3D Model Sorter
Based on Geometrical Information

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1 Introduction

1.1 Purpose

The Purpose of the 3D model sorter based on a geometrical information project is to design such software which takes input of similar types of 3D shapes and sorts them on the basis of some geometrical information such as height of object, area etc.

1.2 Scope

1.2.1 Inclusion

i. STL Object Support: The System will support the input of 3D models in STL format

ii. Geometrical Information: The software will analyze the geometrical information of the models, with a specific focus on height.

iii. Sorting Functionality: The primary function is to sort 3D models based on their height.

1.2.2 User Interaction

i. Implementing Models: Users can import various STL objects representing buildings or other structures into the system.

ii. Displaying Models: The system will provide a graphical interface to display 3D models for user interaction.

iii. Sorting Options: Users will have options to choose sorting criteria, with height being a key parameter.

1.2.3 Sorting Criteria:

i. Height-Based Sorting: The primary sorting mechanism will be based on the height of the 3D models.

ii. Additional Criteria: Consider specifying whether the system allows users to sort based on other criteria with respect to geometrical attributes.

1.2.4 Future Enhancements:

i. Scalability: If applicable, mention whether the system is designed to scale for handling a growing number of models in the future..

ii. Additional Sorting Criteria: If applicable, we can add more sorting criterion based attributes other than geometrical information of objects.

iii. Different file format support: If applicable, we can add more file format support other than STL.

1.2.5 Output:

i. Sorted Model Display: The system will represent the sorted 3D models in a clear and comprehensible manner.

2 System Overview

2.1 Architecture Overview:

The 3D Model Sorter adopts a modular architecture, consisting of the following main components:

- User Interface Module: Facilitates user interactions, including model import, sorting criteria selection, and model display.
- Geometrical Analysis Module: Extracts relevant geometrical information, with a focus on height, from the imported 3D models.
- Sorting Engine: Implements sorting algorithms based on user-specified criteria.
- Data Management Module: Handles the storage, retrieval, and organization of 3D model data.
- Export Module (Optional): Allows users to export sorted models or related data.

2.2 User Interface:

- Model Import Interface: Provides users with a seamless process to import 3D models in STL format. Offers feedback on successful imports and alerts for any errors.
- Sorting Options Panel: Allows users to select sorting criteria, with height as the primary parameter. Provides an intuitive interface for initiating the sorting process.
- Model Display Area: Renders the 3D models, providing an interactive and visually appealing representation of the sorted structures.

2.3 Geometrical Analysis Module:

- STL Parser: Processes imported STL files, extracting vertex and facet information.
- Height Calculation: Computes the height of each 3D model based on geometrical data.
- Attribute Extraction (Optional): Additional processing to extract other relevant geometrical attributes for potential future sorting criteria.

3 Functional Requirements

- **Usability:** The GUI should be designed for intuitive user interaction for those in 3D graphics and related domains.
- **Compatibility:** The tool should be compatible with ASCII STL files.
- **Performance:** The project must handle any statistical data and should be able to do the calculation part.

4 Tools

The development of the 3D Model Sorter based on geometrical information will utilize the following software tools:

- OpenGL
- QT
- Visual Studio
- C++
- Git

5 Milestones and Timeline

Sr. No.	Milestones	Date and Time
1	Send Updated SRS Document	5rd Jan 2024 – 12.00 pm
	Buffer Time	2 hrs
2	Creating basic UI part of openGL (non functional)	5th Jan 2024 – 7.30 pm
	Buffer Time	2 hrs
3	Identifying necessary classes and making dll libraries for each of them according to coding standards	5th Jan 2024 – 9.00 pm
	Buffer Time	2 hrs
4	Enable UI to takes user input for multiple stl files and show them on openGL Window	6th Jan 2024 – 2.00 pm
	Buffer Time	2 hrs
5	Implement sorting algorithm for stl files and test it on the basis of height parameter	7th Jan 2024 – 12.00 pm
	Buffer Time	2 hrs
6	Add other parameters for sorting in algorithm and test it	7th Jan 2024 – 4.00 pm
	Buffer Time	2 hrs
7	Integrate all the features and test it	7th jan 2024 – 11.00 pm
	Buffer Time	2 hrs
8	Show demo of project to client	8th jan 2024 – after 3.00 pm
	Buffer Time	2 hrs
9	Presentation of project	8th jan 2024 – after 3.00 pm
	Buffer Time	4hrs

6 Conclusion

The 3D model sorter project aims to provide users with a robust and user-friendly tool for importing, analyzing, and sorting 3D models based on geometrical attributes, with a primary focus on height. The system's modular architecture ensures scalability and efficiency, offering a responsive user interface and optimized performance during sorting processes. With optional features like export functionalities and robust data security measures, the 3D model sorter provides a comprehensive solution for organizing and inspecting 3D structures. The inclusion of thorough documentation further enhances user understanding and contributes to the overall usability of the system. As the project evolves, dthere is potential for customization, additional sorting criteria, and continued optimization, ensuring adaptability to user needs and technological advancements.