Mtree Tree creation

About Mtree

Mtree is a tree creation tool that allows easy high quality tree creation inside unity editor.

Mtree consist of:

- User friendly step by step tree creation.
- Branches obstacle avoidance to make trees that adapt to the environment.
- Automatic material creation.
- Shader that supports wind vertex displacement, fast translucency, leaf color variation, and instancing.
- Automatic levels of details (LOD) creation.
- Automatic billboard creation.
- Automatic ambient occlusion bake into the vertex colors. o Prefab creation.

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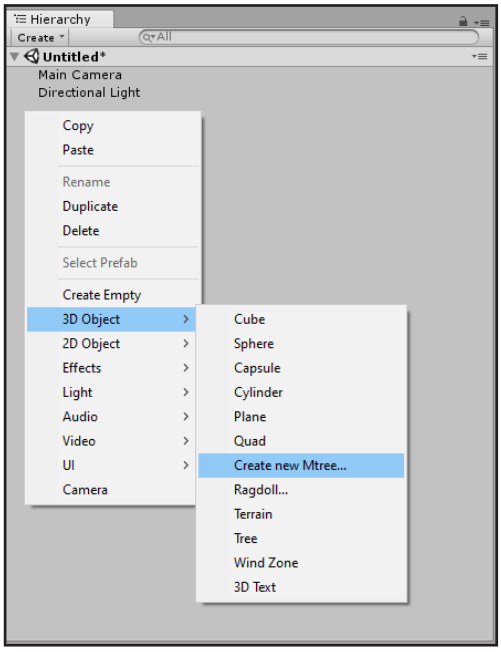
1. Mtree - Getting Started

Create a Tree

In order to create a tree, rightclick in Hirarchy go to *„3D Object/Create new Mtree...“* and select this Option.

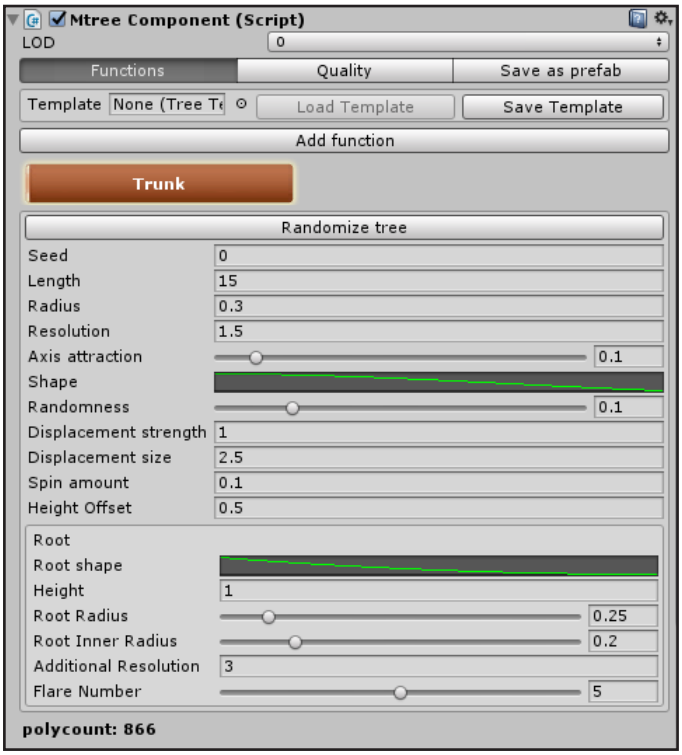


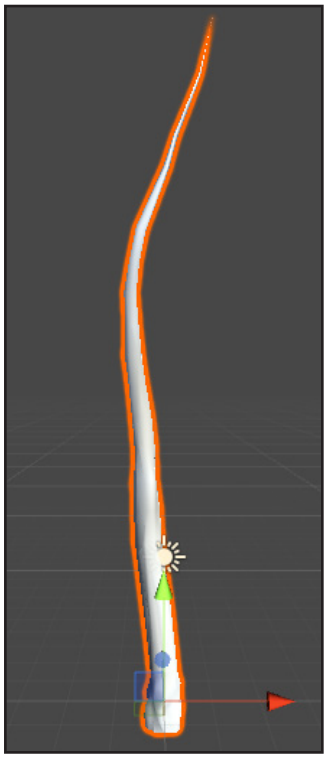
You can also add an empty object, and add the component MtreeComponent.

The Mtree Component

The Mtree component is what will guide the creation of the tree, and allow to save it as a prefab.

It can be found in the inspector when a tree is selected.





There are three tabs on the Mtree component:

- Functions – To create the tree level by level.
- Quality – To control the quality and polycount of the tree.
- Save as prefab – To export the tree as a prefab once it is finished.

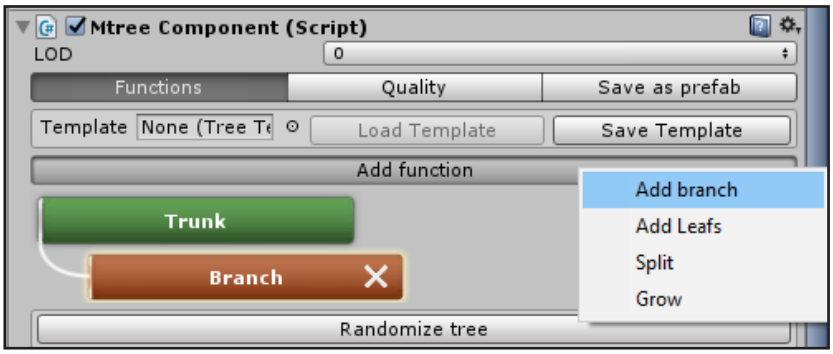
Functions Tab

It is the most important tab, the one in which the tree is effectively created.

A tree follows an intuitive structure. First there is the trunk, then the branches, and finally the leafs. To each step is associated a function, and each function has parameters.

To select a function and change its parameters, click on it.

To add a function, click on Add function and select the function you wish to add. The function will be added on top of the previously selected function.



To remove a function, click on the X inside the function you wish to remove.

Add Branch Function

This function adds branches the active level of the tree; if the trunk function is selected, the branches will be added to the trunk, and if a branch function is selected, the new branches will be added on the selected ones.

Add Leafs Function

This function adds leafs to the active level of the tree. If a tree has a leaf function, it will have two sub meshes, and two materials

Split and Grow Functions

Those functions are used to have a greater control over the tree. They are not used often.

The Split function adds tiny splits to the selected levels. Those splits are very short branches that can be grown.

The Grow function make the extremities of the active level of the tree grow. It is mostly used after a Split function, but can be applied any other function except a Leafs function.

The Branch function is nothing more than a Split and Grow functions combined into one, with less parameters exposed.

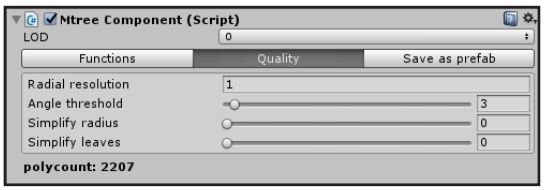
The Functions parameters

Each function has a set of parameters which control how the function affects the tree. Playing with the parameters is probably the best way to discover their uses.
Here are the most important parameters:

Seed – Changing the seed will give another result of the function, like throwing dices two times will give two different numbers. To change the seed of all functions at once, you can click on Randomize tree.
Length – controls the length of the branches/trunk generated.
Resolution – Increasing the resolution will give a more complex looking tree, with a higher number of triangles. Be warry as the poly-count rises quickly.
Randomness – A higher value will give the tree a more jagged appearance.

Quality Tab

It is a seldom visited tab, it allows control over the quality of the tree. The settings of the quality tabs vary with the level of detail (LOD) of the tree. To visualize each LOD level, change the LOD settings.

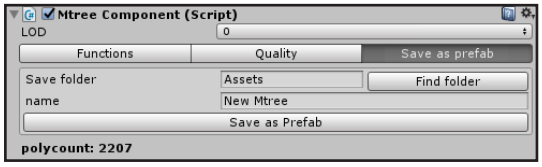


Radial resolution – Controls the amount of vertices that go around each branch. Lower is more performant.
Simplify angle – Controls how much straight branches are simplified. Higher is more performant.
Simplify radius – Threshold of the thinnest branch drawn. Higher is more performant.
Simplify leafs – Controls the density of leafs after their creation. Higher is more performant.

In most uses, the default values of each LOD level are good enough.

Save as prefab Tab

The trees are created with the Mtree component.
When you are satisfied with the tree and consider it finished, **you must save it as a prefab using this tab**, otherwise the tree will not be optimized.



Saving the tree as prefab will generate all 4 LOD levels with ambient occlusion, as well as render a billboard. The meshes are saved in the specified folder, and a prefab with a LOD group is created.

You can visualize the result of the ambient occlusion pass by clicking on Bake ambient occlusion. Note that the ambient occlusion information will be lost if you change the tree afterwards.

You can Select the folder to which save the prefab by clicking on Find folder.

Save the tree as a prefab by clicking on Save as Prefab and wait until the process is over. You can find the prefab in the specified location. Once the tree is saved, only use the prefab, you can delete the tree with Mtree-Component attached.

Save as prefab Tab

You can Adjust the Vertex Color of the Tree by those two sliders, this will affect the Wind Strength on the Bark and the Leafs!

2. Exhaustive list of function parameters.

Trunk

Parameters	*Description*
Seed	Changing the seed will give another result of the function, like throwing dices two times will give two different numbers.
Length	The length of the generated trunk.
Radius	The radius of the trunk.
Resolution	The amount of points per unit of length.
Axis attraction	How much the tree is drawn to its original axis. Prevents the trunk from diverging too much.
Shape	The variation of the trunk radius with its length.
Randomness	How irregular the trunk looks.
Displacement strength	How much noise affects the geometry of the trunk.
Displacement size	How large is the noise affecting the geometry of the trunk.
Spin amount	How much the trunk is twisted.
Height offset	How much the trunk goes inside the ground. Helps when a tree is placed on an uneven ground.
Root Shape	The evolution of the radius of the trunk near the ground.
Height	The height to which the root goes.
Root Radius	The radius of the trunk on the ground.
Additional Resolution	How much more resolution to add to the trunk near the ground.
Flare number	Number of flares near the ground.

Add Branch

Parameters	*Description*
Seed	Changing the seed will give another result of the function, like throwing dices two times will give two different numbers.
Number	Approximate number of how many branches to add.
Length	The length of the branches.
Resolution	The amount of points per unit of length. Warning: polygon count is very sensible to this parameter.
Randomness	How irregular the branches look.
Radius	The start radius of the branches, relative to the radius of what they grow on.
Split proba	The probability for a branch to fork into multiple branches. Warning: polygon count is very sensible to this parameter.
Max splits number	The max number of branches a branch can fork into.
Angle	The angle of the branches from what they grow on.
Up attraction	How much the branches tend to grow toward the sky.
Gravity strength	How much gravity affects the branches.
Start	The minimum height from which the branches are created.

Add Leaf

Parameters	*Description*
Mesh type	The geometry of the leaf.
Number	Approximately how many leafs to add.
Size	The size of each leaf.
Max branch radius	The maximum radius of the branches from which the leafs are created.
Leaf Weight	How much the leafs are drawn to the ground.
Override normals	If true, the leafs normal will be determined by their position on the tree. If false the default leaf mesh normal are used.

Split

Parameters	*Description*
Seed	Changing the seed will give another result of the function, like throwing dices two times will give two different numbers.
Number	Approximately how many splits to add.
Split angle	The angle of the splits from what they grow on.
Max splits at a time	The max number of splits that can occur on the same location.
Split radius	The radius of the split relative to the radius of its parent.
Start	The height
Height spread	The minimum height from which the splits are created.

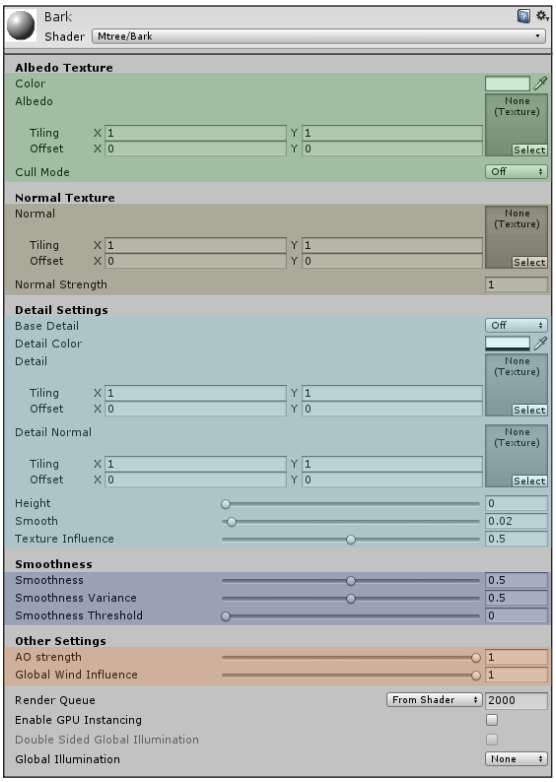
Grow

Parameters	*Description*
Seed	Changing the seed will give another result of the function, like throwing dices two times will give two different numbers.
Length	The additional length to grow the parent.
Resolution	The amount of points per unit of length. Warning: polygon count is very sensible to this parameter.
Split proba	The probability to fork into multiple branches. Warning: polygon count is very sensible to this parameter.
Split angle	When forking, the angle between the newly created branches.
Shape	The evolution of the radius with the length.
Split radius	When forking, the radius of the newly created branches.
Max splits at a time	The max number of splits that can occur on the same location.
Randomness	How irregular the branches look.
Up attraction	How much the branches tend to grow toward the sky.
Gravity strength	How much gravity affects the branche

3. Shaders

Bark Shader

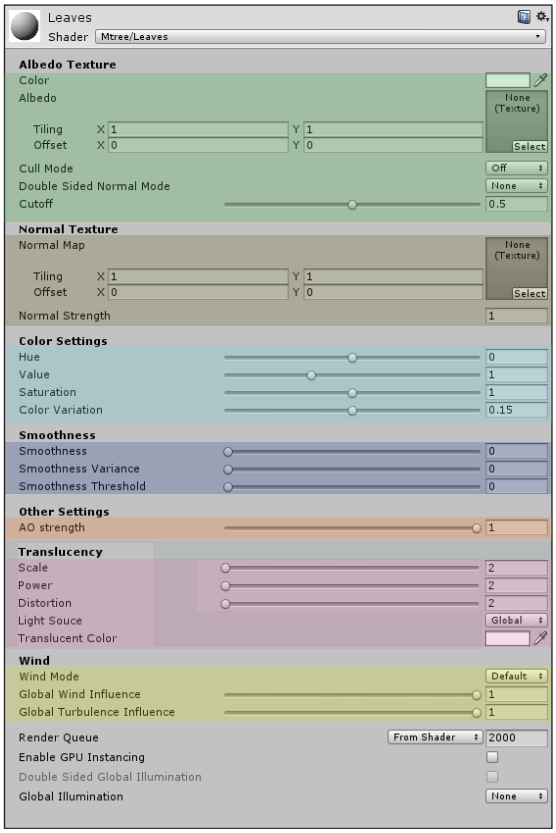
By default, when adding a tree, a material is created using the Mtree bark shader.



Color	Color tint of the Main Bark
Albedo	Main Texture of the Bark
Cull Mode	Which Face is beeing rendered
Normal	Main Normal Map of the Bark
Normal Strength	Intensity of the Normal Map
Base Detail	Turn Detail Map on or Off
Detail Color	Color tint of the Detail Map
Detail	Detail Texture
Detail Normal	Detail Normal Map
Height	Max height of the Detail Map
Smooth	How smooth the Texture blends
Texture Influence	Intensity of the Detail Map
Smoothness	Intensity of the Reflection
Smoothness Variance	Varity of the Reflection
Smoothness Threshold	Threshold of the Reflection
AO Strength	Intensity of Bark Ambient Occlusion
Global Wind Influence	Impact of Global Wind Strength **Needs to be the same value as the Leaves Material, or the result will not be off!**

Leaves Shader

When adding leafs to a tree, a leafs material is created using the Mtree leaves shader.

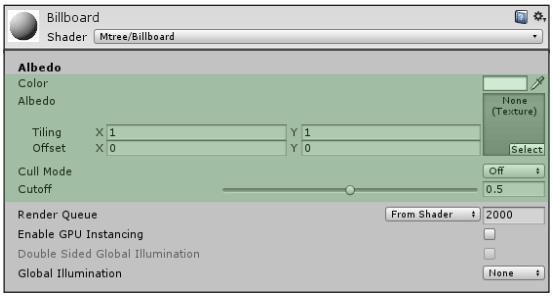


Color	Color tint of the Main Bark
Albedo	Main Texture of the Bark
Cull Mode	Which Face is beeing rendered
Double Sided Normal Mode	How the backface Normals are displayed
Cutoff	Threshold of Alpha Cutout
Normal	Main Normal Map of the Bark
Normal Strength	Intensity of the Normal Map
Hue	Color
Value	Brightness of the Color
Saturation	Saturation of the Color
Color Variation	Color Variation of the Leaves
HDRP Translucency	**Please visit the SRP Section for further Details**
Smoothness	Intensity of the Reflection
Smoothness Variance	Varity of the Reflection
Smoothness Threshold	Threshold of the Reflection
AO Strength	Intensity of Leaves Ambient Occlusion
Scale	Scale of the Translucent Effect
Power	Intensity of the Translucent Effect
Distortion	Distortion of the Translucent Effect
Light Source	Global or Custom Light Source
Translucent Color	Translucent Color, only with Custom Light Source available!
Wind Mode	Choose Windmode for Leaf Shivering
Global Wind Influence	Impact of Global Wind Strength **Needs to be the same value as the Leaves Material, or the result will not be off!**
Global Turbulence Influence	Impact of Global Turbulence Strength

Billboard shader

When saving a tree as prefab, a billboard of the tree is created, and has a material using the Mtree billboard shader.

Color	Color tint of the Billboard
Albedo	Billboard Texture
Cull Mode	Which Face is beeing rendered
Cutoff	Threshold of Alpha Cutout

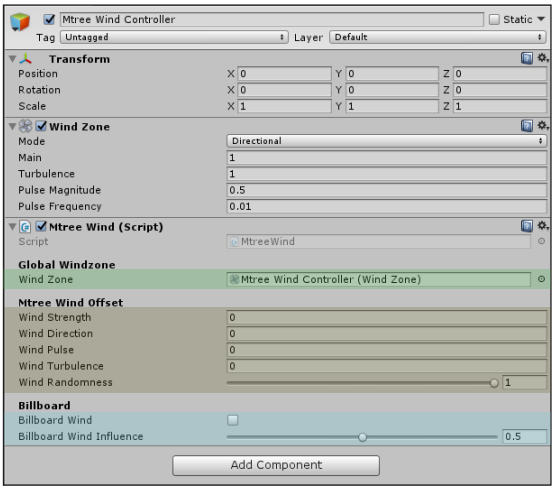


Global Wind Controller

The Mtree Wind script works with or without a Wind Zone. If a Wind Zone is selected the Wind Zones Parameters are used for controlling the Wind and The Mtree Wind Offset is for fine tuning the Mtree Wind, if a behaviours is too much or anything other is not like desired.

Billboard Wind is by default off.

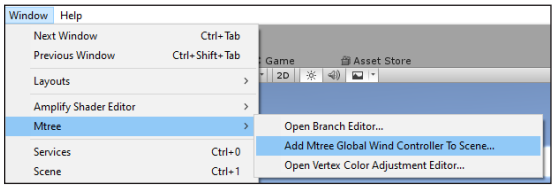
Wind Zone	If Wind Zone is asigned, Mtree Wind will execute from there.
Wind Strength	Main Global Wind Strength
Wind Direction	Main Wind Direction
Wind Pulse	Wave Speed
Wind Turbulence	Shivering of the Leaves
Wind Randomness	How random the wind affects the Trees
Billboard Wind	If billboards do have Wind
Billboard Wind Influence	How much the Main Wind impacts on Billboards



Adding a Global Wind Controller

Mtree Wind Controller can either be attached by script, Add Component on a GameObject, or by opening the Menu: *„Window/Mtree/Add Mtree Global Wind Controller to Scene...“*

This will add a WindZone and the Mtree Wind Script to the Scene at Position (0,0,0).



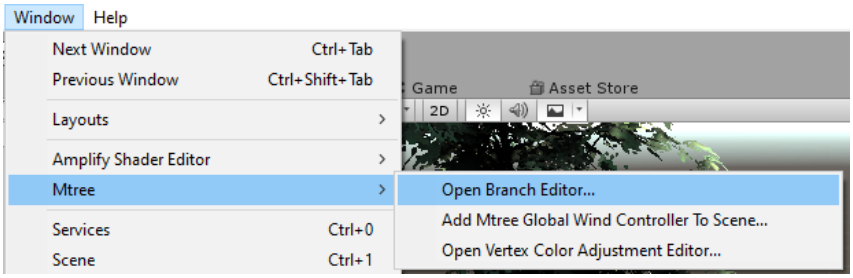
4. Branch Texture Editor

Preamble: as you maybe know, it is not difficult to find leaves textures on the internet. But to find branches textures, it is quite the opposite. However, using branches textures is known to be more optimal, that is why Mtree offers you a unique and simple tool that create a branch texture from a leaf texture, and then uses it as a leaf shader. Let us find how it works.

Getting started with the Branch Editor

Open the Branch Editor

To access the tool window, you must go in: *„Window/Mtree/BranchEditor“*.



Create a basic Branch Texture

The two most important settings are the leaf texture and the bark texture.

After assign those two textures, tweak all the other parameters until you are satisfied with the result. You can find the exhaustive description of all parameters in the next chapter.

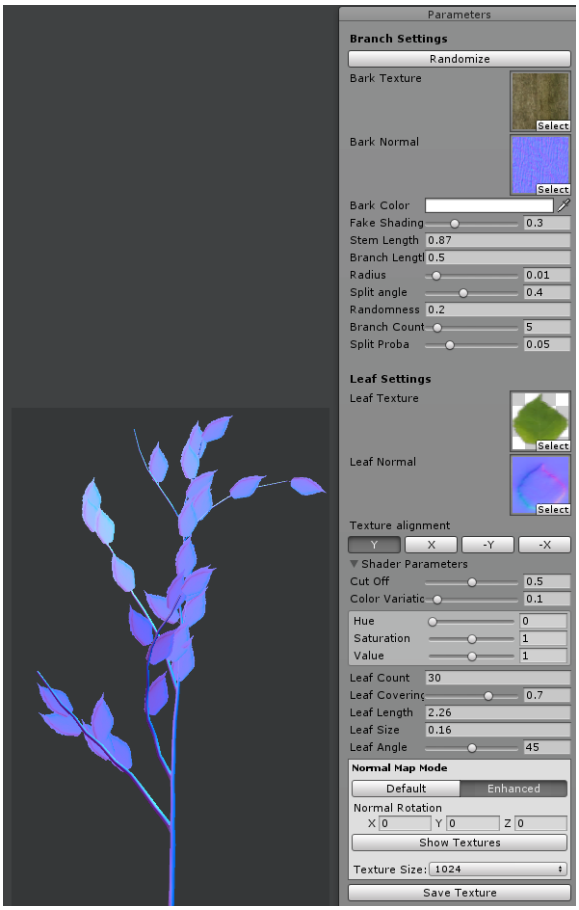
Choose the Size of the Generated Texture.
Once you are satisfied with the result and want to save the texture, click on “save texture”.

Standard and Enhanced Mode

Since Mtree 2.2 you can switch between Standard (Procedural generated Normals) and Enhanced Mode, which is available when you add Normal Maps to the given Properties.

If any of the Bark or Leaf Normal Properties are empty, Enhanced Mode won‘t be available to use.

Use Normal Rotation only if the Normals in Enahanced Mode are incorrect. You can Hit Show Normals / Show Textures button to switch the view.



Attention!

If you are not on Legacy Pipeline and using the Branch Editor, Mtree will switch Automatically Pipelines aslong as you use the Branch Editor (your Materials get Pink), and switches back, when closing the Editor Window! This action does not break you Scene Setup!

5. Exhaustive list of the Branch Editor parameters.

Branch Settings

Parameter	*Description*
Randomize	Change the seed of the branch.
Bark Texture	The texture to use for the bark
Bark Color	The color of the bark.
Fake Shading	How "3D" the bark appears.
Stem Length	The length of center branch.
Branch Length	The length of the side branches.
Radius	The radius of the branch.
Split angle	The angle between the newly created branches and the stem.
Randomness	How irregular the branch looks.
Branch Count	The number of side branches.
Split Proba	The probability for a branch to fork into multiple branches.

Leaf Settings

Parameter	*Description*
Leaf Texture	The texture of the leaf
Texture Alignment	The rotation of the leaf texture
Cut Off	Threshold at which a pixel is considered transparent.
Hue	The tint of the leaves
Saturation	How strong the colors are.
Value	How dark the leaves are.
Leaf Count	How many leaves there are on the branch.
Leaf covering	How the leafs are concentrated towards the extremities of the branches.
Leaf Length	How long the leaves are.
Leaf Size	The size of the leaves.
Leaf Angle	The max angle between a leaf and the branch it grew from

6. Vertex Color Adjustment Editor

This Editor is designed to make Meshes preferable Grasspatches working with Mtree Leaves shader!

Getting started with the Vertex Color Adjustment Editor

To begin with, this tool will paint Vertex Colors to your Mesh, which is not Undoable!

To properly preview what's done with your Mesh add, the Mtree Global Windcontroller to your scene.

Open the Vertex Color Adjustment Editor. Add then one or more GameObjects with meshes inside to the GameObjects property. For preview it can be aswell scene Objects, the Editor saves changes in any way!

Enable the ***„Enable Override Mesh Options"*** and select a Vertex color. You can then switch between the Material Preview Leaves and Vertex Colors.

To apply the Color, hit ***„Update all Vertex Colors".***

7. Mtree Requirements for HDRP, LWRP, URP

In order to make Mtree work correctly with HDRP, LWRP and URP see the List below which SRP's are Supported:

Unity Version	SRP Version	Supported type
2017.4 - 2018.2	Ø	legacy
2018.3	4.10	legacy / HDRP / LWRP
2018.4	4.10	legacy / HDRP / LWRP
2019.1	5.16.1	legacy / HDRP / LWRP
2019.2	6.9.2	legacy / HDRP / LWRP
2019.3	7.1.5	legacy / HDRP / URP
2020.1	untested	untested

legacy = Unity Standard Pipeline

If HDRP / LWRP / URP doesn't work and common mistakes

Be sure to download the correct supported SRP Version.

Be sure you've downloaded all the SRP dependecy files from the Package Manager!

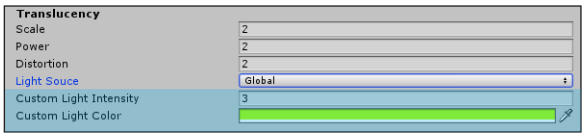
Be sure to switch to linear Space color when using HDRP.

HDRP Translucency

HDRP Translucent effect hase two Modes:

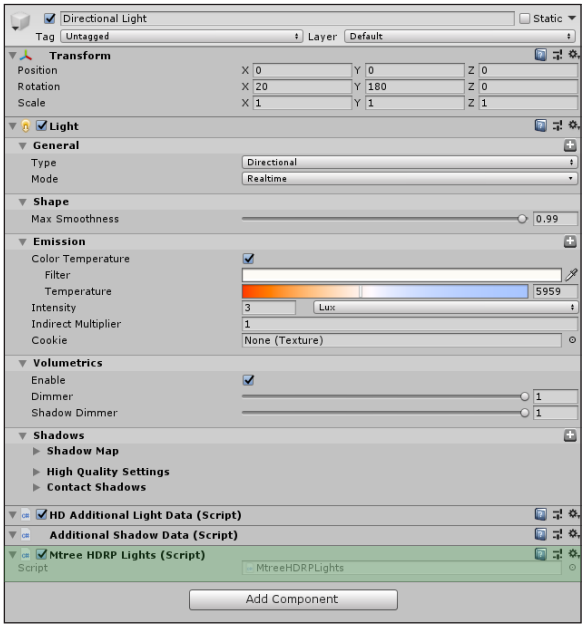
Light Source Custom:

You choose the Light Intensity in the Shader, aswell the Light's Color.



Light Source Global:

Works only if you add to your Main Directional HDRP Light the Component Mtree HDRP Lights.



8. Creating your own Asset for the Asset Store

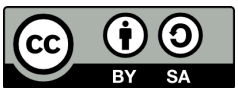
What files can i use?

- All the Trees, which are saved as Prefabs and made with Mtree can be used for your Asset.
- The Leaves, Bark and Billboard Shader.
- The Mtree Wind Script.

You are not allowed to use anything else, to provide an new Asset on the Asset store!
(*„For example: Source Code, Textures, etc.“*)

If you‘re making a Game, and do not sell any Part of this Asset for production, you‘re free to use anything under the EULA from the Asset Store!

Licencing



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- Mtree/Shaders/Legacy/Leaves.shader
- Mtree/Shaders/Legacy/Bark.shader
- Mtree/Shaders/Legacy/Billboard.shader
- Mtree/Scripts/MtreeWind.cs

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