4

11:15–11:45

Extraction of Typographic Elements from Outline Representations of Fonts

Ariel Shamir
The Hebrew University of Jerusalem

Digital typefaces for computer graphics and multimedia applications must be capable of supporting operations such as font variations, transformations, deformations and blending. A powerful implementation of such operations must rely on the inherent typographic attributes of the typeface. However, even today's most advanced typeface representations support only geometric outline representations and basic font variations.

The speaker will discuss high-level typeface representations, which he terms Parametric Typographic Representations (PTRs). He will present an algorithm for automatically extracting typographic elements of typefaces from their outline representation, which is an essential initial step in converting typefaces from outline representations to PTRs. The extracted typographic elements include serifs, bars, stems, slants, bows, arcs, curve stems and curve bars. Most notable is the treatment of serifs, which are represented by finite-automata. The algorithm only needs to learn a serif type once, and is then capable of automatically recognizing it in different typefaces.

The speaker will show an application of a PTR for automatic high-quality hinting of fonts, which is one of the most important stages in digital font production. His system was used to generate hints for dozens of thousands of Kanji, Roman and Hebrew characters.

Joint work with Ari Rappoport.

5

11:45–12:15

Presentation of the O^2 Computer

Jacky Romano
SGI Israel

INVITATION

ISRAEL SIGGRAPH PROFESSIONAL CHAPTER MEETING

Sponsored by

Silicon Graphics (Israel) Ltd.

8:30–12:15
December 27, 1996
Lev Hall (near Shenkar Bldg.)
Tel-Aviv University

Chair: Ayellet Tal
Weizmann Institute of Science

This invitation is an entry permit for your car at gate 4 of the Tel-Aviv University campus.

8:30–9:00

Refreshments

$\boxed{1}$

9:00–9:30

Hierarchical Image Caching for Accelerated Walkthroughs of Complex Environments

Dani Lischinski
The Hebrew University of Jerusalem

The speaker will present a new method that utilizes path coherence to accelerate walkthroughs of geometrically complex static scenes. As a preprocessing step, the method constructs a BSP tree that hierarchically partitions the geometric primitives in the scene. In the course of a walkthrough, images of nodes at various levels of the hierarchy are cached for reuse in subsequent frames. A cached image is reused by texture-mapping it onto a single quadrilateral that is drawn instead of the geometry contained in the corresponding node. Visual artifacts are kept under control by using an error metric that quantifies the discrepancy between the appearance of the geometry contained in a node and the cached image. The new method will be shown to achieve speedups of an order of magnitude for walkthroughs of a complex outdoor scene, with little or no loss in rendering quality.

Joint work with J. Shade, D. Salesin, T. DeRose and J. Snyder.

$\boxed{2}$

9:30–10:00

3D Multiresolution Non-Uniform B-Spline Surface Modeling Using Wavelet Decomposition

Roman Kazinnik
Technion—Israel Institute of Technology

The speaker will show how the idea of an orthogonal wavelet complement can be used to produce multiresolution decomposition of nonuniform B-spline (NUB) spaces, with the aim of handling NUB surface modeling at different levels of resolutions.

Applying multiresolution decomposition to different types of surfaces (possibly C^1 discontinuous), one can preserve, during the multiresolution editing process, the general nature of a freeform model on the one hand, and local features, such as bumps and geometric discontinuities, on the other hand.

The multiresolution decomposition of a NUB tensor product surface is computed via the symbolic computation of the inner product of projections of B-spline basis functions. Representations for the products of the B-spline basis functions can be found by solving an equivalent interpolation problem, whereas the integral of the result is derived with the aid of a closed form formulation.

$\boxed{3}$

10:00–10:30

An Output-Sensitive Algorithm for Discrete Convex Hulls

Sariel Har-Peled
Tel-Aviv University

Given a ‘sufficiently round’ convex body in the plane, its discrete convex hull is defined to be the convext hull of the all the interer lattice points contained within it. The speaker will present a novel output-sensitive algorithm for calculating the discrete hull of the body. This algorithm improves over previous algorithms, being the first algorithm of sub-linear running-time.

10:30–11:15

Coffee Break