Dynamic Audio Environment Tool

Overview

The **Dynamic Audio Environment Tool** is a custom Unity Editor tool designed to streamline the process of creating dynamic audio environments in your Unity projects. It automates the placement of reverb zones and audio sources based on scene geometry, provides real-time audio simulation, and offers extensive customization and debugging features.

Features

- **Automatic Reverb Zone Placement**: Automatically places reverb zones in your scene based on analyzed geometry and customizable settings.
- **Manual Audio Source Management**: Provides control over placing, removing, and playing audio sources in the scene.
- **Custom Audio Profiles**: Create and apply custom audio profiles with specific reverb and occlusion settings.
- **Ambient Settings**: Choose from predefined ambient settings (e.g., Small Room, Large Hall) or create your own custom settings.
- **No-Reverb Zones**: Define areas where reverb zones should not be placed using game objects as boundaries.
- **Real-Time Audio Simulation**: Simulate and control audio playback in the scene in real-time.
- **Visualization Options**: Visualize reverb zones in the Scene View using gizmos for better spatial understanding.
- **Debug Logging**: Enable or disable specific debug logs to track ambient area changes, active ambient sections, and other critical events.

Installation

1. Import the tool script into your Unity project.
2. Open the tool via `Tools > Dynamic Audio Environment Tool` in the Unity Editor.

How to Use

1. Audio Profiles

Creating a Profile:

- Enter a profile name in the text field and click "Create New Profile."
- The new profile will be added to the scrollable list of profiles.

Applying a Profile:

- Click on a profile name in the list to select it.
- Adjust the `Reverb Level` and `Occlusion Level` sliders.
- Click "Apply Profile" to apply the selected profile's settings to all reverb zones in the scene.

Deleting a Profile:

- Click the "X" button next to a profile name to delete it. The default profile cannot be deleted.

2. Ambient Settings

- Select an ambient setting from the dropdown (Small Room, Large Hall, Outdoor, Cave, Custom).
- Custom settings can be adjusted in the `Custom Audio Settings` section, where you can modify volume, spatial blend, rolloff mode, and distance settings.

3. Reverb Zone Settings

Cluster Distance Threshold:

- Adjust the `Cluster Distance Threshold` to control how close objects need to be to form a cluster for reverb zone placement.

No-Reverb Zones:

- Add game objects to the `No Reverb Zones` list in the inspector. These objects should have colliders to define their bounds. Reverb zones will not be placed within these areas.

4. Scene Geometry Analysis and Reverb Zone Placement

Analyze and Place:

- Click "Analyze Scene Geometry and Place Reverb Zones" to analyze the scene and automatically place reverb zones based on the analysis.
- Any existing reverb zones will be removed before new ones are placed.

5. Audio Source Management

Place Audio Sources:

- Click the "Place Audio Sources" button to place audio sources at the appropriate positions in the scene.

Remove Audio Sources:

- Click the "Remove Audio Sources" button to remove all placed audio sources.

Play/Stop Audio:

- Click the "Play Audio" button to start playback of all placed audio sources. The button will change to "Stop Audio," which you can click to stop the audio playback.

6. Debug Logging

- **Log Ambient Area Changes**: Toggle this option to enable or disable logs when ambient areas change during analysis or simulation.
- **Log Active Ambient Section**: Toggle this option to log which ambient section is currently active.

7. Visualization Settings

- **Show Reverb Zones**: Toggle this option to visualize reverb zones in the Scene View using gizmos.

Tips

- **Gizmo Visibility**: Ensure that the Gizmos toggle in the Scene View is enabled to see the visualizations.
- **No-Reverb Zones**: Use colliders on your no-reverb zone objects to accurately define the areas where reverb zones should not be placed.
- **Performance**: For large scenes, consider analyzing smaller sections to improve performance.

Troubleshooting

- **Reverb Zones Not Showing**: Make sure that the `Show Reverb Zones` option is enabled and that the Gizmos toggle in the Scene View is active.
- **Audio Not Playing**: Verify that the correct audio clip is assigned and that the volume and spatial blend settings are configured properly.
- **Reverb Zones Inside No-Reverb Areas**: Ensure that the no-reverb zone objects have colliders and are correctly placed