

2018-2019

Proposta para Dissertação de Mestrado em Engenharia Informática

Title:

Co-segmentation of Triangle Meshes in 3D using Machine Learning Techniques

Supervisor:

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Abstract:

Segmentation and labeling of 3D shapes into meaningful parts is fundamental to shape understanding and processing; for example, to synthesize texturing for a humanoid mesh, one must first identify which parts arms, legs, head, and so forth. In fact, many tasks in geometric modeling, manufacturing, animation and texturing of triangle meshes in 3D build upon on their segmentation into parts.

This work concerns a data-driven approach to simultaneous segmentation and labeling of parts in triangle meshes in 3D. The objective function is learned from a set of training meshes (already labeled). The algorithm uses geometric and contextual label features and learns different types of segmentations for different tasks, no being thus necessary manual parameter tuning. The algorithm will be evaluated on the Princeton Segmentation Benchmark, but we hope the algorithm is capable of producing segmentations and labelings comparable to those produced by humans.

Objectives

This work is in the field of computer graphics, but takes advantage of artificial intelligence techniques. The main objective is to develop an algorithm to segment triangle meshes using machine learning techniques.

Tasks:

This dissertation work will consist of the following tasks:

Task 1. The study of the main concepts behind mesh segmentation with machine learning algorithms.

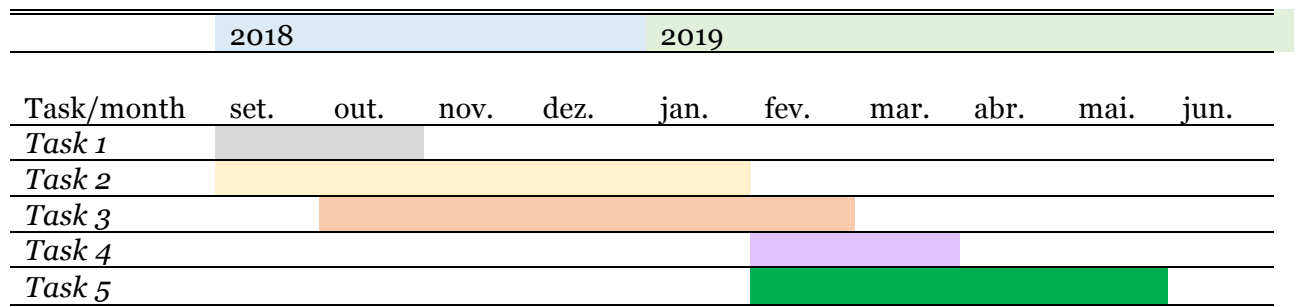
Task 2. To write a brief survey on machine learning-based segmentation algorithms.

Task 3. To implement an algorithm for segmenting triangle meshes using machine learning techniques.

Task 4. To compare the algorithm to others (if publicly available).

Task 5. To write a paper to be submitted to a conference/journal, as well as the write-up of the dissertation.

Timeline:



Pre-conditions:

First. The student must have skills in computer graphics and artificial intelligence.

Second. The student must have a BSc degree with a minimum grade of 14/20.