

Improving User Workflows in Roblox Studio

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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ABSTRACT

The workflow for designing new Layered Clothing in Roblox Studio was complicated and unintuitive, severely impacting the creation and sale of User Generated Content on the platform. To improve the workflow in the Accessory Fitting Tool (AFT), used to design layered clothing, I created a new pop-out window enabling the user to easily preview their clothing in combination with other common clothing items. The window contains an avatar wearing the user's clothing item, along with a user interface for reordering the layering of the clothes. Camera controls let the user pan, rotate, and zoom to inspect all angles of their item on the avatar. If the user wants to preview with multiple avatars, there is a user interface for quickly swapping between pre-selected avatars.

Through user focus groups, the Product team determined that the old workflow made it difficult for users to express their ideas efficiently, and that the new workflow gives the users more freedom and flexibility. This update fosters creativity and should drastically increase the amount of User Generated Content on the platform. Future changes that could further improve the workflow might include enabling users to select folders of clothing to preview in the window, or adding a right click menu to the layer order user interface to facilitate quickly hiding or deleting layers.

1 INTRODUCTION

Roblox Studio consists of a main center workspace where objects and avatars can be placed and moved around. The top bar contains tools for manipulating the content in the workspace. An explorer panel on the right lists the elements in the workspace. When the user opens the AFT via the bar at the top, the AFT panel appears on the left side of the screen. The old workflow for designing Layered Clothing in Roblox Studio consisted of several inefficient steps. First, the designer had to shape a piece of clothing by dragging vertices on a mannequin's body. After shaping the clothing a certain way, they had to select an avatar from the AFT catalog to use for previewing. Then, they selected clothing from the same catalog to preview in combination with the clothing they had designed. The selected avatar, wearing their clothing along with any clothing items they selected from the catalog in a semi-random order, appeared in the Studio workspace next to the mannequin.

If the user shifted the camera to look at something else in the workspace, they would have had to fly back to the center to find the preview avatar. Or, if they wanted to make a change to a specific vertex on the mannequin and see the effects, they had to fly back and forth between the mannequin and the preview avatar. This was extremely inefficient if the user wanted to tweak several small aspects of their clothing, one by one, and preview the changes. Another huge time waste occurred when the user wanted to change the layer order of the clothes on the preview avatar. For example, if they were designing a T-shirt and wanted to see it underneath a jacket, they would have to find each clothing item in the explorer on the right and individually adjust the `WrapLayer` attribute on each one so the jacket was on top. This `WrapLayer` attribute is buried inside half a dozen drop-down lists and can be hard to find if the user does not know what to look for. All of these compounded to deter users from creating new clothing.

2 RELATED WORKS

My project relied on a lot of design decisions made by other teams at Roblox in the past. The decision to use a pop-out window, for instance, has been the standard for a long time and is based upon a standard set by unknown teams. Roblox Studio (2022) provides various examples of pop-out windows, including the AFT itself [2]. The design teams at Roblox advised my team on every feature before implementation in order to keep the AFT consistent with other applications at the company.

The plugins for Roblox Studio, including the AFT, are developed in the Lua programming language (Ogunleke, 2022). Lua was chosen because it is simple, lightweight, and fast [1]. It also offers C APIs that allow it to easily bind to C programs. Much of the game engine in Roblox was built in C++, so Lua was the perfect choice because it allows integration between the plugins and the engine itself. The simplicity of Lua also makes it easy for new users to pick it up and develop their own games and plugins.

3 PROJECT DESIGN

The project design took many different factors into account in order to maximize improvement. The main feature was a pop-out window, along with user interfaces inside for rearranging layered clothing and quickly swapping avatars. Lighting and custom thumbnails for clothing were two smaller features that improve the quality of the interface. The following subsections delve into each feature and describe how they improve the workflow.

3.1 Pop-out Window

In order to address the concerns of the users, another engineer on my team proposed adding a pop-out window that contains the preview avatar and clothing, as well as an interface for adjusting the layer order of the clothing. I was assigned to this task, as well as various tests to determine the efficiency of Roblox Studio. We wanted to determine whether it was feasible to show multiple avatars in the same pop-out window without serious performance issues. I brainstormed several options, such as splitting the window into subsections, each with its own avatar (see Figure 1), or putting multiple avatars next to each other in the same window (see Figure 2). The pop-out window could handle most static formats, but one feature of the AFT is that the user can play an animation on the preview avatar to see how their clothing works when the character is in motion. For example, the user could make the avatar run, jump, swim, climb, and more. It was important that this feature be present in the new workflow as well. After testing, I settled on just having one avatar in the window at a time because more than one made the animations lag. My team reached out to the rendering team to see if we could get a better version of the `ViewportFrame`, which is used to display the avatar, but they were very backlogged and could not prioritize it anytime soon.

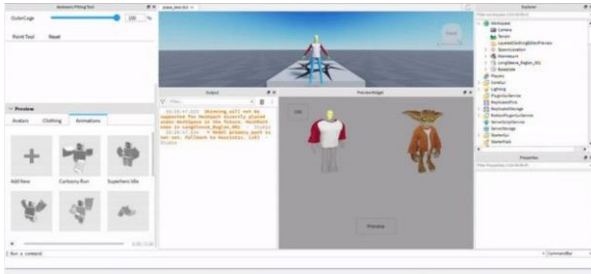


Figure 1: Multiple avatars in separate sub-windows.

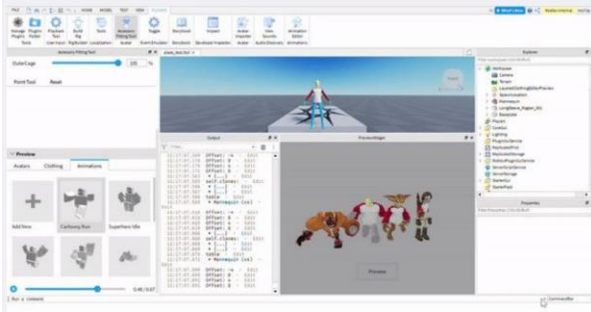


Figure 2: Multiple avatars side-by-side.

3.2 Layer Order and Avatar Wheel UI

In order to improve the layer ordering issue, I created a draggable list of tiles in the upper right of the pop-out window that enables the user to reorder the clothing (see Figure 3). Each tile is a thumbnail image of the clothing item with a black border. When the user drags a tile past another tile, the other one slides into place smoothly. I also created a similar interface for quickly switching avatars at the bottom of the pop-out window. If more than one avatar is selected, the avatar wheel will show up, allowing the user to click on a thumbnail to switch to that avatar.



Figure 3: UI for reordering clothing layers.

3.3 Lighting

Another limitation imposed by the pop-out window itself was lighting. The ViewportFrame cannot support certain lighting features that are available in the main workspace such as dynamic shadows and ambient occlusion. The ViewportFrame only offered a single directional light source and ambient light. The default values for these made the

avatar and clothing seem dark and dull. By tweaking these values, the Product team and I determined the optimal light intensity values to improve the appearance of the avatar in the window. We settled on pushing the ambient light intensity to its maximum value, while the directional light sits at 60% (see Figure 4). I also forced the directional light to follow the camera, so no matter what angle the user is looking from, the avatar gets lit up.



Figure 4: Lighting in the pop-out window before tweaking (left) and after tweaking (center) compared to the workspace (right).

3.4 Custom Clothing Thumbnail

The last feature I worked on was a custom thumbnail for clothing that the user adds to the catalog manually. Previously, all manually added clothing had a 2D blue shirt icon, making it difficult for the user to distinguish between items. I created a new thumbnail showing a preview of the item itself to help users quickly choose the clothing they want (see Figure 5).

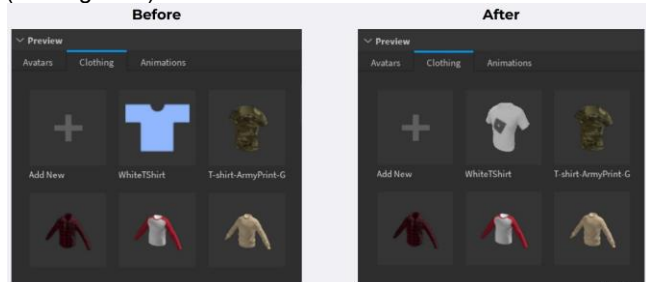


Figure 5: Thumbnail for manually-added clothing, old (left) and new (right).

4 ANTICIPATED RESULTS

The goal of implementing these features is to encourage users to design more clothing and draw more designers and creators to the platform. The plugin is scheduled for release in December 2022 so there is no user data yet, but ideally the AFT will receive much more attention as it currently has very few users. The product team ran focus groups to see how my new features would affect the workflow for people who currently use the AFT. Everyone we heard from gave a positive review, encouraging us to follow through with the pop-out window quality-of-life details.

5 CONCLUSION

This project is critical for the continued growth and adoption of Layered Clothing among Roblox users. Improving the workflow for designers and making it easier to create and preview clothing items will encourage new users to try it out.

Layered Clothing fosters creativity and gives the user even more control over how their avatar looks. If Roblox wants Layered Clothing to become the new standard, they need to make it as easy as possible for users to create and design it. Roblox is already commended for having a low barrier to entry for game design, and lowering that barrier even more for avatar clothing will help Roblox become the largest metaverse in the world. Layered Clothing is only one step in the process, but the improvements to the workflow are crucial to move forward in the future.

6 FUTURE WORK

Though the features implemented during this project were important and improved the workflow by a great deal, there is still a lot of work to be done. After talking with the product and design teams at the end of the summer, it was clear that the features, though functional, were far from being in their final form. The design team had a lot of ideas for restructuring the entire AFT, with the pop-out window being the focus. Ideally, they wanted the pop-out window to be docked inside the AFT initially, with an option to pop it out and move it around. There were also more design details to be tweaked, both in the AFT in general and in the pop-out window, in order to keep the tool consistent with existing features in Roblox Studio. Given all these tasks, my team estimated the final release will be in December 2022.

REFERENCES

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