$\boxed{4}$

11:30–12:00

Spectral Compression of Mesh Geometry

Zachi Karni*
Computer Science Dept.
Technion

We show how spectral JPEG-type methods may be applied to 3D mesh data to obtain compact representations. These methods are based on projecting the mesh geometry on an orthogonal basis derived from the mesh topology. To reduce complexity, the mesh is partitioned to a large number of balanced submeshes with minimal edge-interaction, which are then compressed separately.

Our compression scheme may be used for static and progressive transmission of 3D content, and are shown to be vastly superior to existing methods using spatial techniques, if slight loss can be tolerated.

*** Joint work with Craig Gotsman.**

$\boxed{5}$

12:00–12:30

Multi-User View-Dependent Rendering

Jihad El-Sana
Department of Computer Science
Ben-Gurion University of The Negev

In this talk we are presenting a novel architecture which allows rendering of large-shared dataset at interactive rates on an inexpensive workstation. The idea is based on view-dependent rendering on a client-server network. The server stores the large dataset and manages the selection of the various levels of detail, while the inexpensive clients receive a stream of update operations that form the appropriate level of detail in an incremental fashion. These update operations are based on the changes in the clients' view-parameters. Our approach dramatically reduces the amount of memory needed by each client and the entire computing system, since the dataset is stored only once, on the server. In addition, it decreases the load on the network, as results of the incremental update contributed by view-dependent rendering.

INVITATION

ISRAEL SIGGRAPH
PROFESSIONAL
CHAPTER MEETING

Sponsored by

Silicon Graphics (Israel) Ltd.

May 5, 2000
8:30–12:30
MELAMED Hall (06)
School of Exact Sciences
Tel-Aviv University

Chair: Craig Gotsman
Technion

This invitation is an entry permit for your car at gate 1 of the Tel-Aviv University campus.

8:30–9:00

Refreshments

$\boxed{1}$

9:00–9:30

Revisiting Linear Constraints

Gershon Elber
Computer Science Dept.
Technion

Positional, tangential, and orthogonality constraints are all linear and can be easily incorporated into freeform curve and surface editing environment, as is well known. In this work, we show that the symmetry as well as the area constraint could also be reformulated as linear constraints and similarly incorporated into the editing environment.

Incorporated into a multiresolution editing framework, we will demonstrate the use of these linear constraints for curves and possible discuss the feasibility of extending these results to freeform surfaces.

$\boxed{2}$

9:30–10:30

Automated Model Capture in Extended Urban Environments

Seth Teller
MIT Computer Graphics Group

Environment capture, or "geometric modeling" – acquiring a representation of an object in a form useful for computer simulation – is an essential first step in visualization, simulation, and computer-aided design. Researchers have developed techniques for extracting geometric and appearance information directly from photographs. Existing model capture tools are manually intensive, relying heavily on a "human in the loop" for a variety of tasks. This imposes fundamental limitations on scale, complexity, and capture rates.

This paper describes the development of fully automated computer vision techniques for capturing rich, textured 3D CAD models of urban areas directly from near-ground photographs. We'll show a novel sensor which acquires high-resolution geo-referenced images, and accompanying algorithms which extract textured geometric models of the environment observed by the sensor. The tradeoff is that, in return for automation, this task requires specialized sensor instrumentation, large numbers (typically thousands) of image observations, and significant computational resources.

Eliminating the human in the loop is a significant challenge from both engineering and research standpoints, and the effort has led to some powerful new techniques. In contrast to the prevailing view that human intervention always improves quality, we give examples of situations in which our automated system outperforms a human operator. We describe the current status of the project and show some preliminary results.

10:30–11:00

Coffee Break

$\boxed{3}$

11:00–11:30

Practical Translational Assembly Planning: Framework and Applications

Leo Joskowicz*
School of Computer Science and Engineering
The Hebrew University of Jerusalem

We present a framework for general translational assembly planning based on linear constraints. We show that m-handed assembly planning can be reduced to testing for unboundedness, and present the first polynomial-time algorithm for m-handed assembly of polygonal part assemblies with no initially separated pairs of parts. We describe a new algorithm that performs a linear unboundedness test by solving a single homogeneous system of equations followed by a single linear feasibility test. We show that testing for unboundedness is computationally at least as hard as these two subproblems. The new algorithm is the fastest known algorithm and is practical. We demonstrate the practicality of our algorithms with experimental results of our implementations on planar and spatial examples, including puzzles and furniture.

*** Joint work with Fabian Schwarzer and Achim Schweikard Institut fur Informatik, Technische Universitat Munchen. GERMANY**