VVAMP User Manual

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1 VVAMP User Manual

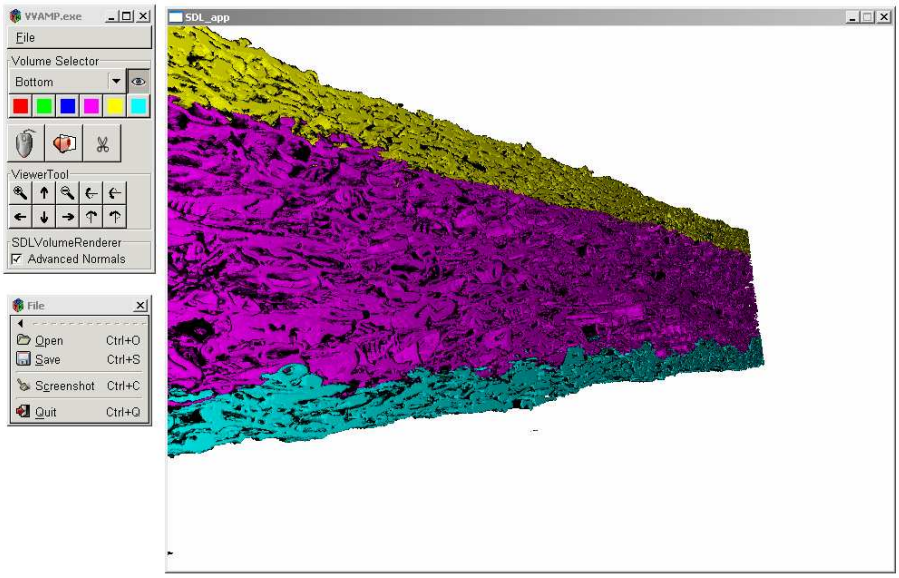

Figure 1: The VVAMP program

Introduction

This is the user manual for the program VVAMP. VVAMP was developed as a master thesis at the centre for image analysis in Uppsala, Sweden. VVAMP is an acronym of Volume Visualisation And Manipulation Program and the purpose of the program is to visualise large binary volumes in a fast and memory efficient way.

The program is downloadable from the web, goto: *http://www.tempsoft.se* and click the paper analysis link. There all data from the project is available including the master thesis and data to try the program on.

Interacting with the program

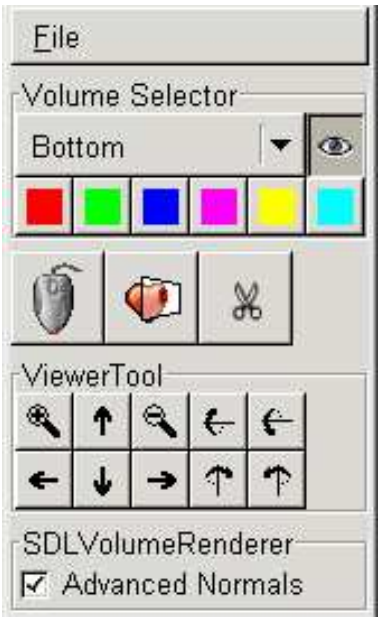

Figure 2: The VVAMP control panel

The program consists of two main parts, the control panel and the view screen. In Figure 2 you see the control panel of the VVAMP program. In the middle are there are three large buttons. These are the three different tools that are currently plugged in to the program. It is possible to extend the program with more tools but that will not be covered here. Each one of the tools have different means of interaction so each tool will be covered in detail by itself.

At the top of the program is the file menu, which will be covered in detail in a later section. Below this is the volume selector. In this pull down menu you can select which volume you are interacting with. Next to this selector is an eye icon. Pressing this will turn the volume invisible.

Below the volume selection area is the colour selection area. There are 6 basic colours and it is possible to change the colour of the selected volume. After these controls come the tools and then the tool options.

The Tools

View Tool

The first interaction tool is the View Tool. The View Tool is represented by a mouse icon and it is the standard tool of the system. When watching the volume in 3d on the view-screen you can interact with the mouse. Left-clicking and holding down the button while dragging the mouse will cause the volume to rotate. When interacting with the

program you will notice that the volume renders the image in low resolution to allow real-time interaction. When you release the button a progress bar will appear. When the rendering phase is completed a high resolution image is presented. You can abort the rendering process at any time to interact with the image. Using the middle button you can move the camera vertically or horizontally and with the mouse-wheel you can zoom in and out. All these controls are also available in the in the control panel while using the view tool.

Projection Tool

This is the second tool and is represented by a heart which is crossed by a plane. With the projection tool it is possible to move a plane through the object and see what structures are projected on the plane. Pressing and holding the left mouse button here while moving it in the structure will move the projection plane backwards and forwards.

The Cut Tool

The last tool is a very naive implementation of a volume cutting tool. It was mostly implemented to show that manipulation of the is possible. When selecting the tool you can select to points on the image plane and then press the Cut button. The two points will together with the viewing direction form a plane that is used for cutting the volume. Everything on the side of the normal (indicated by small lines on the points) are cut. At anytime you can select the abort option.

The File Menu

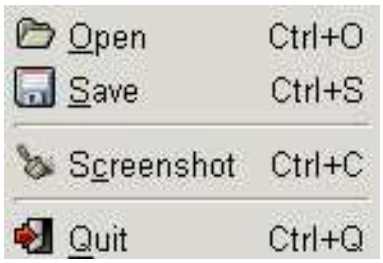

Figure 3: The VVAMP file menu

The VVAMP file menu is used to open - save files as well as taking screen shots of the view screen.

open This is used to open scene files. The most common scene file is the .dat file. There is also a more deprecated version of the files supported, the .scn file. When opening a file there might be a short moment where the program seems to stop responding, this is a known bug. Future versions might solve this through threading the loading but it is currently not implemented.

save It is possible to save the current scene as a .dat file. There is no real purpose with this except if you are converting a .scn file to a .dat file. As with the load it is possible that you experience some lockup while save:ing the file.

screenshot This will make a copy of the image on the view screen to disk. The image is saved as a windows .bmp file.

quit Exits the program.

The .dat File format

It might be of interest for the user to experiment with their own volume data with VVAMP. To do this the volume data need to be converted to a file format that is suported by VVAMP. This file format is refered to as the .dat file format. The .dat file format uses an ASCII header and then the volume data is stored as one byte per voxel. Different byte values represent different volumes. It is possible to have 255 volumes and then background. In Table 1 you will see a short description of each section and below you see an example of a file header.

```
21
3
512 512 512
1.24 3.0 0.7
*5-7:Skeleton
*8-24:Blood
*25:Muscle
<DATA>
```

Data Field	Purpose
21	This is file type followed by file version.
#	This is the number of volumes.
X Y Z	Resolution on the different axis'
x y z	Size of the volume in space (usually no larger than 3).
Volume specification	This is a specification of the each volume.
<DATA>	This is data written in binary mode, one byte per voxel.

Table 1: File format description

File version

Since it is possible that future versions of the system will evolve on this file format it is important to have a header which indicates what version of the file format it is. The 2 indicates that this is the .dat file format. Previous .vol format had a 1 here. The second number, 1, indicates that this is the first revision of the file format. The file version should be followed by one line break.

Number of volumes

It is possible to encode a number of volumes into a single volume in the VVAMP program. This number indicates the number of volumes that are in the data.

Resolution

The resolution is given as integers. There should be one blank space between each and the last one should have a line break after it.

Size

Since one of the purposes with this project was to visualise volumes which are not uniformly sized these numbers indicates the size of the volume in space. The size should be around 1.0, usually no larger than 3.0. This is because otherwise it will be hard to see in the program. As with the resolution the numbers should be given with one blank space between them and one line break at the end.

Volume Specification

There should be one line for each volume here. Each line starts with a star, then there is an interval and then a colon followed by a name and a line break. The star indicates that it is a new volume. The interval is inclusive and can either be a single number or two numbers separated by a single - sign. The colon indicates that a name follows and the name should be no longer than 30 chars and ended with a single line break. It is especially important that the final name is followed by no more than one line break.

Volume Data

Volume data is written in bytes. Each byte is treated as a number between 0 and 255. This number indicates the value of that voxel and is later partitioned by the volume specification (see above). The number 0 is reserved for background. The data is stored in row, column and last depth order.