

Watercolor Rendering Program – User Guide

Welcome to my watercolor stylized character rendering program, the place where you can conveniently add watercolor stylization to your own model and get real time feedback in the process!

So the GUI is pretty self-explanatory and intuitive to use, and also there are tons of keyboard shortcuts for your convenience (which can be disabled if you don't like them). And if you still don't know how to do something, I assure you that you will find all the details in this user guide.

This document will present all the features of the program, by the order they appear in the GUI. If some action can be done using a keyboard shortcut, the relevant keys will be written next to it in parenthesis.

To run the program, simply download the code from the git repository, compile and run it.

One last remark: the question marks in the GUI menus give helpful advice in a subject that is related to the relevant menu. Hover above it with your mouse to see the advice.

Let's dive in!

- [File:](#)
The first menu in the GUI. Contains sub-menus of all the objects that can be loaded to the scene – model, wall, floor, and skybox.
- [Object:](#)
The first sub-menu in the File menu. Contains a choice between a primitive or a model, and the relevant sub-menus (In each run of the program your last choices in the sub-menus are saved and used even if you used different kind of model/primitive).
 - [Model:](#)
The first sub-menu in the object menu. Contains all the information regarding the non-watercolor features of the model.
 - [Path:](#)
The relative path from the root folder of the program code to the mesh file of your model (loads a penguin mesh by default). Please notice that right now **only triangulated meshes of .obj format are supported.** **If you want the diffuse/specular textures of the model to be loaded automatically, please add relevant .mtl file in the object folder and point to it from the .obj file.**
 - [Shadowing:](#)
There are 3 options of model shadowing: Grid, Phong and Toon.

- Texture:
You can choose to add diffuse texture to your model (enable/disable checkbox). By default the texture is enabled. If you choose to add the texture, you can load it by inserting the relative path from the root folder of the program code to the texture file. If there is .mtl file in the model's folder the relevant texture will be loaded automatically.
- Material:
You can choose to add material to your model (enable/disable checkbox). By default the material is disabled. You have control over the 4 properties of the material: ambient, diffuse, specular and shininess. Hint: if you click on the colored square, it gives you more intuitive way to choose the color you like.
- Transformations:
This is the last sub-menu in the Model menu. It allows you to translate, scale and rotate your model.
 - Translate:
Translate your model in x, y, z axes.
 - Scale (Z,X):
Scale your model in x, y, z axes. The keyboard 'Z' scales the model **up** uniformly, and the keyboard 'X' scales the model **down** uniformly. You can adjust the scaling degree in the settings menu.
 - Rotate (right, left, down, up, PgDn, PgUp):
Rotate your model in yaw, pitch, roll axes. The rotation values aren't zeroed by default. The keyboard 'right' (->) enlarges the yaw angle, while the keyboard 'left' (<-) decreases it. In the same manner the keyboard 'down' enlarges the pitch angle, while the keyboard 'up' decreases it and the keyboard 'PgUp' enlarges the roll angle, while the keyboard 'PgDn' decreases it.
- Primitive:
The last sub-menu in the object menu. Contains all the information regarding the non-watercolor features of the primitive.
 - Primitives:
You can choose between a sphere and a cube. The default primitive is sphere. No need to provide a mesh; the primitives meshes are embedded in the program.
 - Shadowing:
There are 3 options of model shadowing: Grid, Phong and Toon.
 - Texture:
You can choose to add diffuse texture to your primitive (enable/disable checkbox). By default the texture is enabled (but not loaded initially, resulting with gray primitive). If you choose to add the texture, you can

load it by inserting the relative path from the root folder of the program code to the texture file.

- Material:
You can choose to add material to your primitive (enable/disable checkbox). By default the material is disabled. You have control over the 4 properties of the material: ambient, diffuse, specular and shininess. Hint: if you click on the colored square, it gives you more intuitive way to choose the color you like.

- Transformations:
This is the last sub-menu in the Primitive menu. It allows you to translate, scale and rotate your primitive.

- Translate:
Translate your primitive in x, y, z axes.
- Scale (Z,X):
Scale your primitive in x, y, z axes. The keyboard 'Z' scales the model **up** uniformly, and the keyboard 'X' scales the model **down** uniformly. You can adjust the scaling degree in the settings menu.
- Rotate (right, left, down, up, PgDn, PgUp):
Rotate your primitive in yaw, pitch, roll axes. The rotation values aren't zeroed by default. The keyboard 'right' (->) enlarges the yaw angle, while the keyboard 'left' (<-) decreases it. In the same manner the keyboard 'down' enlarges the pitch angle, while the keyboard 'up' decreases it and the keyboard 'PgUp' enlarges the roll angle, while the keyboard 'PgDn' decreases it.

- Floor:
The second sub-menu in the File menu. You can enable or disable the floor in your scene (the floor is disabled by default). Please notice that for realistic reasons, **if there is a direct light in your scene and the floor is enabled a shadow of the model/primitive will appear on the floor.**

Texture - You can add diffuse texture to the floor checking the "texture enabled" check box (the check box is checked by default and the floor is loaded with default texture). You can change the floor texture to a texture of your choice by inserting the relative path from the root folder of the program code to the texture file.

Water – if the floor is enabled you can add nice water animation to the floor. Toggle the "water enabled" check box to make the water animation appear/disappear.

Notice that part of the watercolor features will be acting on the floor, making it look watercolor stylized.

- Translation:
Translate your floor in x, y, z axes.

- Wall:

The third sub-menu in the File menu. You can enable or disable the wall in your scene (the wall is disabled by default).

Texture - You can add diffuse texture to the wall checking the "texture enabled" check box (the check box is checked by default and the wall is loaded without default texture, so it's black). You can change the wall texture to a texture of your choice by inserting the relative path from the root folder of the program code to the texture file.

Notice that part of the watercolor features will be acting on the wall, making it look watercolor stylized.

- Translation:

Translate your wall in x, y, z axes.

- cubeBox:

Check the 'cubeBox enabled' checkbox and load beautiful skybox to be in the background of your model.

Textures - You can add texture to each side of the skybox (the skybox is loaded with default textures). You can change each side's texture to a texture of your choice by inserting the relative path from the root folder of the program code to the texture file.

Notice that part of the watercolor features will be acting on the skybox, making it look watercolor stylized.

- Scene:

Contains the cameras and the illumination that constructs the scene.

- Cameras (A, D, S, W, Q, E):

Move your camera along the x,y,z axes. The keyboard 'A' moves the camera left, 'D' moves the camera right, 'S' moves the camera down, 'W' moves the camera up, 'E' moves the camera forward and 'Q' moves the camera backwards.

- Lights:

The menu that oversees the illumination of the scene. You can have 3 different sorts of illumination: direct light, point light and spotlight.

- Direct light:

The first sub-menu of the Lights menu. You can **enable/disable** the direct light by toggling the 'direct light enabled' checkbox (it's enabled by default). You have control over the 3 properties of the light: ambient, diffuse, and specular. Hint: if you click on the colored square, it gives you more intuitive way to choose the color you like.

Also you have control over the cangiante and dilution parameters (properties of the watercolor stylization).

- Direction:
Change the direction of the light by choosing its 'position' (don't worry about normalization – the program will take care of it).

- Point light:
The second sub-menu in the Lights menu. You can have up to 4 different point lights. Since their menus are identical, I will describe only one of the point lights sub-menus.

- Point light x:
You can **enable/disable** the direct light by toggling the 'point light enabled' checkbox (it's enabled by default).
Relative weight: you can give each point light relative weight amongst the other point lights, when relative weight = 0.5 is 50%. The sum of the weights don't have to sum up to 100%. The weight of a disabled point light is zero.
You have control over the 3 properties of the light: ambient, diffuse, and specular. Hint: if you click on the colored square, it gives you more intuitive way to choose the color you like.
Also you have control over the constant, linear and quadratic parameters, and the cangiante and dilution parameters (properties of the watercolor stylization).

- Position:
Change the position of the point light.

- Spotlight:
The last sub-menu in the Lights menu.
You can **enable/disable** the spotlight by toggling the 'spot light enabled' checkbox (it's enabled by default).
You have control over the 3 properties of the light: ambient, diffuse, and specular. Hint: if you click on the colored square, it gives you more intuitive way to choose the color you like.
Also you have control over the constant, linear, quadratic cutoff and outer cutoff parameters, and the cangiante and dilution parameters (properties of the watercolor stylization).

- Position:
Change the position of the spotlight.

- Watercolor:

The menu that oversees the watercolor features of the image.

Turbulence decrease – increase (R) or decrease(T) the hue of the model due to turbulence.

Dilution – increase (G) or decrease (F) the dilution of the model to its background. If dilution > 0.5 the hue changes linearly, otherwise it changes exponentially.

Bleed – increase (N) or decrease (B) the bleed of the model's hue to its background. Notice that high value for the 'bleed' parameter blurs the whole image.

Light – increase (L) or decrease (K) the direct light **on the model/primitive only**. Added for convenience and doesn't affect the model's environment, shadow or the existing lights.

Dark edge – darken (C) or fade (V) the edges of the image. Positive values of this parameter darken edges in the image, negative values lighten the edges. **Warning: high values of this parameter add noise to the image (unwanted random colors). Be careful with it!**

Paper granulation – increase (J) or decrease (H) the background's watercolor paper granulation. The higher the value of this parameter the darker the image appears, because the paper is rougher and more color concentrates in its valleys.

Tremor – increase or (U) decrease (Y) the hand tremor. Positive values of this parameter shift the model to the right, negative values shift the model to the left.

- Settings:

The menu that oversees the program settings. Here you can adjust the 'step' of all the actions described above. In addition, if you forget a keyboard shortcut, it can be found there! Toggle the 'keyboard control enable' checkbox to enable/disable the keyboard shortcuts.

Good luck and may Ping the Pinguin be always in your favor!

