfImage

PngImage

PnmImage

PsImage

TiffImage

7.3.4 Plane

7.3.5 Plot

ArrowPlot

ContourPlot

LinePlot

7.3.6 Text

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Renderer modules provided by **PyVisi**

8.1   vtk

In the process of being developed.

8.2   gnuplot

In the process of being developed.

8.3   povray

To come.

8.4   plplot

To come.

Part V

Appendix

A

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[1] *Python home page*, URL `http://www.python.org`.