

Application of Pose Space Deformation on a Joint Constraint

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Introduction

Pose Space Deformation (PSD) is a deformation technique that can be represented by a pose space. Deformations can be mapped to this pose space, an example could be two abstract parameters, PSD could then be used to implement joint constraints. This project would be very useful for animation, film and computer graphics and games as this approach has good performs and provides the realism expected from modern films and games. [1] [2]

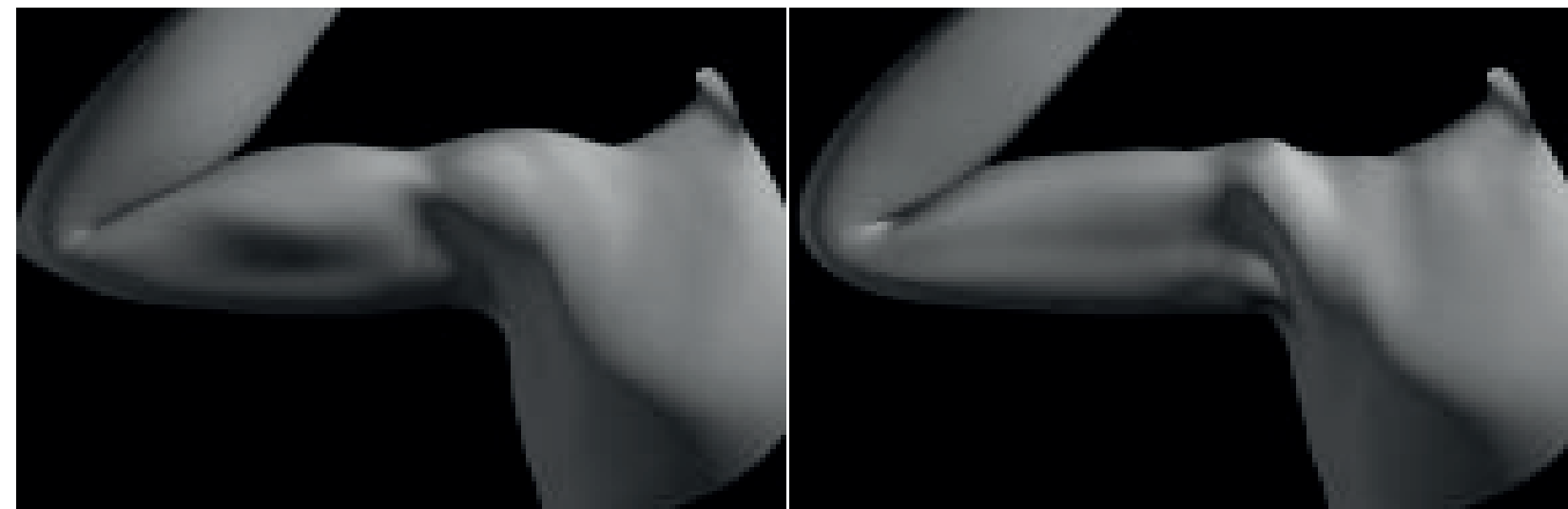


Figure 1. This shows the different results of using PSD (left) over another approach SSD (Skeleton Subspace Deformation, right). [1].

Requirements

These are the requirements of the project so far:

- Should be able to define an arbitrary deformation and solve the interpolation between the two.
- Should allow direct manipulation of the deformations.
- Should provide a User Interface to allow an artist to directly interact with the deformations and the pose space parameters.

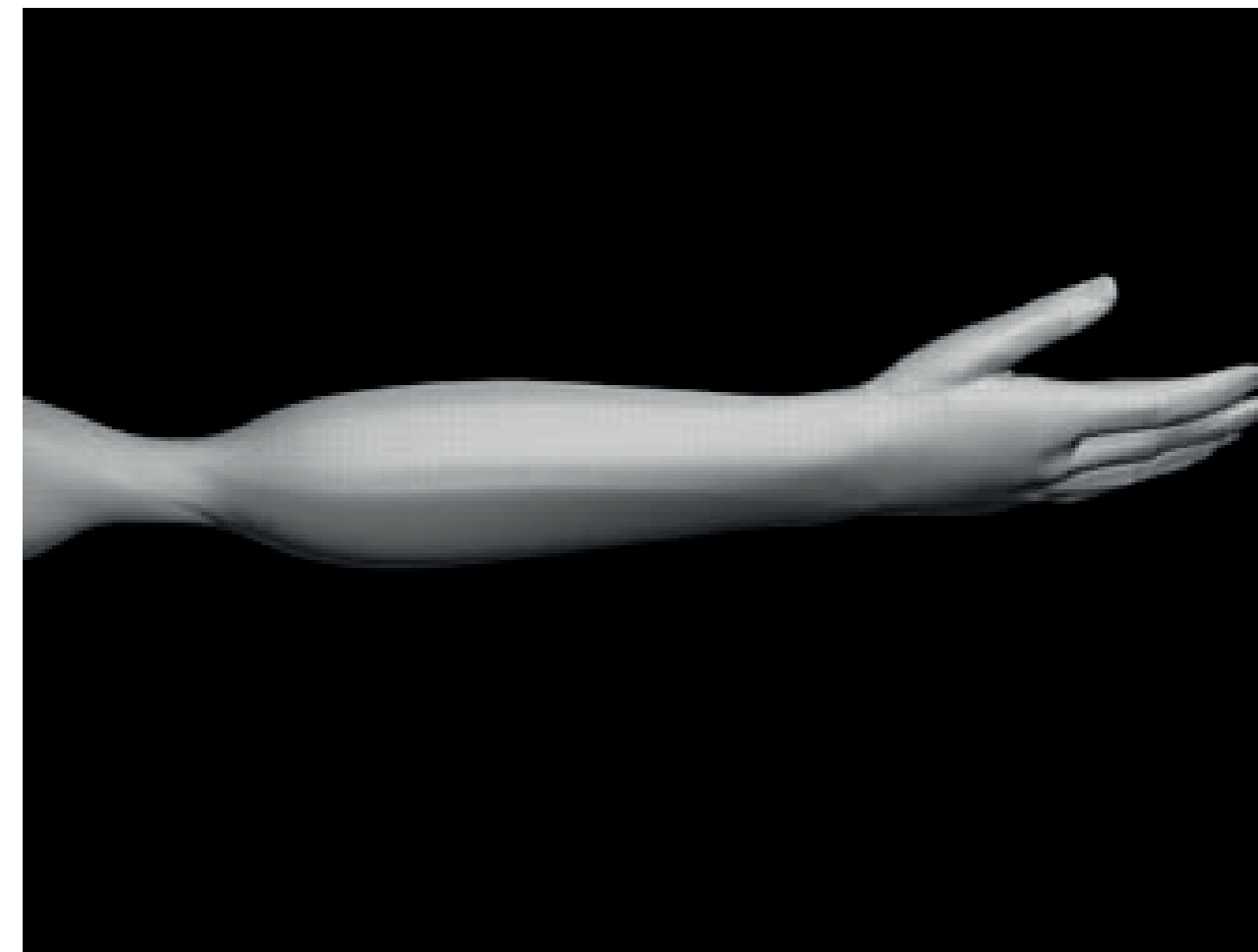


Figure 2. Shows an arm twisting like turning a door handle, the rotation should be limited. [1].

Risk Analysis

The project is made of multiple components and all components of the project may not fit into the timescale. PSD may not be suitable for use on joint constraints and the project will still be a success as it will prove the approach is not suitable.

Next Steps

A literature review will need to be prepared on PSD. Further requirements will also need to be elicited for the project. Per the requirements, the design of the solution can begin.

The final deliverable of the project would be an implementation of a PSD solver and a small suite for artists to use the solver. The solution will then be compared with other approaches on PSD.

Aims & Objectives

The aim of the project is to investigate the application of PSD for an anatomical joint constraint and create a PSD solver. Here are the objectives of the project:

- Conduct a literature review of PSD, considering alternative approaches.
- Implement a PSD solver capable of working with data used in other approaches.
- Compare the approach implemented with previous work on PSD.

Methods & Project Management

An Agile development method will be adopted for the project. SCRUM will be used as the development methodology adapted for use as a lone developer.

Unified Modelling Language (UML) will be used to create diagrams of the system during the analysis and design phase. Development will make extensive use of C++ 11 features like templates. The project will also use Github. The IDE that will be used (Visual Studio 2015) also has a Github extension.

References & Acknowledgements

Dr. Glenn L. Jenkins for providing the project.

[1] J. P. Lewis, M. Cordner and N. Fong, "Pose Space Deformation: A Unified Approach to Shape Interpolation and Skeleton-Driven Deformation," Centropolis.

[2] T. Rhee, J. Lewis and U. Neumann, "Real-Time Weighted Pose-Space Deformation on the GPU," EUROGRAPHICS 2006, vol. 25, no. 3, 2006.