

Hair simulation using Position Based Dynamics

5th semester Project Laboratory report

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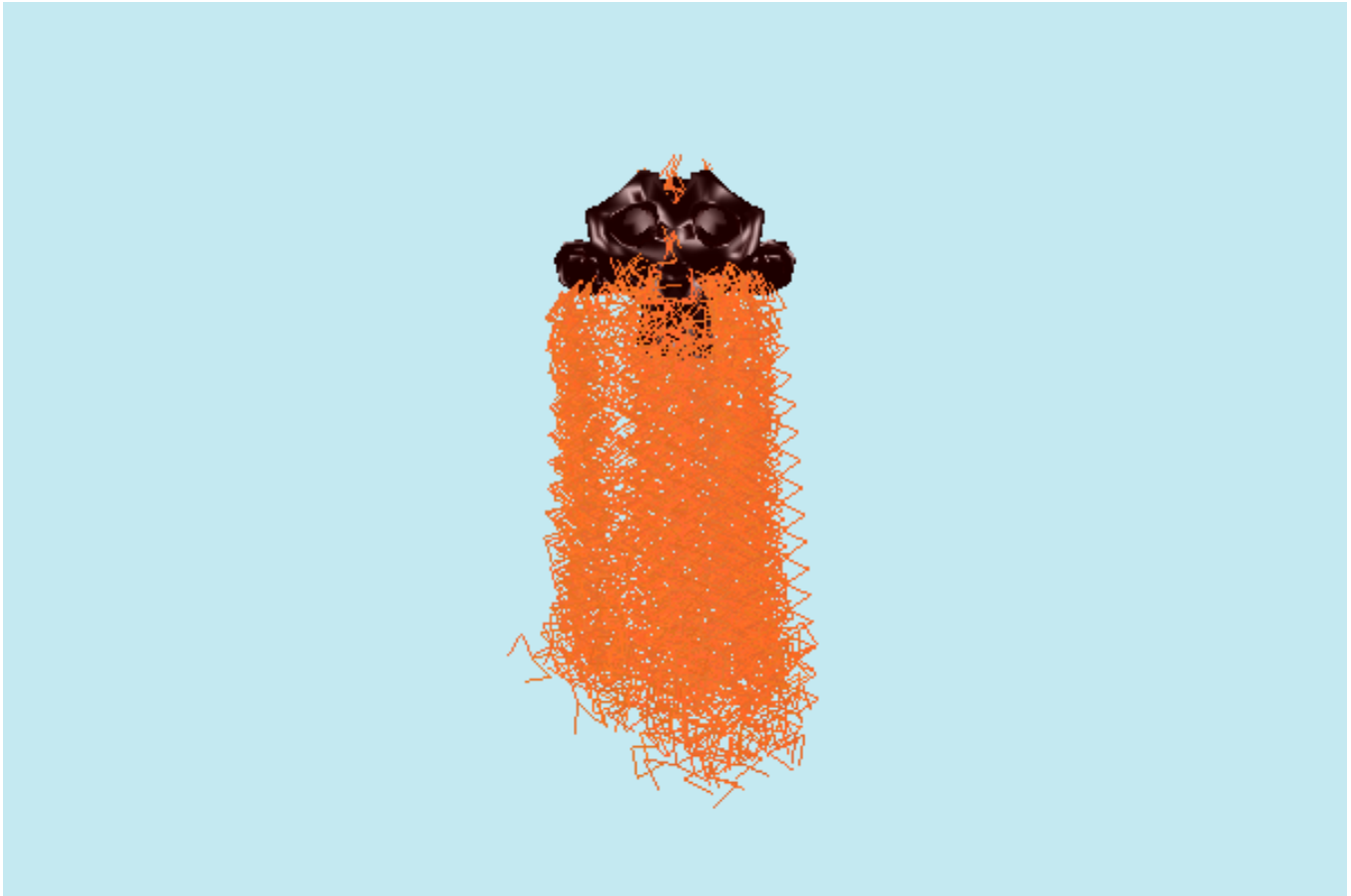


Figure 1. The achieved visual look

Abstract

A self-assessment of the 5th semester Project Laboratory Project is presented in this article. My goal was to achieve hair simulation of acceptable quality both in terms of look and performance. Multiple approaches were considered before arriving at a Position Based Dynamics based solution. The simulation was implemented in C++ with the Open Graphics Library (OpenGL ¹)

CCS Concepts: • **Computing methodologies** → *Physical simulation*.

Keywords: hair simulation, position based dynamics, OpenGL

1 Introduction

In the 5th semester of their undergrad studies, BSc students from Budapest University of Technology and Economics embark on their first journey of scientific research. I was always interested in and fascinated by computer graphics, it came naturally to choose a subject in this area. As I had little hands-on experience in this field, a long time had to be dedicated to research and trying out different simulation methods.

¹<http://www.opengl.org>

The first of this paper reflects this, giving an overview of considered methods, and other possible routes that could have been taken to implement hair simulation.

2 Overview of considered methods

There were mainly three methods considered, two of them being substantially different:

2.1 Mass Spring System

The whole idea of doing hair simulation as my project laboratory came from *TODO reference Pixar article and Khan Academy video*

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\documentclass[STYLE]{acmart}
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2.2 Position Based Dynamics

2.3 Follow the Leader

The Dynamic Follow-The-Leader method outlined in *TODO reference article*

Acknowledgments

To Dr. László Szécsi, associate professor at the Computer Graphics Group (Department of Control Engineering and Information Technology), whom I had the chance to consult with during the semester.

A Supplementary development

A.1 OBJ Reader

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A.2 Recording the simulation on-the-fly

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