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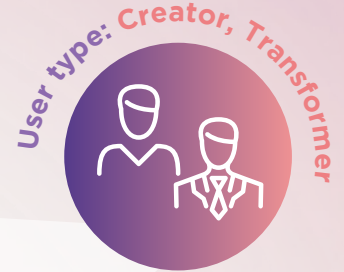
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(3D Object) Reconstruction

Making Digital Twins



What It Is

3D object reconstruction is like taking real-world objects and turning them into digital twins. It utilises photos, videos, or even special scanners to capture the object's shape and appearance. The 2D data is then transformed into a 3D model.

What It Can Do

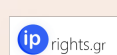
Imagine taking pictures of a building from different angles, then software creates a virtual 3D replica that you can use to create your XR experience. This technology is used everywhere, from preserving cultural heritage sites by creating digital twins to allowing architects to virtually walk through planned towns before they are built.

Key Features

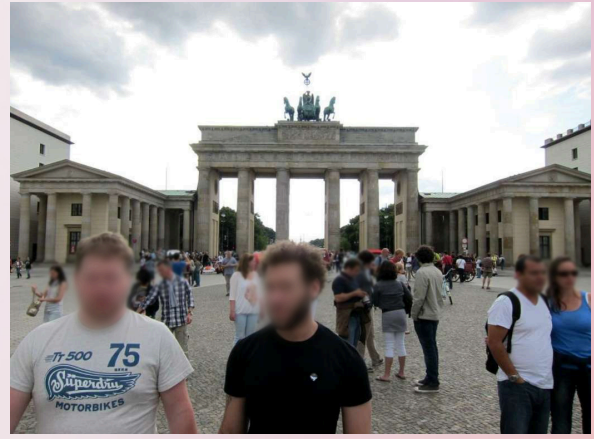
- Traditional photogrammetry-based reconstruction (Structure from Motion) with triangle meshes
- Novel Neural Radiance Field-based reconstruction representing scenes as radiance fields

Advantages

This type of digital reconstruction enables the creation of realistic 3D models for films, video games or virtual reality experiences. They are already used for better visualization of objects and scenes in the fields of entertainment, tourism and medicine. And, of course, 3D reconstruction helps with preservation, for example, by creating digital archives of historical sites and other real-world objects.



NeRF-in-the-wild input data



NeRF-in-the-wild result



How It Works

NeRF-In-The-Wild Content



You want to create a 3D model but all you have are a few photos? Not to worry! NeRF (Neural Radiance Fields) is a way to create 3D scenes from 2D images. More specifically, it allows you to create 3D scenes from just a collection of photographs or very sparse views of a scene. In other words: Photos of an apple become a 3D apple you can turn and rotate and look at from all sides as if it were real. Content used for the creation of NeRF-3D-models is also called “in the wild” content. This refers to images or videos that were taken at different times, with different lighting conditions or from different perspectives. In the end, you will still have a smooth, cohesive 3D model that you can view from all sides and light according to your wishes.

Structure From Motion



The idea is similar to NeRF. Again, 3D objects are created from 2D photos in order to reconstruct scenes or objects - even entire buildings. The photos must be taken from different angles to cover the whole object or scene. They are then used to create a so-called *textured triangle mesh* that captures the shape and appearance of the object. And voilà - you created the 3D object of your desires. Luckily, you do not need expensive equipment or cameras for this. Smartphones and other consumer-grade cameras are more than enough.



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