

Avalanche Simulation in a Particle System

As a part of the Master - Module 3D-Animation in the Hochschule Rhein Main
purely written in Python and OpenGL

Tiras Zemicael

Karl-Blum-Allee 57, 65929 Frankfurt am Main
Tiras.Zemicael@student.hs-rm.de

Simon Rininsland

Roseggerstrasse 5, 65187 Wiesbaden
Simon.Rininsland@student.hs-rm.de

ABSTRACT

(What did we do. As tiny as possible)

- the question(s) you investigated (or purpose), (from Introduction)
- state the purpose very clearly in the first or second sentence.
- the experimental design and methods used, (from Methods)
- clearly express the basic design of the study.
- Name or briefly describe the basic methodology used without going into excessive detail-be sure to indicate the key techniques used.
- the major findings including key quantitative results, or trends (from Results)
- report those results which answer the questions you were asking
- identify trends, relative change or differences, etc.
- a brief summary of your interpretations and conclusions. (from Discussion)
- clearly state the implications of the answers your results gave you.

An Avalanche. A natural dreaded force of many snow and ice particles rushing down a Slope, driven by the Gravity. As many as snowflakes and ice particles which are included in an avalanche as good as we can play with them in an Particle System. One of the best examples for dynamically rendered simulations for Particle Systems a snow Avalanche will be the central Part in our Project.

In order also to start just from the basics we decided to not use huge frameworks and start from the OpenGL Scatch. We will just use OpenGL Basics.

We will solve some Physically based Problems which comes around with the Topic of an Avalanche like:

- Particles with seperated masses, driven by a force.

- Physically Effects, bouncing Particles and combining ones. and some OpenGL based Problems like:
- shadow for every seperated Particle
- performance Issues and optimization.

We have developed a piece of Software, we want to simulate a physic driven avalanche. The Core features are mainly dedicated to understand and solving physical Problems. We created Particles which reacts on physical forces from outside. These happens physically correct. After that we took some work to give the Particles a good-looking view, which should give a better understanding what we try to simulate at the first look.

1. INTRODUCTION

In the current time Simulation for almost everything exist. Simulations are a important part of todays society and is used for everything that can't be test on a large scale or can't even be create. The simulations are created to see possible situation or behavior of different thinks, for that the simulations need to be precise. Simulations are for the most parts not only a programming problem but also a problem in the subject the simulations are aiming for. Simulations need to behave the exact same as the real world counterpart, therefore a lot of physics is involved in such a simulation. And one of the highest requested kind of simulations are for weather phenomena. For that kind of problem simulations for every kind of weather phenomena exist. There are simulations for tidal waves, thunderstorms, flood and for our project Avalanche.

1.1 Project Description

1.2 Project Result

2. TECHNOLOGY

2.1 Python

2.2 OpenGL

2.3 Other Packages

3. ARCHITECTURE

3.1 Grid System

3.2 World Class

4. COLLISION

4.1 Particle Collision

4.2 Terrain Collision

5. CONCLUSION AND OUTLOOK