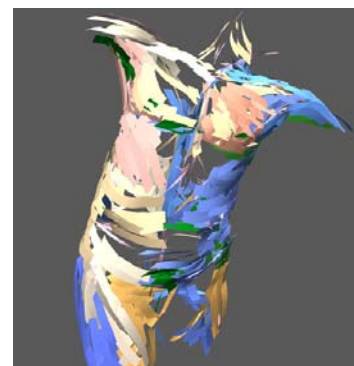
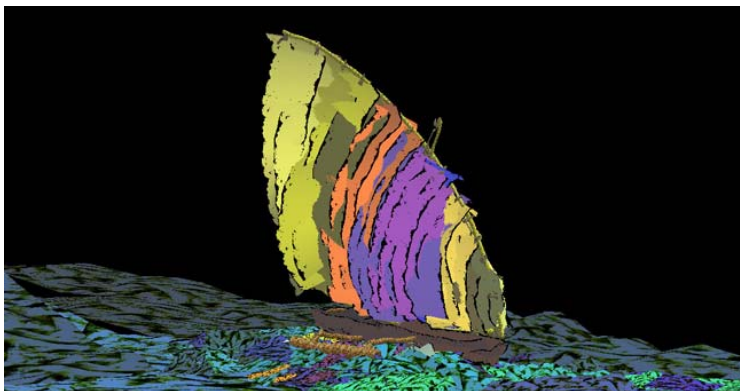
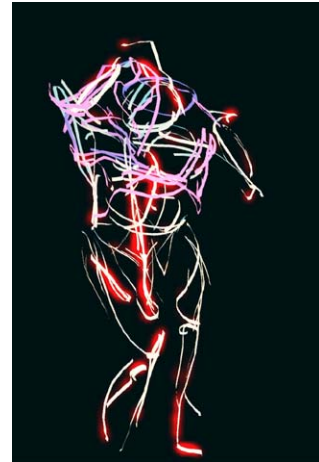


CavePainting Drawing Tool Manual

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Overview of CavePainting

CavePainting is a freehand 3D drawing tool for hand crafted 3D modeling. As opposed to more traditional CAD or animation style 3D modeling programs, CavePainting is easy to learn and is focused on exploring a style of computer graphics driven by hand-based input, like drawing or painting.

Typical CavePainting Controls

In CavePainting, you hold a 3D tracked input device in each hand as you work. Each of these devices has a button on it. The one you hold in your drawing hand is referred to as the brush in this manual. The other device is referred to as the non-brush hand, or just the hand in this manual.

How to draw: When you push down on the button on the brush and move your hand in the air you start drawing a line through the air. In fact, to be more specific the brush can do other things too if you change its mode using the Brush Mode Menu, but the typical use is drawing.

How to move the drawing: The most frequent use of the non-brush hand is to grab and move the virtual drawing around. You do this by pressing and holding the button in your non-brush hand and then moving your hand around. The drawing is rotated along with your hand, so you can spin it around and turn it upside down just by twisting your hand.

How to zoom in and out: You can also scale the drawing up and down. To do this, first press and hold the button in your non-brush hand just as you do to grab and move the world, but then while you are holding that button down, also press and hold down the button on your brush. Now, move your hands closer together – as you do the world will shrink. Now, move your hands farther apart, as you do the world grows. This allows you to zoom in and paint detail, or zoom out and paint lines that look huge when you zoom back in.

~~**Saving a .jpg of the screen:** You can save a .jpg file of the image on the screen by selecting the “Save Snapshot” button in the Save menu, or just by pressing the “S” key on the keyboard. In the Cave, the image will look like what you see out of your left eye when looking at the front screen. So, before you press save, close your right eye and look at the front wall to frame up a good picture.~~



Brush Mode Menu

Overview: Your brush always performs an action when you press down on its button. The brush mode that you select from this menu determines what that action is. Once you select a mode, the brush will stay in that mode until you go back to the menu and select a different one. This is like in Photoshop where you can select the paint bucket, the pencil, the eraser, etc.. When you want to change from the pencil to the eraser, you have to go back the menu and click on it. This is the same idea.



Default (Drag/Two-Handed) Drawing Mode: This is the default drawing mode. When you press and hold the brush button paint starts coming out, but in a special way. As you move around you actually drag the brush along behind you, like a water skier. This makes it easy to draw nice smooth curves and avoid picking up jitter in the line from muscular and/or 3D tracker noise.

In this mode you can also transition smoothly while you are drawing from the drag drawing style to a two-handed drawing style by pressing and holding the button in your other hand. In the two-handed mode, as described below, your line is constrained to move directly toward your other hand.

Tip: In this mode, use the guideline. Unlike the freehand mode, you can draw very slowly without ending up with a jittery line. If you want to make a very precise line, watch that guideline and don't move your brush forward until it points in exactly the direction you want to go.

Another tip: If you are drawing a line that has some straight sections and some very curvy ones, try engaging the two-handed drawing feature by pressing and holding the button in your non-brush hand when you get to the straight sections.



Two-Handed Drawing Mode: This is a drawing mode to use when you really want precision or when you want a straight line. When you draw, your brush is constrained to move only in the direction toward your other hand. So, if you hold your other hand still, you'll get a totally straight line. If you move your hands together you can draw very precise and smooth curves with this mode.

Tip: In this mode, use the guideline. Line it up carefully and don't advance the line forward until you see it is in the right place.



Freehand Drawing Mode: It's really easy to use this mode, paint comes right out of your brush, no dragging like the other modes. This is good for scribbling and quick gestures, but you may find it hard to control for more precise lines.



Place Slide: When you select this mode, a palette of slides that you imported into the program shows up. First put the brush on the slide you want to use and click and release the button. Then, move both your hands together to reposition the slide in space and when you have it where you want it, press the brush button to place it there.



~~**Move Stuff:** In this mode, you can select marks, images, and annotations in your drawing to move around. In this mode and in the delete mode, you will see little spheres show up near the marks when you move your brush near them. These are handles. The closest handle to your brush will be red and all the others will be orange. The mark or image belonging to the closest handle will also highlight by turning red so you can see when it is selected. Once you have it selected, press and hold the brush button to grab it and move it around. Release it when you get it where you want.~~

~~Tip: The handles that you grab onto show up at the end points of lines that you draw. Put your brush near the end of the line to select it.~~



~~**Copy Mark to Next Frame:** In this mode, your brush turns to a yellow arrow like in the move mode, but now when you select a mark (remember to grab it by the handles either end, not the middle) it gets copied to the next movie frame. This only works if you have already added one or more frames to the drawing. (Drawings have just one frame by default.) Let's say you have 3 frames in your animated drawing and you are currently looking at frame 1, if you select a mark and click the brush button, you'll copy that mark to frame 2. Then,~~

~~when you advance to frame 2, you'll see it in the exact same place as it was in frame 1.~~



~~**Delete Mode:** In this mode, you point at objects in the scene the same way as described in the Move Stuff mode above. But, when you click your brush when something is selected, it gets deleted. You can undo a delete by choosing undo in the Oops menu.~~



Brush Properties Menu

Overview: All the options in this menu select properties of the brush, this is how you tweak the appearance of the geometry that gets drawn when you paint with the brush.



Size: Use this to select the maximum size (width) for the brush. The size is always adjusted based on how hard you push on the pressure sensitive button on the brush. This controls how big the line is when you press as hard as you can.



Color: Use this to select the color swatch for the brush. In some modes, the color is interpolated down the column that you select based on how hard you push on the brush button when you draw. Otherwise, the color at the very top of the column is always used.

Tip: If you have multiple color palettes loaded, you can switch between them by pressing the button on your non-brush hand or the space bar when this widget is active. Remember, you have to pick one color palette and stick with it for your whole drawing.



Pattern: Use this to select the pattern to map onto the form of the brush. Depending on the mark type you have selected, this pattern will either repeat along the form, or get stretched out along the length of it.

Tip: This pattern gets combined with the current brush color. If it looks really dark, it's probably because you have a dark color selected and the pattern is making it look even darker. To just see the true color of the pattern, go to the color picker and select white.

You can also switch through other pattern palettes by pressing the button on your non-brush hand or the space bar when this widget is active.



Brush Tip Mask: Use this to select a black and white pattern to map onto the form of the brush. This works the same way as the patterns described above, except that it controls transparency, not color. Where the pattern is black, the form will come out completely transparent, and where it is white it will be opaque.

Tip: Try using this to draw a line with a stippled look to it.

You can also switch through other brush tip palettes by pressing the button on your non-brush hand or the space bar when this widget is active.



Mark Type: Use this to select the type of 3D geometry that comes out of the brush. You can create tubes, ribbons, flattened tubes, or annotations (arrows with text labels).

Tip: You can also control how patterns are applied to the forms here. Use a stamped (repeating) pattern, or a stretched pattern. Try drawing a muscle with a stretched out texture that looks like muscle fibers.



Artwork Menu

Overview: This menu controls properties of the whole scene (artwork).



Top Light Color: Use this to select the color of an ambient ceiling light. This will start up a 3D color picker, move your brush directly within the color space to adjust the color. All the way at the top is pure white. As you move around the sides of the cone you get different hues. At the center of the space the colors are not very saturated. As you move outward, they are much more saturated. The ambient ceiling light will shine on the top surfaces of your forms.



Bottom Light Color: Set the color of an ambient floor light. This will shine on the bottom facing surfaces of your forms.



Background Color: Use this to set the background screen color.



Layers: This pops up a layer window that is very similar to Photoshop layers. To the left of each layer that is listed, you'll see a button to show or hide the layer. There is also a button to create a new layer. Click on the name of the layer itself to set it as the active drawing layer. You can only draw on one layer at a time – the same as in Photoshop.

Tip: The number of the current drawing layer is always displayed in the top left corner of the screen.

Try drawing a figure with the bones on one layer and the muscles on another, then you can turn one or the other off easily at any time.



Movie Frames: This pops up a movie frame window that looks very similar to the layer window. Unlike layers, only one frame can be seen at a time. In fact, many drawings will only have one frame. Thus, they are like a sculpture. You can animate your sculpture by drawing in multiple frames and then cycling quickly through the frames by pressing the arrow keys on the keyboard.

~~Tip: You can copy an entire frame to another frame. Use this carefully because it really copies the entire contents of the frame, so you really only want to do it once. But, it could be helpful if you want to draw all the bones for a skeleton in~~

~~frame 1 and then copy them all to frame 2, 3, and 4. Then, you don't need to redraw them all in the other frames, you can simply move them around until you get them in the right position.~~



Oops Menu



Undo: Not all operations can be undone, but you can use this to quickly undo the last line that you drew. Some other things, like deleting lines can also be undone.



Redo: This reverts back to the way things were before your last undo.



Save and Load Menu



Save Artwork: This saves a .3DArt file of your work to disk. When you select this, the program suggests a name for the file. You can change it using the keyboard, or you can just press enter on the keyboard OR press the brush button (if you don't have the keyboard next to you) to keep it. It will always avoid overwriting any of your existing files by adding a number to the end of the filename. For example, if the first time you save your drawing as "myDrawing" the second time you save, the program will suggest "myDrawing2" as the name.

Tip: Keep in mind that you are using research, not production, software here. This means you get some unique, cutting edge features, but you might uncover a few bugs. In other words, it's always possible that the program could crash. Your best defense against losing your work is to save it often!



Load Artwork: This pops up a list of files in the directory setup for your account. You can select one to load and then just look at it, or keep working on it and save it again.



~~**Save Snapshot:** This will save a snapshot to a .jpg file of whatever is on your screen (or the front wall if you are running in the cave) to a file marked with the date in the directory setup for your account.~~