

A04

The video I watched was very insightful on assisting me getting familiar, and motivated me to learn and get familiar with ray tracing, A computer graphics technique that is used to imitate how light reacts when it interacts with virtual things. compared to normal rendering approaches, which usually use rasterization to approximate lighting, ray tracing determines each light ray's path as it bounces around in a scene. The final product is a picture that remarkably mimics the behavior of light in the real world, featuring accurate reflections, refractions, shadows, and overall lighting. Ray tracing's realism makes it perfect for producing realistic sceneries and images in a variety of applications, especially those where visual integrity is important.

The simple concept of ray tracing is to follow light rays as they go from the camera's eye to the objects in the image, as compared to the light source. Every ray is directed using the virtual world by the viewer. A ray's calculation of light's interaction with an object takes account of reflections off mirrors, refractions through transparent materials like glass, and the impact of shadows cast by obstructions. In film production, when realistic rendering is used to provide high quality effects, ray tracing is one of the most common used techniques. Ray tracing is seen in movies such as Avatar and Toy Story, where complex and detailed worlds were created. Also widely used in architecture visualization, because displaying realistic spaces requires correct lighting simulation. Games are a growing trend as well. Ray tracing is becoming increasingly common in real time applications due to the development of more powerful hardware. This is seen in recent games such as Cyberpunk 2077 and Minecraft RTX, which use ray tracing to improve lighting effects, shadows, and reflections.

Useful visual examples of how this process works were show found in the video I watched. For example, it shows how light is correctly simulated using ray tracing to mimic the way light bends and refracts through glass items in real life. It also explains why real time ray tracing has just recently become more possible with developments in graphics cards like NVIDIA's RTX series. The technology is extremely costly and requires a lot of processing

power. The way reflections are shown in the video is another excellent example. Ray tracing is capable of producing more than just basic mirror reflections; it can also accurately reflect the surrounding environment onto objects that have reflecting surfaces, adding to the realistic experience. Everything considered, ray tracing has changed computer graphics because it offers unmatched visual realism and is the preferred solution in areas that need high quality rendering. Yet because of the computational intensity & processing power, offline rendering has historically only been used for professional graphics work and motion pictures. Real-time ray tracing is becoming widely available and is expected to become standard in real-time applications such as gaming, and films.

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