Outdoors Reflectance Capture

Capturing the appearance of the real world is an exciting topic. The fact that the appearance of materials change drastically with external factors, such as the environment and the light conditions, makes this a challenging task. Nevertheless, correctly reproducing the appearance behaviour in virtual environments is important for many applications such as games, movies, architecture, medicine, and other industrial scenarios.

In this project, we will focus on outdoor environments. More specifically, in collaboration with the NIOZ (Royal Netherlands Institute for Sea Research), we wish to investigate how to precisely capture the appearance of typical Dutch coast landscapes, such as mud flats, sand flats, and salt marshes, which are build from an intricate mixture of patterned sands or muds, interwoven with highly reflecting wet surfaces.

Assignment

The goal for this master project is to develop methods that can overcome some challenges of acquiring reflectance data in outdoor patchy environments, where there is little control over the illumination and surrounding scenario. A possible direction is to use drones to capture images of the environment from different points of view and use Computer Graphics approaches to decompose the data into material maps (diffuse, specular, normals) that can then be used to reproduce the appearance virtually.

Requirements

C++, Blender or similar, some knowledge in Rendering methods (ray-tracing) can be an advantage.

Contact

For more information, please contact:

Dr. Ricardo Marroquim (Computer Graphics and Visualization group) r.marroquim@tudelft.nl

Dr. Johan van de Koppel (NIOZ) johan.van.de.koppel@nioz.nl