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# BUILDING 3D MODELS OF REAL- WORLD OBJECTS

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(CSC 322 Computer Graphics)

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## Summary:

An object (toy car) has different 2D images and need to convert the 2D images of the target model into a 3D model using a “Meshroom” and “MeshLab” software program. The rendering process of model was done by the Meshroom program, and a 3D model was generated from it. The rendered image was imported in MeshLab software program where 3D model refined by adding or removing color and textures etc.

## Background / Introduction:

Meshroom stands out for its simple operation and excellent node-based user interface. Contrary to other free tools, Meshroom supports nearly the whole photogrammetry workflow, including photo alignment, creating sparse point clouds, and producing high-quality mesh and textures. The inability to build and visualize a dense point cloud within the programme workspace (only a sparse one) remains a drawback of this tool. It is possible to export a dense point cloud, however this involves additional node work.

MeshLab is a free software used to edit and analyze 3D triangle meshes. It offers a selection of tools for sculpting, exporting, rendering, and repairing and restoring meshes. It provides functionality for handling the unprocessed data generated by 3D digitization equipment and devices as well as for getting models ready for 3D printing.

Making three-dimensional models of an item or a region is known as 3D modelling. Computer-based 3D modelling software is used to create 3D models. You can choose an object's size, structure, and material while 3D modelling it. The steps used to construct the three - dimensional objects in the software use points, arcs, and triangles. A 3D model is primarily composed of vertices, which join to create a mesh and serve as the model's structural foundation. The model's points can all be moved around to alter the shape. The computer software program locates each

horizontal and vertical point relative to a reference point through using supporting information.

The most typical method for starting to create a 3D model is by using a simple shape. You can start shaping and perfecting your initial shape until it is what you want.

### Analysis:

At first 30 to 40 pics of an object were taken. Then the task was to import the different images by using the import command in the software program “mesh room”. After successfully imported the images into the mesh tool software then the rendering process was started by using the render command in the software program. When the rendering process was completed then rendered file was imported in another tool “MeshLab” in which the 3D model of object was generated. There are many tools available in MeshLab software program. Some tools were used to sculpt the 3D object. Then finally the 3D model of and object was obtained.

The below figure shows the different 2D images of an object,

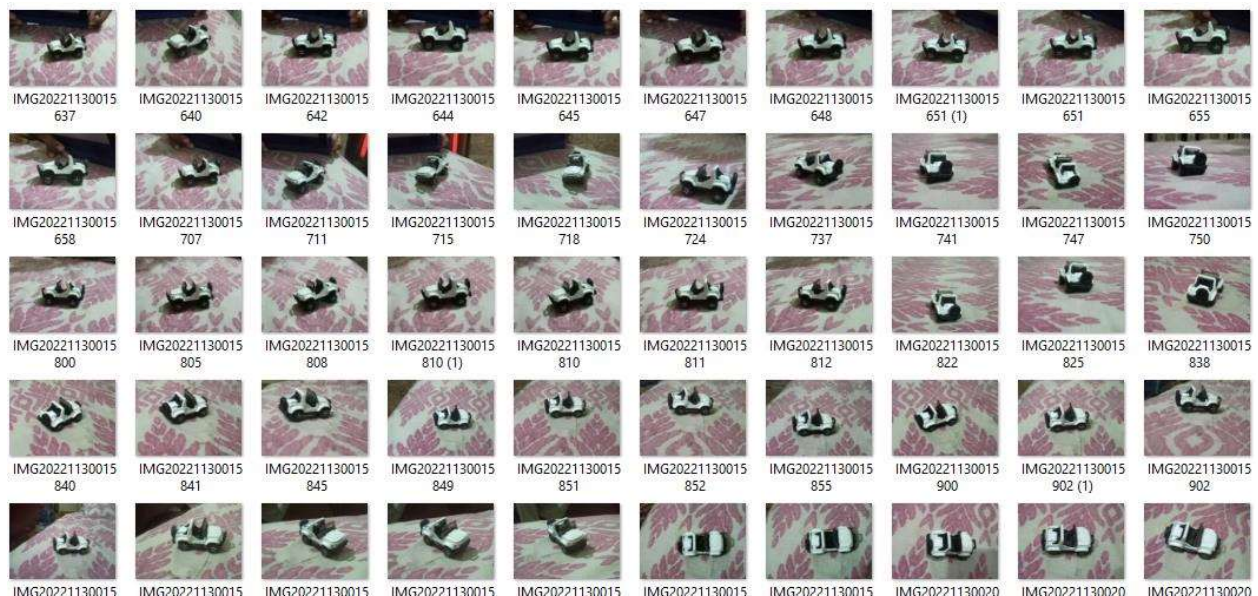
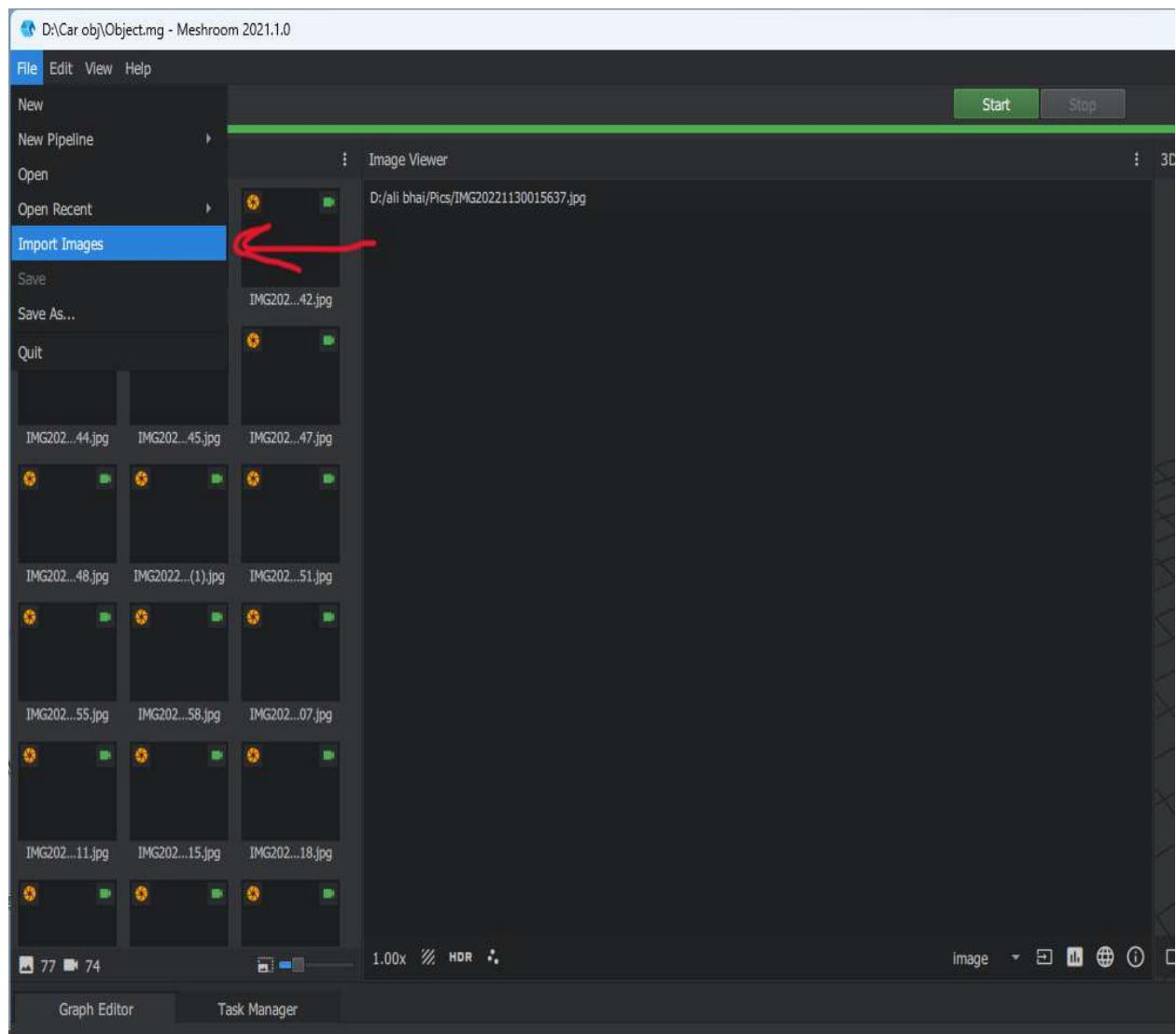


Figure 1: Object images

The 2D images were imported in meshroom software as shown below,



*Figure 2: image showing how to import image in meshroom software*

The below figure shows how start the rendering process of a model,

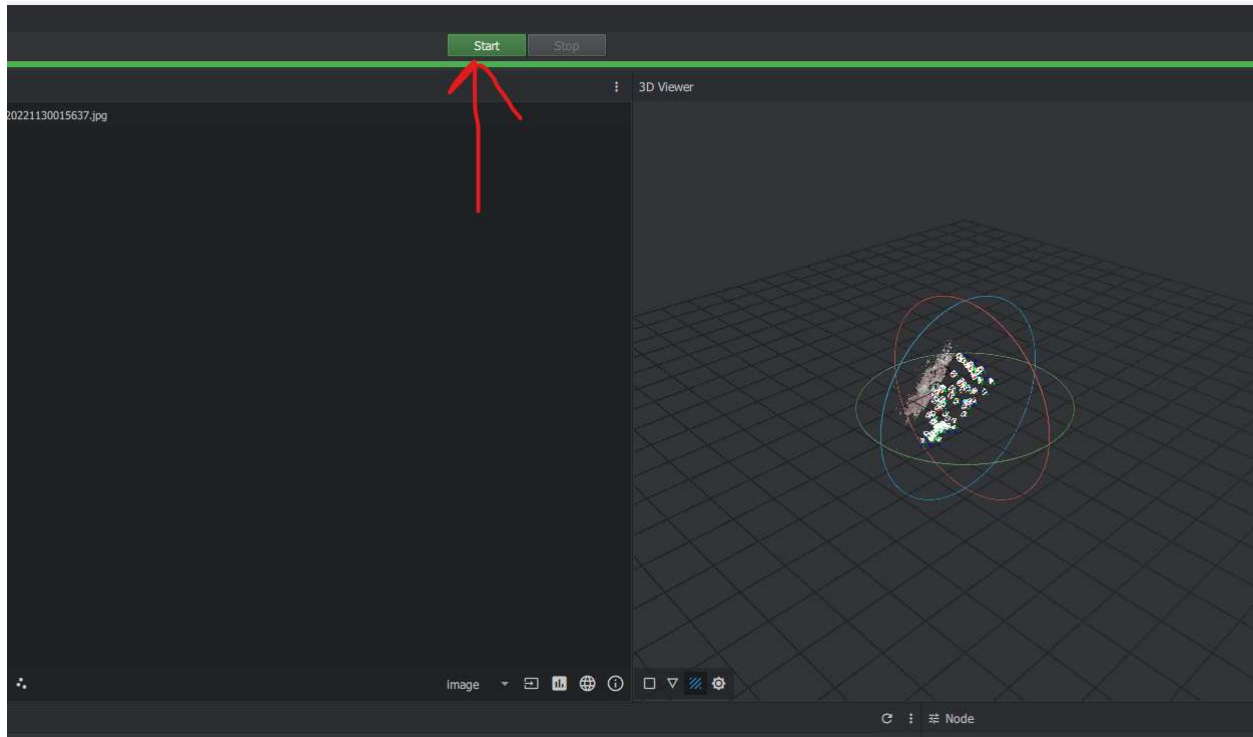


Figure 3: image showing rendering process in meshroom program

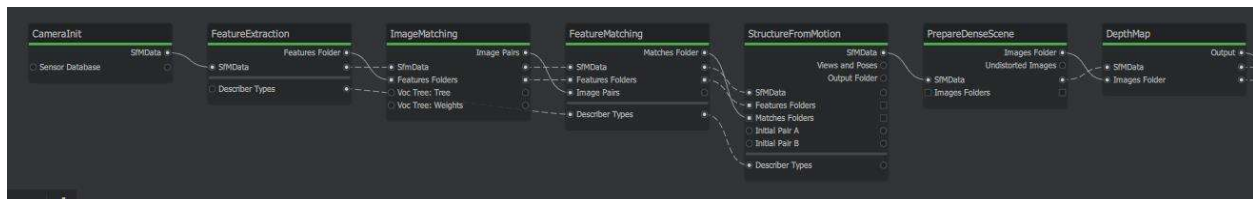


Figure 4: image showing rendering process in meshroom program

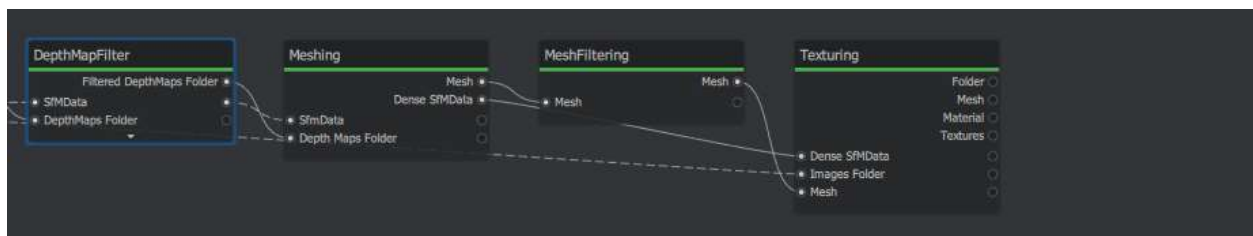


Figure 5: image showing rendering process in meshroom program

The below figure shows how a meshroom software utilize different 2D images and render them into a 3D model as shown below,

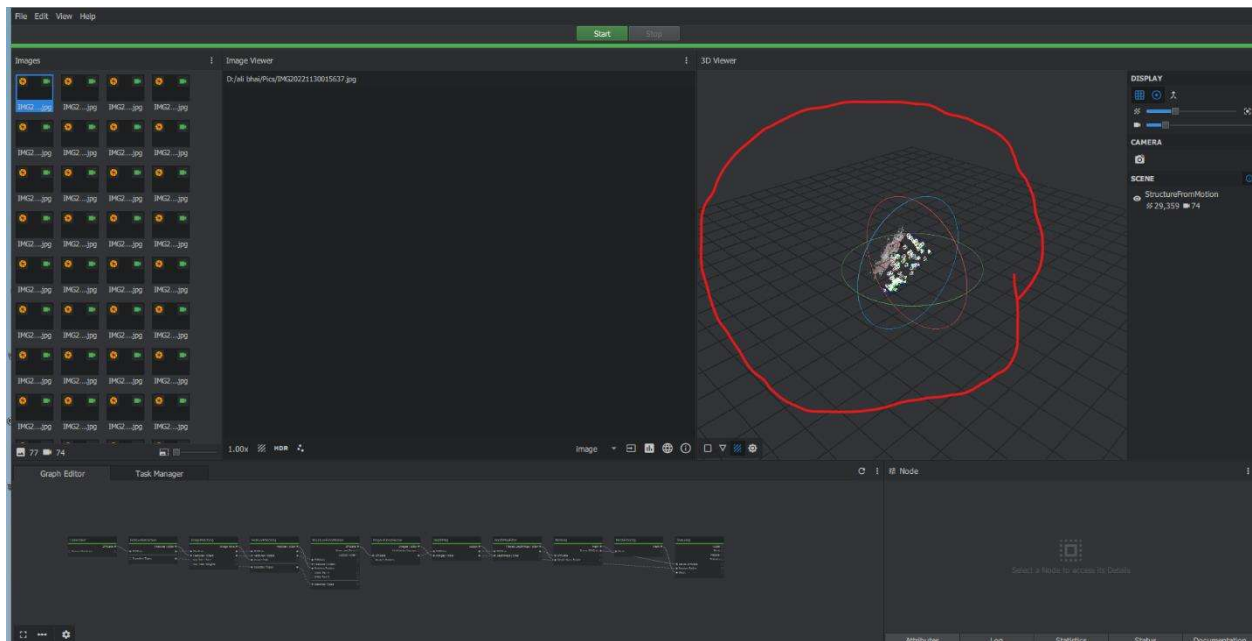


Figure 6: image showing rendering process in meshroom program

The below figure shows the finals files obtained after the rendering process completed in meshroom,

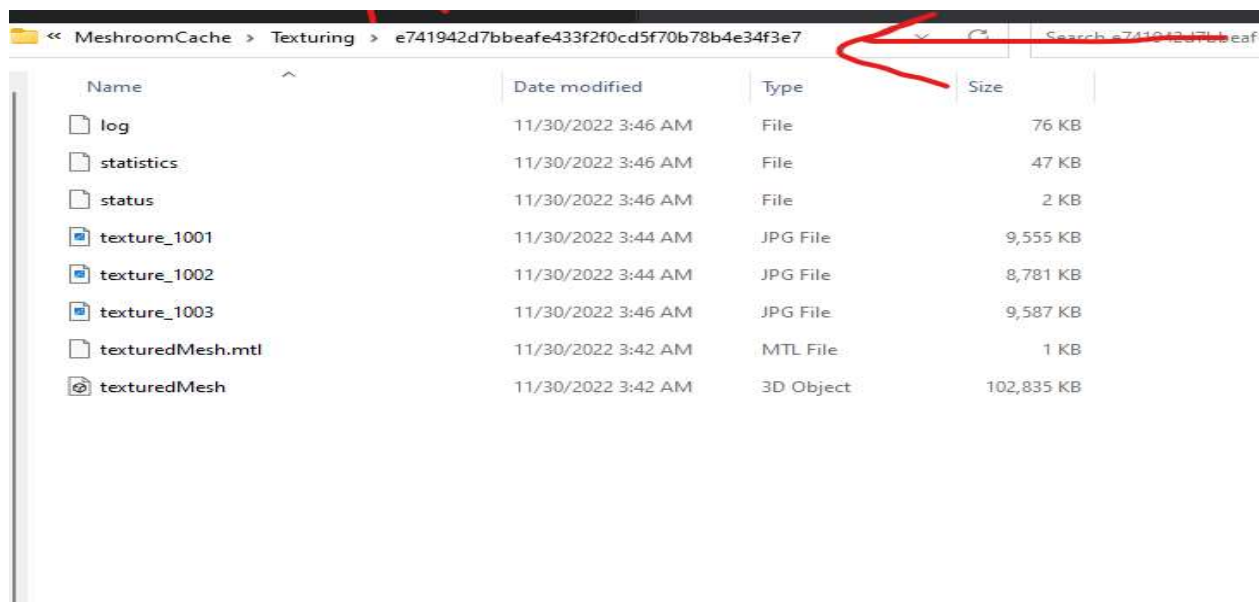


Figure 7: files obtained from meshroom software



The below figure shows the rendered model was opened in MeshLab software,

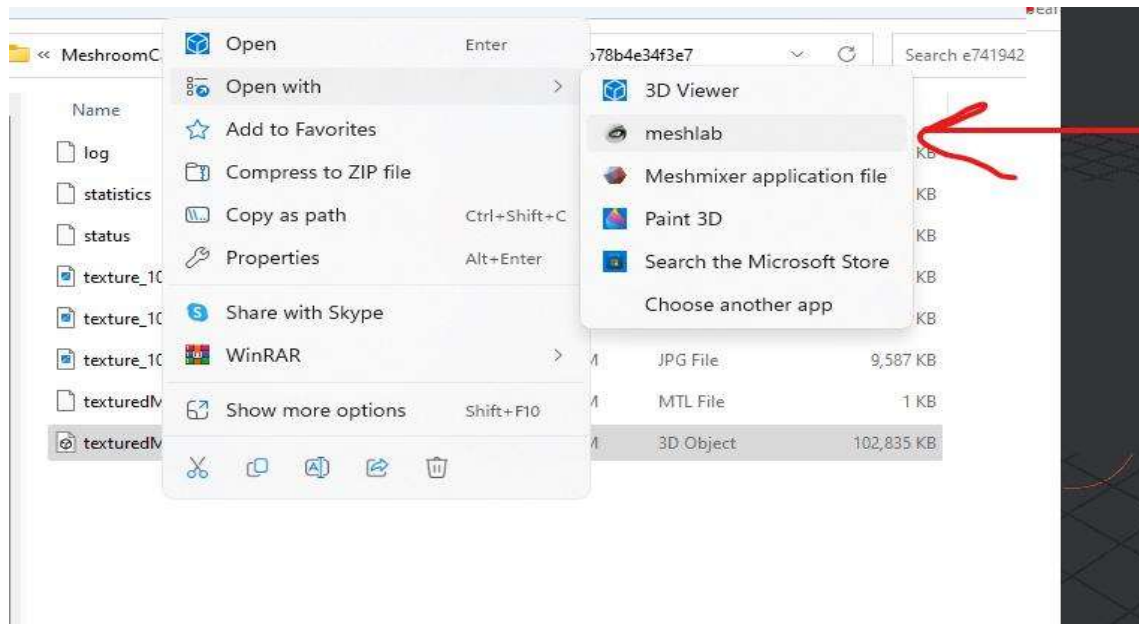


Figure 8: file to open in MeshLab

The below figure shows the rendered 3D model of object,

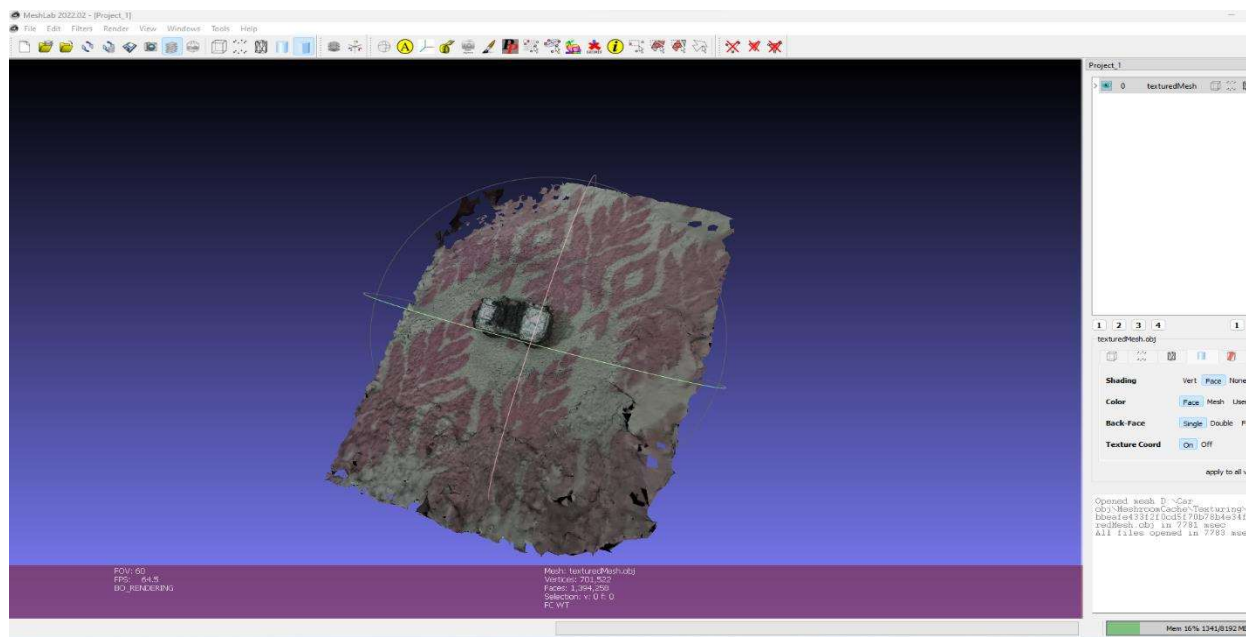


Figure 8: 3D model of object opened in MeshLab



The color of the object was changed to make it fine look,

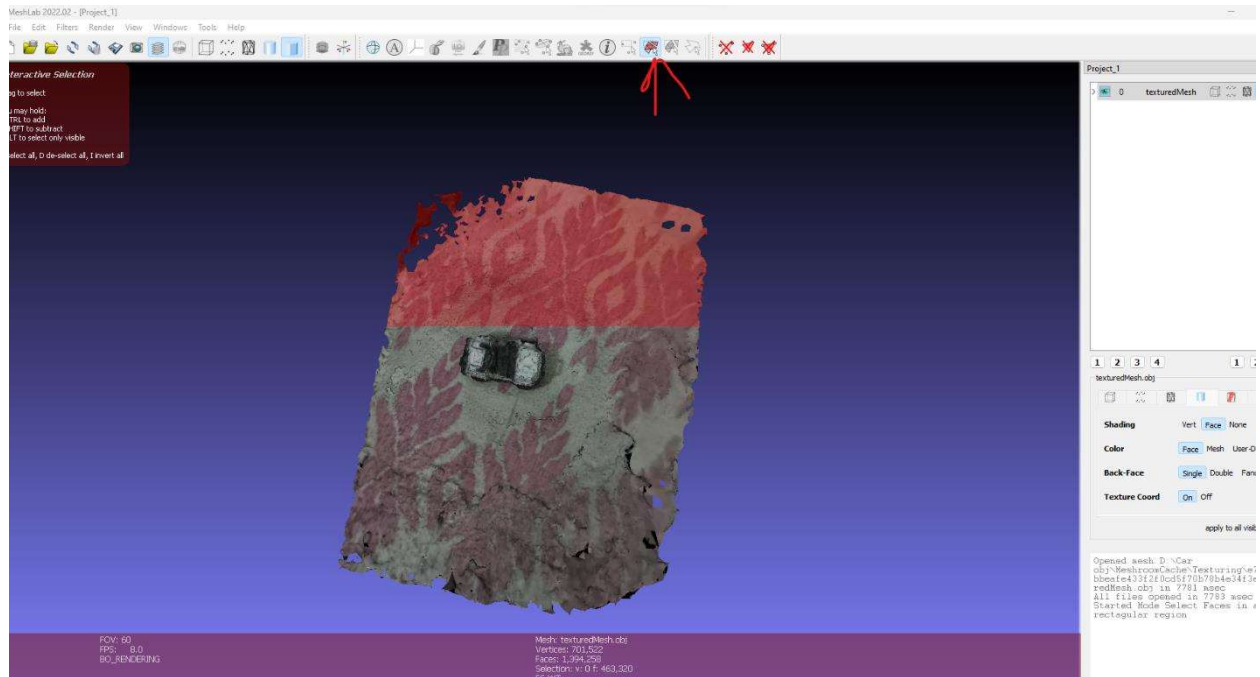


Figure 9: image showing color change

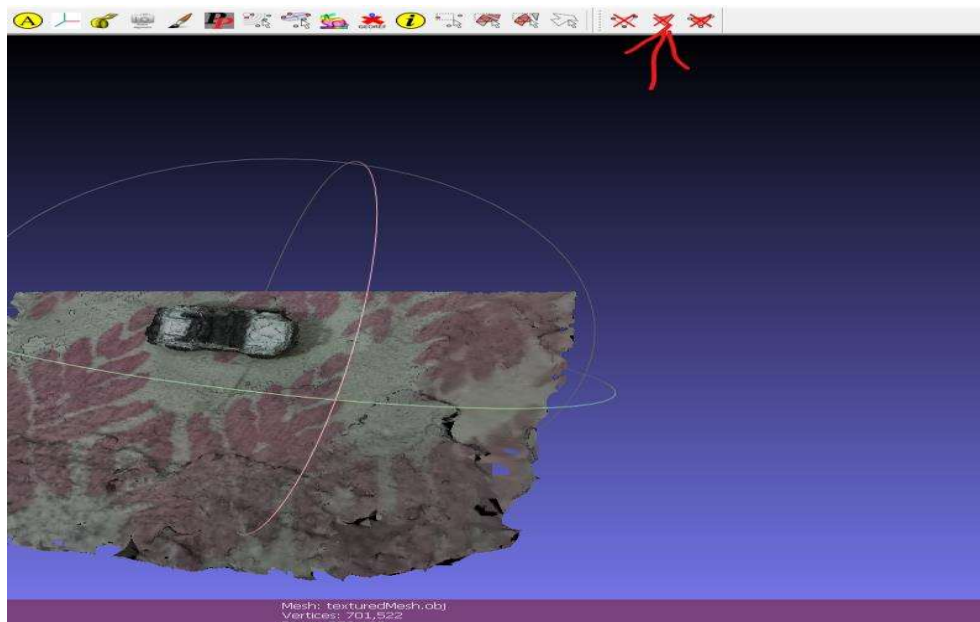
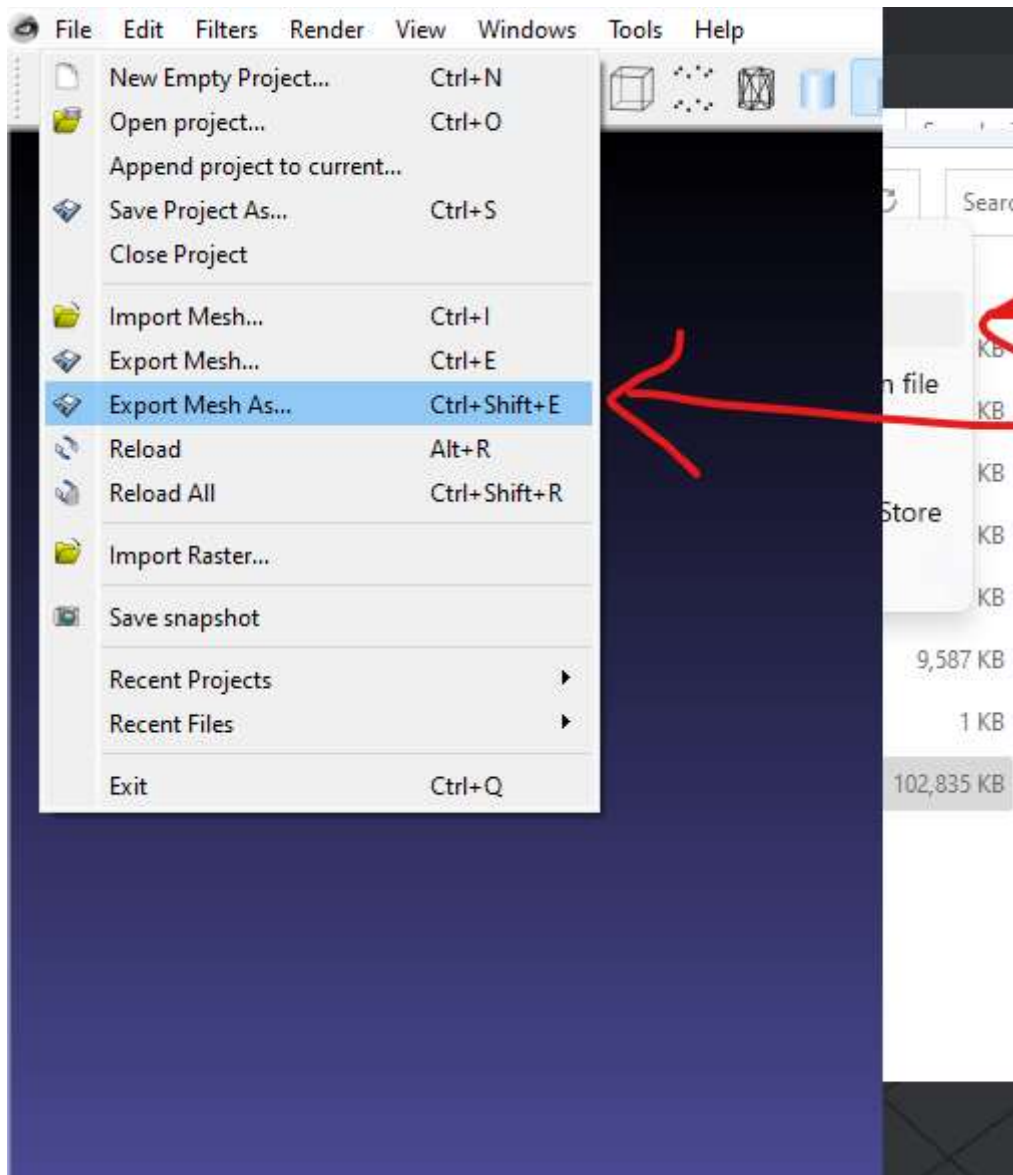


Figure 10: tools used to sculpt 3D model

The below figure shows how to export the final model,



*Figure 11: final file imported*

### Conclusion:

The Meshroom tool successfully utilized to make a 3D model of an object. This project greatly helps in understanding the 3D modeling software. The MeshLab tool gives the fine results as expected and a fine object 3D model was obtained by using this software programs.

## References:

FutureLearn (2022) What is 3D modelling and what is it used for?, FutureLearn. Available at: <https://www.futurelearn.com/info/blog/general/what-is-3d-modelling>

Meshroom (2022) AliceVision. Available at: <https://alicevision.org/#meshroom>

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