Previewer Readme

1. Setup and build process

Before building please ensure you have the OpenGL development libraries and the X11 development libraries installed, plus necessary compilers. Particular packages will vary depending on OS, on Ubuntu you can use xorg-dev and libgl1-mesa-dev, plus build-essential. For Mac install Xcode development tools.

The previewer can be activated by uncommenting the appropriate option at the top of the makefile (Makefile_pv) , the rendering method can then be chosen further down. In the current build the previewer is already enabled, with the highest quality renderer chosen.

There are various different renderers to choose from, depending on your hardware capabilities, further instructions as to renderer choice and capabilities are in the makefile as well as described in the renderer section of this document.

To run Splotch with the previewer, run Splotch as usual but add the switch -pv to the command line. EG: "./Splotch5-mac myparameters.par -pv"

2. Command System

The command console for the application can be activated/deactivated using the hash key (#). An angle bracket prompt will appear near the bottom of the screen.

To move around the scene use the WASDQE key's to move forward, left, back, right, up and down respectively. To rotate (or orbit) around the centre point of the data using the IJKL keys, the centre point in this case is the centre of a computational box composed of the maximum and minimum particle locations on each axis. Holding right click and dragging the mouse will rotate the camera, allowing a 360 degree field of rotation.

A number of commands can be input using the command line interface, bring up the console and enter the command using the keyboard. Once a command has been entered, it can be executed using the enter or return keys, if the command is valid a confirmation will appear in the prompt. Command input is not case-sensitive. A list of commands and their resulting actions is provided on the next page.

3. Parameters

Some parameters can be provided in the splotch parameter file that apply only to the previewer. This parameters are listed below with information on usage and default values.

Parameter	Type	Default	Usage
pv_brightness_mod	float	1	Multiplicative factor for brightness
pv_radial_mod	float	1	Multiplicative factor for smoothing length
pv_recalc_cam	bool	TRUE	Set to false to keep original camera Setup from parameter file

Previewer Command List

Category	Command	Action
Generic	quit	Quit the application
	get fps	Display current framerate
	set res <xres> <yres>	Set resolution <int> <int>
	set xres <xres>	Set x resolution <int>
	set yres <yres>	Set y resolution <int>
	run <commands>	Send command to terminal <strings>
		Eg "run ./Splotch5-mac params.par"
	view <filename>	View tga image <string>
	stop	Stop viewing image
Scene Manipulation	set move speed <speed>	Set speed of camera movement
	set rotate speed <speed>	Set speed of camera rotation
	set fov <fov>	Set camera field of view <int>
	set palette<ptype> <filename>	Set color palette for particle type
		EG "set palette 0 palettes/Blue.pal"
	reload colors	Reload the simulation with new colors
	set brightness <ptype> <value>	Set brightness for particle type <int> <float>
	get brightness <ptype>	Get brightness for particle type <int>
	set smoothing <ptype> <value>	Set smoothing length for particle type <int> <float>
	get smoothing <ptype>	Get smoothing length for particle type <int>
	reset camera	Reset camera location
Parameters	set param <param name> <value>	Set parameter value <string> <param type>
	get param <param name>	Get parameter value <string>
	write params <file name>	Write parameter file <string>
Animation	set point <time>	Set animation point <int>
	remove point	Remove previous animation point
	preview	Preview animation (auto interpolates)
	save animation <filename>	Write animation file (for previewer) <string>
	load animation <filename>	Load animation file(for previewer> <string>
	interpolate	Interpolate animation points
	write scenefile <filename>	Write splotch scene file <string>
	set camera interpolation <value>	Set interpolation method for camera <string>
		Possible values: linear or cubic
	set lookat interpolation <value>	Set interpolation method for lookat <string>
		Possible values: linear or cubic

4. Typical Usage Scenario

A brief description of how the previewer would typically be used.

Start out by opening Makefile_pv, the makefile used to build Splotch with the Previewer. Ensure the Previewer option at the top is enabled (uncommented), and choose your system type (most likely either mac or generic for standard linux distro).

Scroll down to the renderer choice section, and uncomment the highest quality renderer available to you (explained further in this section of the makefile).

Save, and build using 'make -f Makefile_pv'

Run the executable, with a parameter file and the previewing option enabled, like so:

./Splotch5-mac paramfile.par -pv

The executable name may be different depending on your system type.

This should open the previewer window, with a full view of the data on screen. Activate the on screen command line interface by pressing the hash key(#). Type 'get fps' to check the framerate and see if the program is running at an acceptable speed. If not you may want to activate the sampler and sample a smaller number of particles – do this by adding these parameters to the parameter file:

sampler=true

sample_factor=50

This will sample 50% of the particle data only, and should run faster. You can try other percentages too if this is not acceptable. (this may be dependant on the file type you are using – currently sampler is only available for Gadget and Ramses data)

Use the keyboard and mouse to navigate the scene and view the data from different angles. Check the command list for other changes that can be made, such as modifying the brightness or smoothing length.

To start creating an animation, find your starting point and use the command 'set point 0', this will set an animation point starting from 0 seconds, you can then move the camera and set another point at 5 seconds. Continue doing this until you have a suitable length animation, and then type 'preview' to see a preview of the animation. If you are not happy, you can remove animation points and add more and preview again.

Once happy, write a splotch scene file using 'write scenefile <filename>'. You can then add this scene file to the parameter list using 'set param scene_file <filename>' and write out a parameter file using 'write params <file.par>'. To generate a set of splotch images for this animation, run Splotch with the written parameter file. As this can take a while, it is usually better to run Splotch directly from the command line when generating animations rather than from within the previewer.

To see a single Splotch image of your current position, call 'write params <file.par>', then 'run ./Splotch5-mac <file.par>' (your executable may be named differently). After 'run' everything is sent directly to system as if it was typed in a terminal. Once Splotch has generated an image (confirmation on command line), you can call 'view <filename.tga>' where the filename is specified in the parameter file (outfile parameter). When finished viewing, type 'stop' to return to the Previewer.

5. Adding New Renderers

To add a custom renderer, one must implement the IRenderer interface (previewer/libs/renderers/IRenderer.h). To do this, inherit from IRenderer and implement its virtual functions. Then simply write your renderer as you wish, refer to the PP_FBO renderer for ideas on how to proceed and an example of using an IMaterial.

Remember to add an option in Makefile_pv to choose your renderer, and add preprocessor commands in previewer/libs/renderers/CurrentRenderer.h and the Load() function of previewer/libs/core/ParticleSimulation.cpp for your renderer to be useable.

6. Notes

- Scene files are automatically saved in previewer/data/splotchAnimationPaths

- Movement and rotation speeds are arbitrary unit scales compensated for frame rate. As a rough guide, 50 is slow, 200 is average and 500 is fast.

- Cubic lookat interpolation may cause jitter in the camera with a complex animation, this has been noted and is being worked on.

- The 'view' command will be relative to your working directory, so remember to use the correct file path.

7. Contact/Bug reports/Other

The previewer and Splotch itself are under ongoing development, and so on occasion a bug may be encountered. If you find an issue with the previewer, please message any of the email addresses provided below.

In addition for any questions/problems/other contact feel free to send an email to any of the below email addresses.

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