

DIMENSION

The Newsletter of the L.A. ACM/SIGGRAPH

April 2000



LA SIGGRAPH

L.A. ACM/SIGGRAPH Presents
Tuesday, April 11th, 2000



Motion Planning for Digital Actors

The Program

6:30-7:30 Doors Open
(Priority entry for members
up until 7:00)

7:30 Presentation

The Location

UCLA Freud Playhouse Theater
MacGowan Hall UCLA Campus,
Westwood

Directions

From 405, exit Sunset Blvd.,
go east, Turn right at Hilgard,
Turn immediately right at
Charring Cross.

Parking

Parking in Structure 3 (\$5 per
car). Follow pedestrian signs to
Freud Playhouse or MacGowan
Hall.

Fees/Registration

The event is free to L.A. ACM
SIGGRAPH members and \$10
for non-members.

New members who sign up
on-site and pay the \$25 annual
membership fee (checks or
cash only) do not have to pay
the \$10 fee.

Audio/Visual donated by 3D Expo and Conference

The Event

Special Guest Speaker: Professor Jean-Claude Latombe, Stanford University

The goal of Professor Jean-Claude Latombe's research is to create autonomous agents that sense, plan, and act in real and/or virtual worlds. Most of Professor's Latombe's work focuses on representing, sensing, planning, controlling, and rendering motions of physical objects. This spans a variety of topics, including: collision-free path planning among obstacles, optimal motion planning using dynamics equations, motion planning to achieve visual tasks, dealing with sensing and control uncertainty, assembly planning, construction of 3-D models of complex environments, visual tracking of articulated objects, relating shapes to functions, and reasoning in multiple-agent worlds. Applications of his research include robot-assisted medical surgery, design for manufacturing, autonomous digital actors, and rational pharmaceutical drug design.

Professor Latombe will talk about the use of motion planning techniques to automatically generate the motions of digital actors. Focus will be mainly on locomotion and manipulation motions. He will show us how real-time motion planning allows an actor to autonomously react to changes in its environment. We will look at the role of these techniques both as a tool to simplify the animators' task and as a component of runtime systems providing interactive contents. In addition, Professor Latombe will also briefly present his current research to animate human-body soft tissues. Although this research is mainly aimed at medical surgery applications, it is also relevant to animating human characters.

DIGITAL ACTORS

The goal is to create virtual actors modelling real or fictional humans that can move and act realistically on a graphic display. We equip these actors with capabilities that make it possible to direct them using high-level instructions. We use motion planning techniques to enable the actors to compute their own motions in order to achieve the goals stated in the high-level instructions. The core of the project is the design and implementation of a digital actor architecture that has many similarities with a robot control architecture. Each digital actor has an imperfect model of the world which it uses for

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UPCOMING MEETINGS

Tuesday, May 9, 2000 CGI's High Resolution Future in Digital Cinema, HDTV and Beyond

Our panel will feature several of the world's leading pioneers discussing how new presentation technologies are evolving to boost our experiential perceptions closer to the believability barrier than ever before. HDTV, the advances of digital cinema toward solid-state optical technologies and ultra high res CG scene synthesis are steadily pushing the envelope of human perception.

Tuesday, June 13, 2000 An Evening with The Walt Disney Company

Call the SIGPHONE, 310-288-1148

For recorded information on the time and location of our next meeting.

Dimension Advertising Specs:

\$5 per line (~70 char/line)

1/4 Page (3.75"x 4.75") \$100

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Accepted Media and Formats:

Zip, Jazz, Quark, FreeHand, Illustrator, Photoshop, TIFF, and EPS. Make sure to include all linked images and fonts. Macintosh format. For Media, include a self-addressed, stamped envelope for return.

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Ad submission deadlines are six weeks before date of Issue.

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planning. But, in order to generate realistic behaviors, execution occurs in another model, which represents the real world and is displayed. The actor accesses this second model through simulated sensors. For example, simulating vision requires computing the regions of the world that are actually visible by the actor at his/her current position. The digital actor is also equipped with both real-time motion control techniques to deal with small discrepancies between the planning and the world models and replanning capabilities to handle bigger differences. The actor also uses its sensory inputs to update his/her planning model. Applications of this research include movie generation, video games, and military simulation.

TISSUE MODELING FOR SURGICAL PLANNING

This project is aimed at developing efficient and realistic generic computer models of anisotropic, non-homogeneous, non-linear, visco-elastic tissues, to be used in virtual environments for surgical training and planning. Our models are mass-spring meshes. One specific application of this research is the development of a training tool for microvascular surgery (anastomosis of micro blood vessels). Another potential application is craniofacial surgical planning with the goal to show how the soft tissues would respond to underlying bone movements.

Another of our goals is to automatically learn the parameters of a mesh representing a tissue structure by observing the deformations of this structure. A step toward this goal is to automatically build meshes from surfaces sensed with a laser range sensor.

BIO:

Jean-Claude Latombe is Professor of Computer Science at Stanford University and currently serves as the Chairman of the Computer Science Department. He obtained his PhD in 1977 from the University of Grenoble (France). From 1980 till 1984, he was on the Computer Science faculty at the National Polytechnic Institute of Grenoble. From 1984 to 1987, he was the CEO of ITMI, a company that he co-founded in 1982 to market Robotics, Vision, and Artificial Intelligence products. He joined Stanford in 1987.

He is on the Technical Advisory Boards of France Telecom, mySimon, Wisenut, Simplylook, and Upstart, and on the Board of Directors of The Motion Factory.