UE5 Texture Editor ➢ Textures, Decals

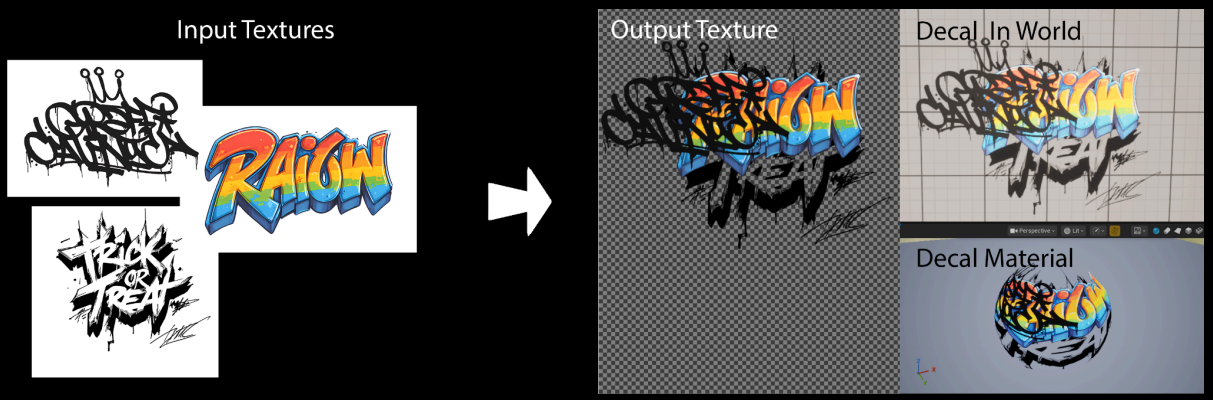
Introduction

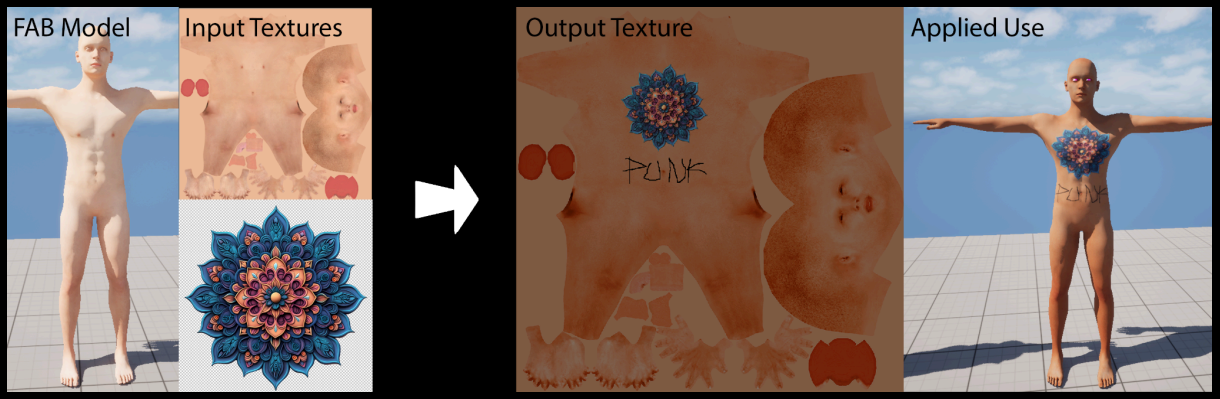
Tool Concept

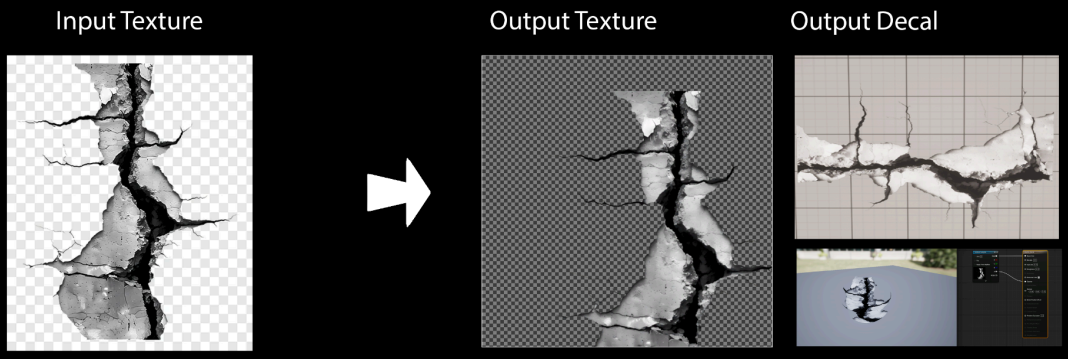
UE5 Texture Editor is a tool that allows the user to create modified textures and decals based on a pre-existing texture in Unreal Engine 5.

This tool was made in attempts to make editing within Unreal Engine easier and faster - meaning no external software will be needed. It can be used to create diversified assets such as graffiti, tattoos or scars using the same base textures but in different combinations/locations with filters, resulting in more variation than basic presets that are often present in games whilst reducing the amount of individual designs an artist or team would have to make.

Inputs & Outputs







Background

Image editing software first originated publicly in the1980s, with software such as the SuperPaint system (1986) and MacPaint (1984) emerging, with Adobe Photoshop joining the fray in 1990 and soon becoming the industry standard. Adobe Photoshop then became a subscription-only product in 2013. Since Adobe Photoshop's rise in popularity, other open-source software such as Krita (2005) have been established yet are not considered industry standard.

This tool aims to implement the core functionality of Adobe Photoshop and other drawing software from within Unreal Engine itself, allowing for artists to create textures within the engine and not needing to use external software to accomplish what they need.

Main Problems this tool aims to address

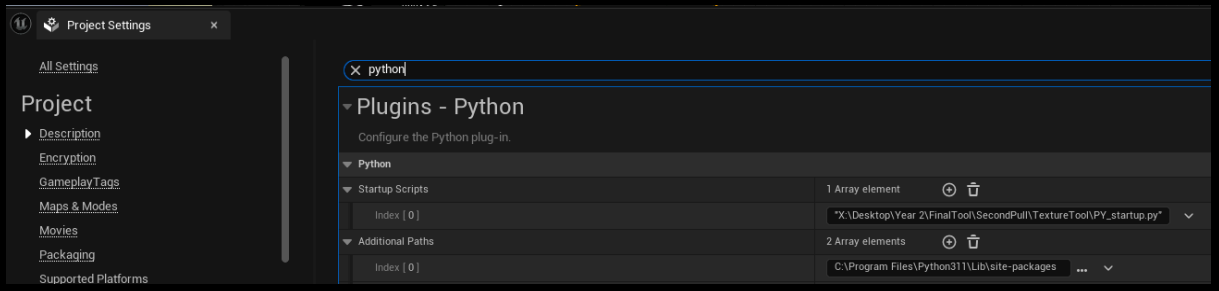
- Remove the **tedious** process of creating assets externally and having to import and export from different software, increasing ease of life for artists
- Due to being within the engine itself, the user can **quickly** apply their texture changes and compare the outputs (eg. on models)
- Outputs will be more **diversified** than presets, for example, whilst still needing the same amount of textures (eg. diverse tattoo compositions in a game as opposed to multiple characters having the same tattoo sleeve design), saving costs and speeding up production time

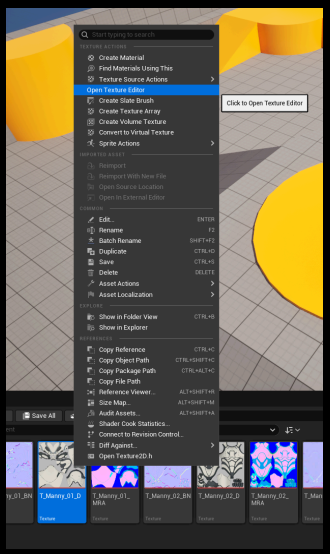
- Remove the requirement of a subscription-based software for texture editing, providing use for those with **smaller budgets**
- Remove the requirement of deep software knowledge through intuitive UI design and layouts, allowing for both entry-level and highly skilled users to easily, effectively and efficiently create textures

Setup

- Ensure Python 3.11 or later is installed on the system.
- Install PySide 6.9.2 or above by typing “pip install PySide6” in the terminal.
- Install Pillow 11.3.0 or above by typing “pip install Pillow” in the terminal.
- Copy the path of the PySide6 and Pillow installation location(s).
- Go to the desired Unreal Engine Project, go to Edit > Project Settings > Search for “Python” > Add to "Additional paths” the path(s) to PySide6 and Pillow.

- Download the python files and icon-images folder, keep them in a singular folder
- Copy of the path of PY_startup.py.
- In the Unreal Project, navigate to Edit > Project Settings > Search for “Python” > Add the copied path to the “Startup Scripts”.
- -prompted, the user should restart the engine.
- Once the engine has restarted, a pop up should appear informing the user that the tool has successfully been installed.





Usage

Once installed, in order to use the tool the user must select a texture in the content browser right click, bringing up the menu depicted on the image to the right. Then, they must select “Open Texture Editor” and the editor will open their selected texture as a base layer.

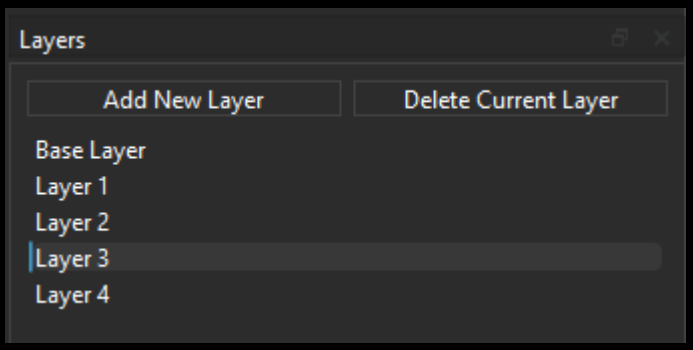
Controls

Movement Controls

- Pan - to pan across an image, hold space bar and drag left click
- Zoom In - to zoom in, press Ctrl +
- Zoom Out - to zoom out, press Ctrl -
- Reset Zoom - to reset zoom to original ratio, press Ctrl 0

Layer Management

- Add New layer - creates a blank layer in which the user can use the pen tool freely
- Delete Current Layer - Deletes the current selected layer
- To select different layers via the layer UI, left click on the desired layer. Alternatively, click on the image with the move tool selected.

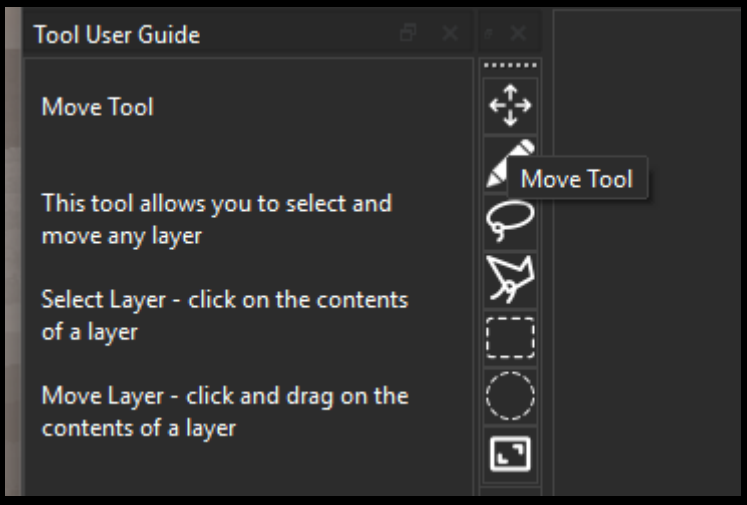


Colour Picker

- The colour picker affects the pen tool's colour.
- Click on the "Pick Color" open the colour picker menu
- From this menu, select a color either with HSV, clicking on the color preset, selecting a custom color or by inputting an HTML hex code. Alternatively, press "Pick Screen Color" and then click to the desired color on the screen.
- To add a custom color to the presets tab, select the desired slot, then press "Add to Custom Colors"
- Press OK to add use the selected colour
- Press Cancel to return the colour to black

Tool Types

- To select a tool, click on the icon on the tool bar. It will display a description of the tool on the left, displaying what tool has been selected alongside additional information.
- Hover over the icon to see a tool tip showing what the tool is.
- NOTE: all selections are shared between tools and visible on all except the move and transform tool



Move Tool

- This tool allows the user to select and move different layers by clicking within the image bounds.
- Select a layer by clicking within in the image bounds
- Move a layer by clicking within the image bounds and dragging to desired location

Pen Tool

- This tool allows the user to draw on the selected layer within its bounds as if it were a clipping mask
- If there was a prior selection, the user can only draw within that selection
- To increase the size of the pen, press]
- To decrease the size of the pen, press [
- NOTE: if drawing very fast with the pen tool, the pen tool can clip out of selections
- NOTE: if drawing with a large pen, it can clip outside of the border of the selection. Suggested to use a smaller brush when attempting to fill in selections.

Lasso Tool

- This tool allows the user to make freehand selections
- To add another selection onto a pre-existing one, hold shift on the initial click then draw the desired additional selection
- To subtract from a pre-existing selection, hold alt on initial click then draw the desired subtracting selection
- CHANGE: To remove all selections, press Esc

Polygonal Lasso Tool

- This tool allows the user to make polygonal selections.
- Start a selection by clicking and continue it by drawing additional points.
- Finish a selection by clicking on the original point.
- To add another selection onto a pre-existing one, hold shift on the initial click then draw the desired additional selection

- To subtract from a pre-existing selection, hold alt on initial click then draw the desired subtracting selection
- To remove the most recent point of a selection, press delete.
- CHANGE: If there is no current unfinished selection, delete will remove all selections
- CHANGE: To remove all selections, press Esc

Rectangle Tool

- This tool allows the user to make rectangular selections.
- To make a selection, click and drag to the desired point
- To add another selection onto a pre-existing one, hold shift on the initial click then draw the desired additional selection
- To subtract from a pre-existing selection, hold alt on initial click then draw the desired subtracting selection
- To lock the selection into a square, whilst drawing, hold shift
- To lock the selection around the starting point, whilst drawing, hold alt
- To remove all selections, press Esc

Ellipse Tool

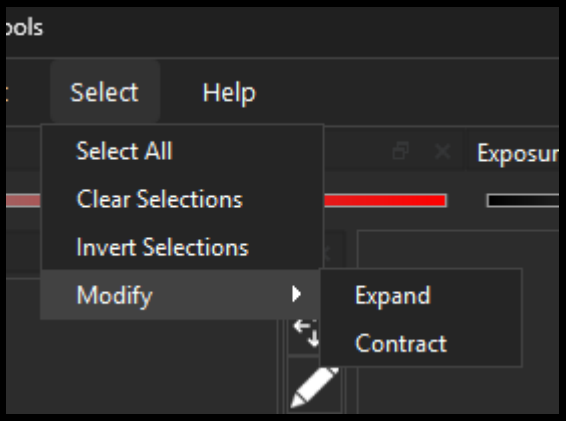
- This tool allows the user to make elliptical selections.
- To make a selection, click and drag to the desired point
- To add another selection onto a pre-existing one, hold shift on the initial click then draw the desired additional selection
- To subtract from a pre-existing selection, hold alt on initial click then draw the desired subtracting selection
- To lock the selection into a rectangle, whilst drawing, hold shift
- To lock the selection around the starting point, whilst drawing, hold alt
- To remove all selections, press Esc

Transform Tool

- This tool allows the user to manipulate the selected layer by moving, scaling and rotating.
- To move the image, click and drag to the desired location
- To scale the image, click outside the bounding box yet close to it and drag towards or away from the centre to scape down/up
- To rotate the image, click far outside the bounding box and drag around the image to get the desired rotation

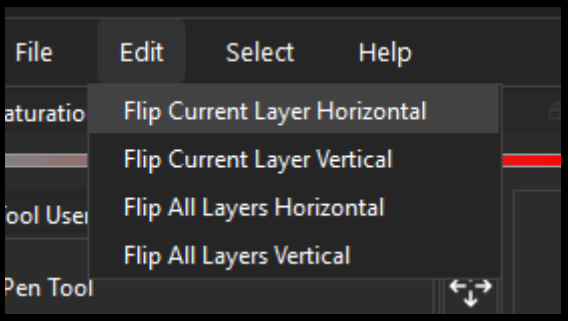
Selection Modifications

- To access selection modifications, go to the menu on the top of the window and click on “Select” which will open a drop down of different modifications.
- Click “Select All” to make the selection match the size of the base image
- Click “Clear Selections” to make clear all selections
- Click “Invert Selections” to invert the selections, alternatively, press Ctrl+Shift+i
- Hover over modify to get the options to “Expand” or “Contract” the selection(s)



Edit Modifications

- To access edit modifications, go the menu on the top of the window and click on “Edit” which will open a drop down menu with different options
- Click on “Flip Current Layer Horizontal” to flip the current layer horizontally
- Click on “Flip Current Layer Vertical” to flip the current layer vertically
- Click on “Flip All Layers Horizontal” to flip all layers horizontally
- Click on “Flip All Layers Vertical” to flip all layers vertically



Importing Textures

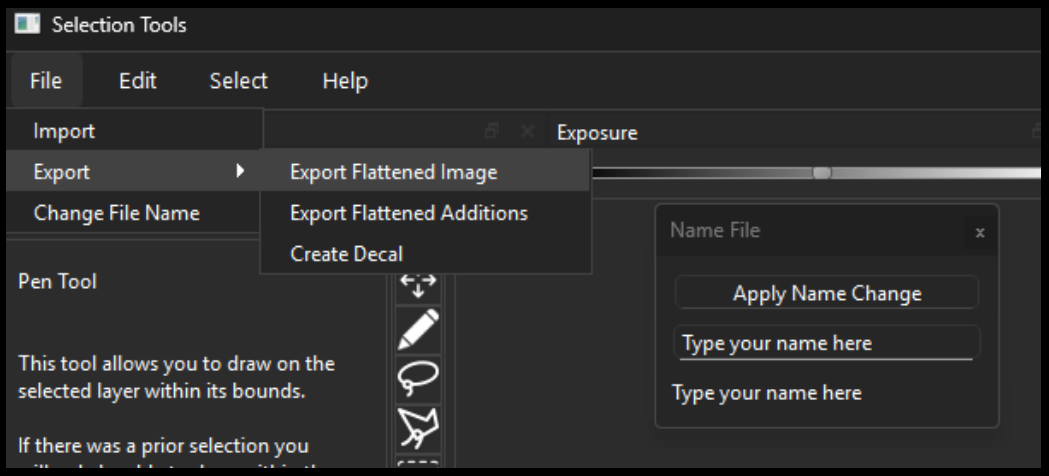
- To import a texture, go to the menu on the top of the window and click on “File” and then click on “Import” which will open up a file browser in which the user can select assets from their PC or unreal project.
- Press open once the desired texture has been selected
- This will automatically create a new layer

Exporting

- To export a texture, go to the menu on the top of the window and click on “File” and then click on “Export” which will open a drop down menu with different options
- Click on “Export Flattened Image” to export all layers merged into one as a texture. It will open up a window to name the file. Enter the desired name of the file and then press “Apply Name Change”. This will open up a folder browser in which the user must navigate to their desired folder location in the Unreal Project. Once done, press “Select Folder” to export the image.
- Click on “Export Flattened Additions" to export all layers bar the base image merged into one as a texture. It will open up a window to name the file. Enter the desired name of the file and then press “Apply Name Change”. This will open up a folder

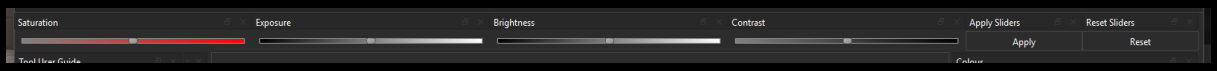
browser in which the user must navigate to their desired folder location in the Unreal Project. Once done, press “Select Folder” to export the image.

- Click on “Export as Decal” to export all layers bar the base image into a texture as well as create a decal in the desired folder location.
- NOTE: To change the name of a decal, the user MUST rename it using the “Change File Name” button.



Adjustment Sliders

- The adjustment sliders affect the selected layer in their selected attribute. They can be modified by dragging and then applied or reset.
- Once sliders have been changed, the apply button will change colour, indicating that the user needs to apply the change. This will reset the resolution and apply all filters (besides opacity)
- Alternatively, the user can press reset to restore the previous version of the layer.
- NOTE: While changing a texture with these sliders, the resolution will temporarily decrease, this will change after pressing apply or reset.
- NOTE: All sliders except opacity will be updated when the layer is changed; opacity remains persistent and cannot stack effects even after “Apply” has been pressed.



Saturation Slider

- This slider affects saturation with the middle being the default saturation of the layer. If moved to the left, it will decrease the layer's saturation to grayscale. If moved to the right, it will amplify the layer’s saturation.

Exposure Slider

- This slider affects exposure with the middle being the default exposure of the layer. If moved to the left, it will decrease the layer's exposure. If moved to the right, it will increase the exposure.

Brightness Slider

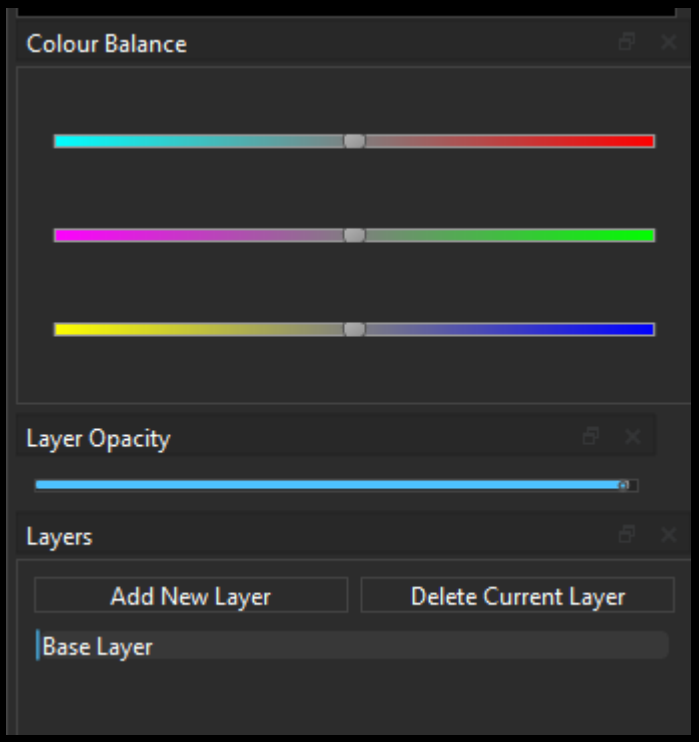
- This slider affects brightness with the middle being the default brightness of the layer. If moved to the left, it will decrease the layer's brightness,

decreasing all the way to black. If moved to the right, it will increase the brightness.

Contrast Slider

- This slider affects contrast with the middle being the default contrast of the layer. If moved to the left, it will decrease the layer's contrast, decreasing all the way to gray. If moved to the right, it will increase the contrast.

Colour Balance

- The top slider affects the balance of cyan and red in the image with the middle being the default color balance of the layer. If moved to the left, it increases the amount of cyan (decreasing the red). If moved to the right, it increases the amount of red.
- The middle slider affects the balance of magenta and green in the image with the middle being the default color balance of the layer. If moved to the left, it increases the amount of magenta (decreasing the green). If moved to the right, it increases the amount of green.
- The bottom slider affects the balance of yellow and blue in the image with the middle being the default color balance of the layer. If moved to the left, it increases the amount of yellow (decreasing the blue). If moved to the right, it increases the amount of blue.
- 

Opacity Slider

- This slider affects the opacity of the selected layer, remaining persistent and is separate from the application of other layers. The default is at 100% - fully opaque. If moved to the left, the opacity decreases to 0% and the image is invisible. If moved to the right, the opacity is at 100% and fully opaque

Troubleshooting/Warnings

Flipping Imported Images

If the user would like to flip an imported image horizontally or vertically, they should do this *before* moving the layer with the transform or move tool. Otherwise, the location of the image might change.

Inverting Selections Can Crash if Complex

If the user has selected more than one shape that is not a rectangle (eg. two ellipses) and they try to invert the selection, it is highly likely that Unreal Engine will crash. To avoid this, there is the alternative method of selecting all and then removing complex shapes afterwards as opposed to using the shortcut.

Image can delete itself

Under circumstances involving the transform and opacity, on occasion the layer might delete itself. Unfortunately, this bug was discovered later into testing and further information regarding its cause cannot be provided.

Future Steps

- Gradient Maps
- Filters (Gaussian Blur, Sharpen, Invert, Darken, Overlay, SoftLight)
- Magic Wand Tool
- Bucket
- Undo
- Redo
- Layer Manipulation (Changing Order, Copy Layer, Visibility)

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I acknowledge the use of ChatGPT (chatgpt.com) to aid in debugging such as for texture exports and for showing examples of how to use certain modules of Qt such as Qt Widgets that were not well documented