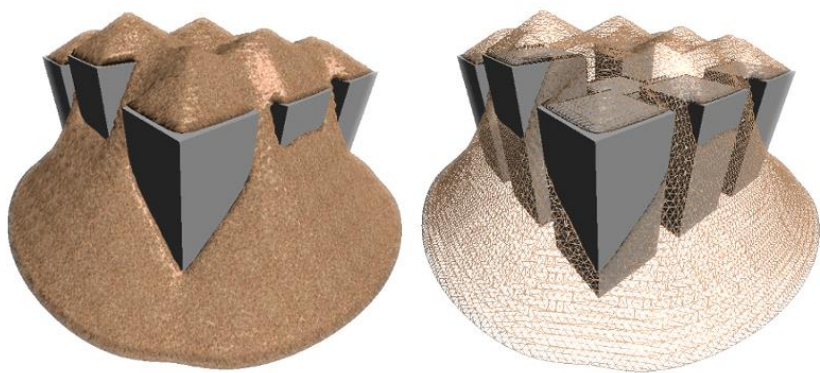


Real-Time Simulation of Sands and Soils using Voxel Grids.

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Introduction

When rendering terrain composed of a granular material, it is common to assume that the terrain surface will remain fixed during the simulation. This is good for the efficiency of the simulation, particularly in real-time, but it leads to a less realistic application. With the increasing power of GPUs, we can develop efficient rendering techniques for simulating such materials and how they react to deformation in real-time.



Goal

The aim of this project is to replicate and then expand upon an implementation of one such technique that utilises a voxel based approach to simulate sands and soils. Some possibilities for expansion include:

- The effects of moisture
- Soil on moving objects
- Compaction and consolidation

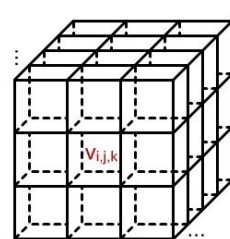
Implementation

The simulation will use a series of voxel grids to store the state of the world at each render step. For example, the Density grid will store the current sand density in each voxel, and the Velocity grid will store the magnitude and direction of movement of the material in each voxel.

A: Typical Voxel



B: Voxel Set



C: Voxel Grid

