BEAUTIFY

Universal Rendering Pipeline Edition

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Introduction

Thanks for purchasing!

Beautify for Universal Rendering Pipeline packs the best effects rewritten from scratch for the new render pipeline (requires Unity 2019.3 or later).

What's Beautify?
Beautify is a combined set of effects. **Uses several algorithms in a single pass resulting in a very fast image effect**:

- Analyses local pixel contrast, enhancing visual features and producing sharp images.
- Reduces or completely removes banding in gradients, usually seen in sky boxes due to color quantization.
- Adjusts pixel saturation, boosting pixel color without over saturating the image.
- Factory presets or global effect slider, which takes care of all effect details in one step.

In addition to this unique image enhancement technology, Beautify provides state of the art filmic ACES tonemap operator and high quality extra effects which you can combine just enabling them in the inspector. These are high quality effects which are combined in the same render passes providing superior performance.

Setup for Universal Rendering Pipeline

Video tutorial

You can follow these steps in this setup video: https://youtu.be/6fpeiysj6KM

Guideline

1.- Install **Universal RP 7.3.0 or later** from the Package Manager.

2.- Create or assign **URP setting pipeline asset** into Project Settings / Graphics section.

Important! If you have created the project using the "Universal Rendering Pipeline" template, Unity has assigned a different URP asset to each Quality level. For example, if you have High Quality level selected in "Project Settings / Quality" section, you can see the High Quality URP settings asset assigned there. In this case, this URP asset will be used and not the default URP asset assigned in "Project Settings / Graphics" section. Bottomline: whenever changing some parameter from the URP asset, make sure you're updating both the URP asset in "Project Settings / Graphics" section and in "Project Settings / Quality" (if there's any there).

3.- Select your camera and **enable Post Processing checkbox**.

4.- You can now **add Beautify effects to your Volume profile** (as you would add other effects).

Demo Scene

A demo scene is included in the package. It allows you to quickly play with the different effects. Just open it, select the PostFX gameobject and expand the Post Process Volume component and play with the different settings to learn about Beautify possibilities.

Beautify Inspector Options

General Settings
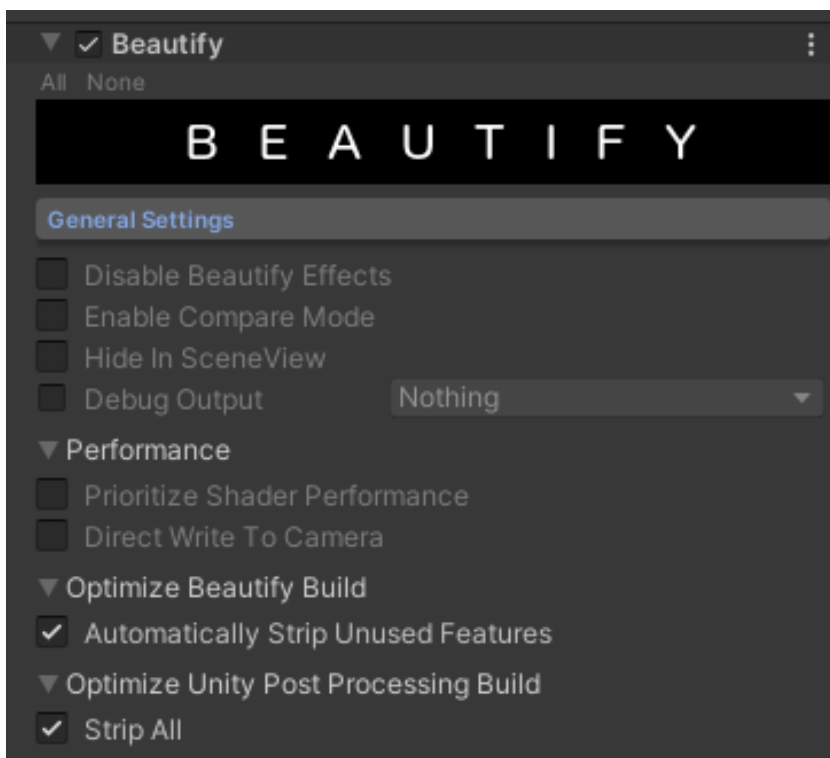
This section contains useful options to fine-tune the results and performance of Beautify:

- **Disable Beautify Effects**: This checkbox will disable any Beautify effect regardless of the profile settings. It's a global on/off switch for Beautify. Use it to quickly check how the scene looks before and after applying current set of Beautify effects.
- **Enable Compare Mode**: shows a side by side comparison of Beautify effect.
- **Hide In Scene View**: enable to avoid rendering effects in Scene View.
- **Debug Output**: let you visualize the intermediate buffers for bloom or depth of field.
- **Prioritize Shader Performance**: enabling this option will force Beautify to use shader variants that run a bit faster albeit with lower quality. Useful for slower devices.
- **Direct Write To Camera**: enable to bypass Unity Post Processing effect chain. Beautify will render the result directly to the camera target saving a full screen blit. Recommended when running on mobile. Note: enabling this option will make Beautify overwrite any other effect

from Unity Post Processing stack so make sure you have no other Post Processing effects except Beautify.

- **Optimize Beautify Build**. Here you can enable the build optimization which will strip any unused shader feature of Beautify from your build. This will save lot of compilation time and will also make your build a bit smaller. Recommended setting: "Automatically Strip Unused Features".
- **Optimize Unity Post Processing Build**. Likewise, here you can specify that the build should skip some Post Processing features saving built time again! Select "Strip All" if you're only using Beautify.

Image Enhancement Section

Sharpen

- **Intensity**: sharpen intensity. A higher value will produce a dramatic result but can show some undesired artifacts with thin objects or whitish backgrounds. Use the following extra settings to control those artifacts:
- **Depth Threshold**: will compute depth difference around pixels to detect edges. When the depth delta is greater than this value, sharpen will not occur. This will protect thin objects like standalone wires or lines.
- **Depth Range / Depth Range FallOff**: allows you to choose the depth range where sharpen will be applied. Decrease max depth to remain skybox untouched. Increase min depth to cause an effect similar to depth of field.
- **Relaxation**: sharpen is subtler on high contrasted areas. This parameter tunes this relaxation. Reduce this value to preserve thin edges or bright areas.
- **Clamp**: irrespective of sharpen intensity or above params, clamp controls the maximum effect applied over a single pixel.
- **Motion Sensibility**: reduces sharpen effect while camera moves/rotates. This option can reduce flickering and produce a cheap motion blur effect. Set this value to 0 to disable this option.

Dither

- **Intensity**: amount of noise added to the image to reduce banding due to quantization of colors. When "Prioritize Shader Performance" is enabled, Beautify will use a faster numerical dither algorithm otherwise Beautify will use a blue noise based algorithm.

Tonemapping and Color Grading

Tonemapping: default is Linear which means no tonemap operator is applied. Choose ACES (Academy Color Encoding System) to map HDR colors into LDR space. Use only with HDR enabled on your camera.

- **Saturate**: controls the intensity of adaptative saturation. This algorithm considers current saturation of each pixel, so low saturated pixels receive more importance than high saturated pixels.

- **Daltonize**: similar to vibrance but mostly accentuate primary red, green and blue colors to compensate protanomaly (red deficiency), deuteranomaly (green deficiency) and tritanomaly (blue deficiency). This effect does not shift color hue hence it won't help completely red, green or blue color blindness. The effect will vary depending on each subject so this effect should be enabled on user demand.

- **Sepia**: applies a procedural sepia transformation.

- **Tint Color**: multiplies scene pixels by a given color. Alpha controls the transparency of the tint effect.

- **Contrast** & **Brightness**: these two paramters adds a final contrast + brightness adjustment to the image.

- **White Balance:** adjust the color temperature.

- **LUT (Look-up Texture) Transform**: switches colors according to the provided lookup texture. A sample LUT Sepia texture can be found inside Beautify/Resources/Textures folder.

Except for LUT, all color tweaks use GPU code with no texture reads, resulting in a very fast color transformation.

Lens & Lighting Effects

- **Bloom**: produces fringes of light extending from the borders of bright areas, contributing to the illusion of an extremely bright light overwhelming the camera or eye capturing the scene. Use intensity and threshold (light sensibility) to adjust bloom effect. Layer mask option allows you to specify which objects are subject to bloom.

- **Anamorphic Flares**: also known as JJ Abrams flares, they add a sci-fi look to the scene. This effect is only available for Best Quality settings. It's similar to bloom but also can be assigned a tint color (use alpha to blend between original and tint color) and an orientation (horizontal or vertical).

- **Sun Flares**: beautiful, fast and procedural lens flares produced by the bright light of the Sun. There're lot of options to customize from sun disk size and intensity, corona rays, ray diffraction and ghosts.

- **Lens Dirt**: adds dust and dirt effect to your camera when looking to a light source. You can control the intensity and the brightness threshold (brightness sensibility). If you want to use different dirt textures, just assign your own texture into the Dirt Texture slot (several textures are provided in this asset inside the Textures folder).

- **Depth of Field with Bokeh**: depth of field is the distance between the nearest and the furthest objects giving a focused image. Enable this option to produce a photography effect where the target object remains focused while the the backgorund and foreground looks blurred.

  - **Autofocus / Focus target / Focus distance:** allows you to specify where is the focus plane. For autofocus it's recommended to reduce the focus speed as it will produce a more pleasant effect between changes.
  - **Focus speed**: the speed between current focus and a focus change. For example, if the target focus is moving a focus speed of 1 will update the focus instantly whereas a lower value will make the focus more progressive.
  - **Focal Length and Aperture:** these two parameters are used to simulate the virtual camera. Focal Lenth is the distance between the lens and the image sensor. Aperture is referred to the effective apertura or diameter of the pupil through which the outside light enters.
  - **Foreground Blur:** enable to allow foreground objects to be blurred. Use offset to adjust the foreground blur distance.
  - **Downsampling**: reduces the screen buffer size to improve performance. Can produce some artifacts.
  - **Sample count**: referes to the maximum samples that will be gathered. The algorithm is optimized to produce adequate results with a value of 4. A lower value will be faster but the results will look incorrect. A greater value will increase the quality of the blur, which can be appreciated when using a higher focal length value.
  - **Bokeh**: adds hexagonal shapes on bright spots resembling the aperture shape.

- **Eye Adaptation**: simulates eye reaction to quick luminance changes in the scene. You can customize the eye adaptation to light or to dark, either min/max exposure changes and adaptation speeds.

- **Purkinje**: this effect simulates the achromatic vision in the dark plus a spectrum shift to blue tones. You can customize the shift amount and the effect luminance threshold.

Artistic Choices

- **Vignetting**: darkens or tints with a custom color the border of the scene. The alpha component controls the effect intensity. This effect can be combined with Night Vision or others to add great depth and special feeling to your scene.
  Optionally assign a mask texture whose alpha component will be overlaid over the image. You can find a sample grungeBorder texture inside Resources/Textures folder.
  Use the Blink feature to simulate eye blinking (check demo scene for code sample).

- **Outline**: adds a colored outline to all objects in the scene.

- **Night Vision**: switches colors to simulate a night vision filter including scan lines and noise.

- **Final Blur**: performs a final multi-stage blur. Useful to blur the scene while showing a menu (use Screen Space Overlay for the canvas so it doesn't get affected by the blur).

Orthographic camera support

In order to support orthographic camera, edit BeautifyCommon.hlsl file and uncomment this macro:
//#define BEAUTIFY_ORTHO

Scripting support (C#)

The following properties and methods can be accessed through **BeautifySettings.instance** property (check **sample script included in demo scene**):

sun: assigns or gets the gameobject that holds the directional light acting as the Sun.

depthOfFieldTarget: assigns or gets the gameobject that's being tracked by the depth of field autofocus algorithm when in Follow Target mode.

OnBeforeFocus: event that's triggered when focusing an object and allows you to get and change the current focus distance dynamically.

depthOfFieldCurrentFocalPointDistance: the current distance to the focused object.

sharedSettings: returns a reference of the current settings of the Beautify effect in the volume.

settings: returns a copy of the current settings of the Beautify effect in the volume.

Blink(duration, maxValue): executes a blink effect (like in demo scene). For example, if you call **BeautifySettings.Blink(0.5f)**, it will execute a blink effect for 0.5 seconds.

Recommendations

We recommend providing 3 levels of quality in your game. Each level quality (which the user could select from a main menu) defines a specific profile with custom settings.

Tips to get the best performance:

- Enable "Prioritize Shader Performance".
- Enable "Direct Write To Camera"
- Reduce "Render Scale" in Universal Rendering Pipeline asset.
- Reduce number of effects.

Tips to improve build times:

- Enable "Automatically Strip Unused Features" or manually strip effects you won't use.
- Enable "Strip All" under Optimize Unity Post Processing Build.

Support

Please visit kronnect.com for questions, support and more info.

Thanks for using Beautify!