Sumit Jain

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Research Interests

Physics-based animation and simulation with focus on control of virtual human characters.

Education

Georgia Institute of Technology — Atlanta, GA, USA
Ph.D. Student, Computer Science (GPA 4.0) — Aug. 2007 - Aug. 2011 (Expected)

University of Southern California (USC) — Los Angeles, CA, USA
Master of Science, Computer Science (GPA 3.96) — Aug. 2004 - Dec. 2006
Ph.D. Student, Computer Science — Aug. 2004 - Jul. 2007

Indian Institute of Technology (IIT), Delhi — New Delhi, India
Bachelor of Technology, Computer Science (GPA 7.75/10) — Aug. 2000 - May 2004

Academic and Work Experience

Georgia Institute of Technology — Atlanta, GA, USA
Graduate Research Assistant — Fall 2007 - present
Working on interactive character animation using optimization-based approaches.

Adobe Systems Inc. — San Jose, CA, USA
Computer Scientist Intern — May 2008 - Aug 2008
Worked on physics-based interactive editing of highly dynamic motion.

University of Southern California — Los Angeles, CA, USA
Graduate Teaching Assistant — Spring 2006, Spring 2007
Computer Animation and Simulation: Evaluated group projects and helped students understand topics such as optimization, particle simulation etc.

University of Southern California — Los Angeles, CA, USA
Graduate Research Assistant — Fall 2004 - Summer 2007
Worked on real-time camera pose and focal length estimation using 2D feature tracking.
Explored optimization-based methods for physically-based human character animation.

INRIA Rhône-Alpes, EVASION, GRAVIR Lab — Grenoble, France
Research Intern — Summer 2003
Worked on modeling of cloth for virtual actors and proposed methods for interactive layout.

Indian Institute of Technology, Delhi — New Delhi, India
Undergraduate Research Assistant — Summer 2002
Developed a fast generic compiler for given language semantics.

Publications

S. Jain, C. K. Liu, "Modal-Space Control of Articulated Characters", *Conditional accept*, ACM Transactions on Graphics (TOG), 2011

S. Jain, C. K. Liu, "Interactive Synthesis of Human-Object Interaction", Eurographics/ACM SIGGRAPH Symposium on Computer Animation (SCA), Aug. 2009

S. Jain, Y. Ye, C. K. Liu, "Optimization-based Interactive Motion Synthesis", ACM Transactions on Graphics (TOG), Vol. 28, No. 1, Art. 10, Jan. 2009 (*Presented at ACM SIGGRAPH, New Orleans, Aug. 2009*)

S. Jain, C. K. Liu, "Motion Analogies: Automatic Motion Transfer to Different Morphologies", Eurographics/ACM SIGGRAPH Symposium on Computer Animation Posters (*Invited*), Aug. 2009

S. Jain, Y. Ye, C. K. Liu, "Optimization-based Interactive Motion Synthesis for Virtual Characters", ACM SIGGRAPH 2007 Sketches and ACM SIGGRAPH 2007 Posters, Aug. 2007

B. Allen, S. Jain, P. Faloutsos, C. K. Liu, "Environment-Based Physical Motion for Secondary Characters", ACM SIGGRAPH 2007 Posters, Aug. 2007

S. Jain, U. Neumann, "Real-time Camera Pose and Focal Length Estimation", Proc. 18th International Conference on Pattern Recognition (ICPR 2006), Aug. 2006

D. Mahajan, N. Kwatra, S. Jain, P. Kalra, S. Banerjee, "A Framework for Activity Recognition and Detection of Unusual Activities", Proc. 4th Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP 2004), Dec. 2004

Skills

Languages: *Fluent:* C++, C, LaTeX. *Experience:* MATLAB, XML, Java
Tools: OpenGL, GLUT, Fast Light Toolkit (FLTK), Open Dynamics Engine (ODE)
Operating Systems: Windows XP, Linux, Mac OS X, Solaris

Miscellaneous Implementation

Generic N-body **articulated rigid and deformable body simulator** with contact resolution by solving Linear Complementarity Problem.
Generic **spacetime optimization** framework to synthesize physically realistic motion for articulated characters.
Generic N-dimensional **fluid simulator** using Navier-Stokes equations.
Generic N-dimensional **level sets** for tracking interfaces.
Recursive **ray tracing**, with reflections, transparency, etc.
Application to automatically **transfer color** to a greyscale image given a color image.
Animation between two images using **image morphing**.

Relevant Courses

Computer Graphics and Vision: Advanced Image Synthesis, Computer Animation and Simulation, Computational Geometry, Advanced Computer Vision, Computer Graphics, Digital Image Processing

Mathematics: Variational Calculus, Numerical Partial Differential Equations, Scientific Computing and Visualization, Numerical and Scientific Computing, Linear Algebra, Probability and Stochastic Processes, Real Analysis, Complex Analysis, Optimization Methods

Computer Science and Engineering: Advanced Artificial Intelligence, Databases, Advanced Operating Systems, Algorithms Design and Analysis

Awards

3rd Prize in ACM Student Research Competition at ACM SIGGRAPH 2007, San Diego	Aug. 2007
Graduate Research Assistantship	2004 - 2011
Graduate Teaching Assistantship	2006, 2007
4th Prize in All India Inter-college Technical Fest, Indian Institute of Technology, Kanpur	Mar. 2002
All India rank 68 in the Joint entrance exam (JEE) for Indian Institute of Technology (IIT)	May 2000
Selected amongst top 35 students for the 32nd International Chemistry Olympiad'2000 Training Camp	May 2000
Merit certificate (Top 0.1% in India) for excellent performance in Maths and Science in Metric examination	Jun. 1998
Silver medal in State level Mathematics Olympiad	Jun. 1998