

Master's thesis in France ?!



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Access Map (Building 21)

Haptics-Based Design Interactor for the Generation of 2D Artwork

This work is about an interactor for creating highly-winded curve networks using special curve tools. To make it intuitive to use, human-computer-interaction shall be done with a haptic input device. The system shall be based on cubic, uniform B-spline curves as the underlying curve representation.

For an example of curves to be generated have a look at this picture



Work Description

The base system for drawing cubic, uniform B-spline curves in a Windows environment (C++, Trolltech's Qt) will be provided to get you started. As a work program, we propose the following steps

1. Build up a catalog of suitable curve tools, where you specify and document each tool in detail.
Some ideas would be,
connect two existing curves by a Hermite interpolating fillet curve,
add an additional control point to the representation of the same curve (knot insertion),
subdivide a curve into two interpolating segments (double knot insertion for a triple knot),
for two curves with the same number of control points, generate a curve that lies inbetween.
2. Implement your curve operations in the system so that they can be used with mouse input.
3. Change user input for a haptic interaction device, like the Novint Falcon,
see <http://home.novint.com/> and http://www.youtube.com/watch?v=ik_pbsig1pA. For this important part, you have to think about the additional possibilities of the device and how to utilize them suitably. So for example, after inserting additional control points to a curve, the interactor could be

used to modify the free inner control points (i.e., the control points not responsible for continuity to neighbors).

Links

Curves and Surfaces for CAGD – A practical guide Gerald Farin, 5th Edition, Morgan-Kaufmann Publishers 2002.

Qt Whitepaper Version 4.4, Trolltech Corporation,
<http://trolltech.com/products/files/pdf/qt-4.4-whitepaper>

Prerequisites

You are about to finish your studies in applied mathematics or computer science and have basic knowledge and interest to learn more about Bézier and B-Spline curves, good knowledge of programming in C/C++ and Trolltech Qt.

Periode

between march and mid-july 2009

Financing

ERASMUS

Application

CV (with a list of your classes and projects), and a letter of motivation to send to the below contact.

Contact

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To learn more about the CAGD team of the Laboratoire LAMAV in Valenciennes, see <http://www.univ-valenciennes.fr/lamav/cgao/>.