SCP 3DViewer v2.0

Program Documentation

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0.1 Introduction

This program, a 3DViewer, is developed using C++17 and follows the principles of object-oriented programming. It employs various design patterns, including Model-View-Controller (MVC), command, singleton, and observer. The graphical user interface (GUI) implementation is based on QT 6.4.3. The program functions as a 3D model explorer, enabling users to adjust a wide range of view parameters, allowing them to appreciate the beauty of each individual 3D object.

For a more user-friendly experience, the program incorporates undo/redo functionality and a history of opened files. The undo/redo feature is implemented using a command template. This template enables the storage of actions and previous states as objects in a stack, allowing the easy undoing of actions when necessary.

In addition, the 3D viewer offers the ability to create a GIF that captures all object transformations and generates images of the object. Given that the GIF creator object exists in a singular form within the program, the Singleton pattern is utilized to ensure the object's uniqueness.

Lastly, the Observer pattern is used to allow the OpenGL widget to observe the main window and adjust its appearance and properties based on the changes in the main window.

0.2 Usage

To install the program, you first need to navigate to the directory containing the program's source files. Run 'make install'. After the installation process is completed, you can start the program by running either 'make open' or './install/scp_3DViewer_v2'

0.3 Available buttons

Open	Open an .obj file
Render	Render object's wireframe
Projection	Change projection
Screenshot	Take a screenshot
GIF	Create a gif
Undo	Undo last action
Redo	Redo last action
Scale	Change object's scale
Rotation	Change object's rotation
Move	Change object's position
Apply	Apply affine transformations to the object
Reset	Reset object's affine transformations
Background	Change background color
Line type	Change lines to solid/dashed
Line thickness	Change lines thickness
Line color	Change lines color
Vertex type	Change vertices to none/circle/square
Vertex size	Change vertices size
Vertex color	Change vertices color