Virtual Reality Interfaces for 3D model reconstruction and sharing

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# Abstract

In recent years, 3D reconstruction has revolutionised various industries, proving to be a transformative practice in scientific research, e-commerce, and beyond. Studying a 3D model has proven to be more useful and intuitive than 2D images in analysing objects, helping professionals improve their expertise in medicine, archaeology, art, and many other fields.

This immersive experience not only enhances the assessment of virtual objects but also bridges the gap between the virtual and physical worlds. The integration of this technology has revolutionized the way professionals approach their work, enabling them to gain unparalleled insights into complex structures and artifacts. However the reconstruction is done mostly by professionals that are passionate about photogrammetry and possess skills and software for 3D reconstruction, and can later choose to publish their work on specialized platforms for 3D portfolios such as Unity Asset Store or Sketchfab.

This project comes as a solution for users who would like to create their own 3D models without having any prior knowledge of photogrammetry, visualize the results using a virtual reality platform, store their work and easily share it with others.

The project encompasses a web-based user interface acting as a social media platform where users publish 3D models based on uploaded images or videos, a structure from motion 3D reconstruction pipeline using Meshroom, and a Unity-based application for VR visualization. The VR application allows users to immerse themselves alongside the reconstructed 3D objects, enabling them to inspect the models from various angles and distances.

The project's methodology combines image processing, computer vision, and VR development, resulting in a robust and user-friendly system. Throughout the development process, a thorough review of related literature was conducted to ensure the project's alignment with current advancements in VR applications and photogrammetry.

The evaluation of the system involved user feedback and usability tests, providing valuable insights into the overall effectiveness and user experience. The results demonstrate the system's ability to generate accurate 3D models and deliver an engaging VR experience to users.

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