Introduction

The following guide is to help you get started with our software and use it to turn a normal image into a low resolution, low palette size, pixelated image. Our program will assist you in the process, helping you choose the colors in the palette, and where to place them in the resulting image. Our software can be used in one of two ways: It can be completely automated and it will generate a result for you, or the program can assist you to complete your own work.

Overview

The general steps of the program are:

1. **Create:** start a New Project
2. **Weight:** (Optional) Using a brush, indicate which parts of the input image are important and which are unimportant.
3. **Process:** Use our automated algorithm to create a result
4. **Edit:** (Optional) Use our built in tools to change the palette and pixels of the result.
5. **Save**: Save your project or export it as an image

Steps 3 (**Process**) and 4 (**Edit)** can be looped through any number of times. At any point while **Editting**, you can click **Process** to have our algorithm find a solution based off your changes. Afterwards, you are free to continue adding your own changes.

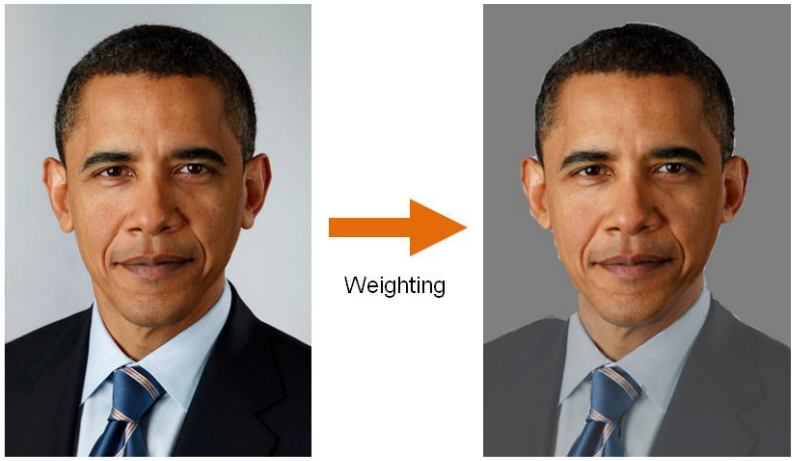
1 Create

To begin, choose either **New Project**, or **Load Project**:

- **New Project**: Create a project from a source image. Begin by choosing the size of the longer edge (in pixels) and the number of colors in the palette. Then Click "new Project" to load the desired image. It is recommended not to use an input image greater than 500x500, as they may make the program sluggish. If you'd like to change the size of the output or palette after beginning, simply change the values and click **Update Sizes**. However, be warned, you will lose all your progress by doing so.
- **Load Project**: Load an existing project saved from a previous session

2 Weight

The weighting stage, is optional, but you can use it to mark which parts of the image are important (weight = 1) and unimportant (weight = 0) or anywhere in between. Areas painted as unimportant (weight = 0) will be shown as **gray** and an areas painted as important (weight = 1) will be shown unchanged. Weights in between will be shown as a combination of the two. The **Processing** step will use this information to determine which colors should be emphasized in the palette.



To add weights to the image, use the simple brush. The controls for the brush are:

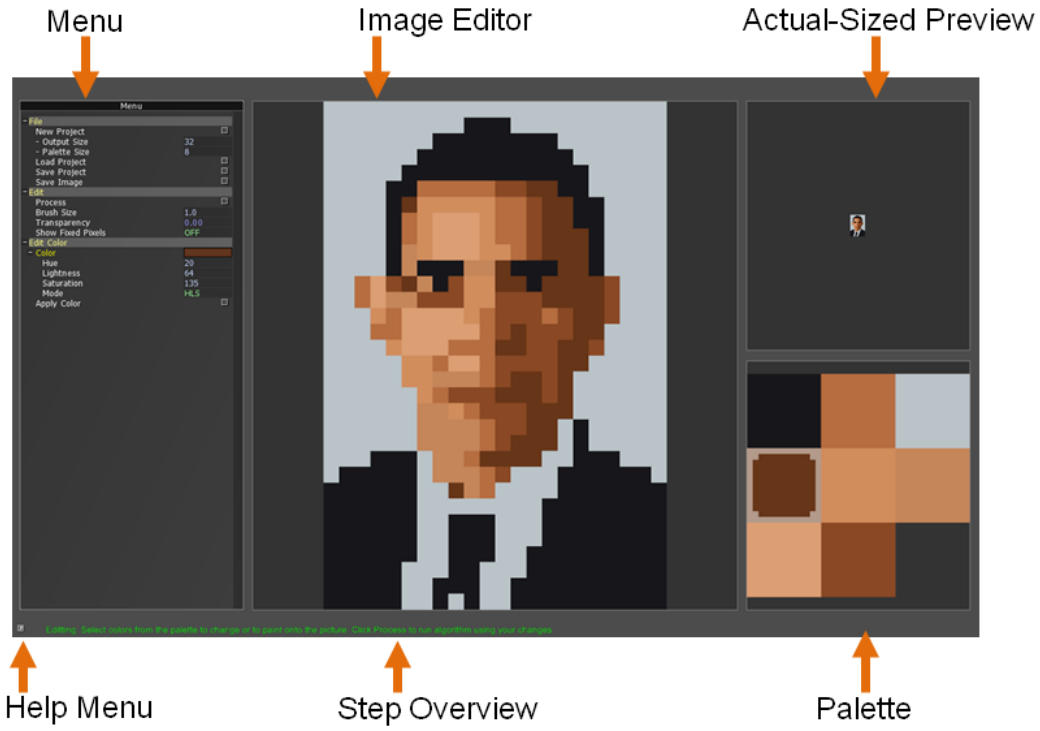
- Paint: Left Mouse Button
- Change the brush size: Mouse Scroll
- Change the brush weight: Shift + Mouse Scroll

The brush properties can also be controlled using the menu on the left of the interface. # 3 Process

When you are done **Weighting** the image, the next step is to click **Process**. This will start our automated algorithm, which will find a result for you. This is a complicated step, which needs to find which regions to map to pixels in the output, and which colors to use, so please give it a moment to run (You can watch

the result form!). It will generally take a couple of seconds for the initial **Processing**, and less than a second for any after.

4 Edit



After the initial **Processing**, you can make your own changes to the result. We've provided several tools to help make this step easier for you:

Paint Brush: Like a typical brush tool, using our paint brush, you can change which colors in the palette pixels map to. Simply choose a color in the palette (by left clicking) and then left click anywhere on the image. However, our brush comes with a twist: you can choose *more than one color* in the palette. By holding shift as you select colors in the palette, you can select multiple. When you paint onto the image, our program will *choose the color to assign for you* from the ones you've selected.

Color Edit: There are two ways you can change the colors in the palette

1. After selecting a single color in the palette, use the "Edit Color" menu, to choose a new color, then click "Apply Color" to change the color in the palette.

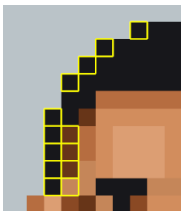
2. By holding down the Spacebar, you can see the original image By selecting a single color in the palette, and then an area of the original image, our program will *change the color for you*, to match the *general color of that area*.

Note that when you change a color in the palette, the program will determine where this color would be best used in the image. If this color is far from the colors of the original image, it may not be used. However, you can force pixels to that color by simply painting it to where you'd like to see it.

Transparency: Found on the menu, this will allow you to see the original image overlayed on top of the pixel image. This will allow you to compare the result with the original image. You can also hold the spacebar down to see the original image, without overlaying it.

4.5 Reprocessing

Anytime while **Editing**, you can re-process the image (simply click the **Process** button again). This will run our algorithm on the current image, using your input to better educate the result. You can affect this step in two ways:



Fixed Pixels: Every time you paint on the result, our program is keeping track of which pixels you changed. You can view which pixels are fixed by using the "Show Fixed Pixels" menu item. When **Processing**, these pixels will not change from the color(s) you assigned them to. If you'd like to "free" any of these pixels, simply paint over them by holding down the Right Mouse Button.

Fixed Colors: You may have noticed every time you changed a color in the palette, a Lock symbol appeared over the color. This means that during the processing step, this color cannot change. To "lock" or "unlock" these colors, simply click them using the Right Mouse Button.

After re-**Processing**, the program will switch back to **Edit** mode, where you are free to make more changes, **Process** again, etc.

5 Save

When you are done working on your image, you can save the project using the Save Project button. You can later load the project back up later, and continue from where you left off. If you'd like export your result as an image, use the Save Image button.

Shortcuts

Undo	Ctrl+ Z
Redo	Ctrl + Y
Process	P
Show Fixed Pixels	F
Brush Size	Middle Mouse Button
Brush Weight	Shift + MMB
Transparency	Up/Down Arrows

Advanced Options

There are some advanced options of the automated algorithm. These are for users who would like to fine-tune the algorithm, and for readers of the paper, and are not necessary for typical use. Here is a brief summary of what each option does:

- **m factor:** When Processing, the importance of pixel location vs. pixel color when creating regions to map to pixels in the output. The higher the value, the more important the pixel location becomes.
- **saturate:** The factor of extra saturation used to create the output palette. 1.0 corresponds to no extra saturation, 1.1 corresponds to 10% extra saturation.
- **Smooth factor:** During processing, the higher the smooth factor, the more regions try to retain their original neighborhoods.
- **BF Color:** The standard deviation used for the color component in the algorithm's bilateral filter. The bilateral filter is used to smooth noisy regions of the input image.
- **BF Position:** The standard deviation used for the positional component in the algorithm's bilateral filter. The bilateral filter is used to smooth noisy regions of the input image.