Nipun Kwatra

physbam.stanford.edu/~kwatra nkwatra@gmail.com

Research

My primary research interests are in physically based simulation with focus on computational fluid dynamics and solid fluid coupling. I am interested in applications of simulation to both computer graphics and computational physics.

My thesis focussed on developing a semi-implicit method for simulating inviscid compressible flow and its extensions for strong implicit coupling of compressible flow with Lagrangian solids, and artificial transition of fluid from compressible flow to incompressible flow regime for graphics applications.

My work at Google focussed on information retrieval for ads and search, where I worked on both systems infrastructure and quality improvements. I have had extensive experience with analyzing bigdata and improving serving system performace during this work.

Education

Stanford University, GPA 4.007/4.0 — Stanford, CA
Ph.D, Computer Science — Sep. 2006 - Jun. 2011

Georgia Institute of Technology, GPA 4.0/4.0 — Atlanta, GA
M.S., Computer Science — Aug. 2004 - May 2006

Indian Institute of Technology, GPA 8.93/10 — Delhi, India
B.Tech., Computer Science — Jul. 2000 - May 2004

Work Experience

Chekkoo Technologies — Bangalore, India
Co-Founder — May. 2015 - Present
Working on a mobile application for Android/iOS to make browse, discovery and sharing of personal videos fun and frictionless. Personal videos are currently a heavily underutilized medium and we plan to change that completely. I am working on all aspects of the product including tech, design and growth. The app has received great reception: 100K downloads, 8K daily actives, 3.7 sessions daily & 15 minutes average daily time spent per user.

Google Inc. — Bangalore, India
Software Engineer — Jan. 2012 - Feb. 2015
Worked on ads keyword suggestion tool and dynamic search ads (keywordless ads). Worked on search infrastructure for improving the performance (cpu and storage) of the search serving system.

Google Inc. — Mountain View, CA
Software Engineer — Jan. 2011 - Jan. 2012
Worked in the ads serving team on ad formats, quality analysis and infrastructure. Worked in the dynamic search ads team on core infrastructure, improving ads quality.

Google Inc. — Mountain View, CA
Summer Intern — Jun. 2010 - Sep. 2010
Designed and developed the time lapse framework for Android, including adding support in the native camera application. The feature was launched in the Honeycomb, Ice Cream Sandwich releases.

Stanford University — Stanford, CA
Graduate Research Assistant — Sep. 2006-Sep. 2007, Jan. 2008 - Jan. 2012
Developed a semi-implicit method for compressible flow simulation and extended it for implicit solid-compressible flow coupling. Worked on asynchronous time evolution for deformable solids and high resolution fluid simulation techniques to simulate small scale phenomena like spray and foam.

Stanford University — Stanford, CA
Teaching Assistant — Sep. 2007 - Dec. 2007
Course assistant for Mathematical Methods for Computer Vision, Robotics, and Graphics.

University of North Carolina — Chapel Hill, NC
Summer Intern — Summer 2006
Worked on interaction of articulated characters with fluids.

Georgia Institute of Technology — Atlanta, GA
Graduate Research Assistant — Aug. 2004 - May 2006
Did research in motion capture and physical simulation. Developed a finger tracking application and a system for document tracking.

INRIA Rhône-Alpes Grenoble, France
Summer Intern Summer 2003
Analyzed the performance of various supervised and semi-supervised learning techniques on the problem of classifying images according to their indoor or outdoor location, given a small set of training images taken at each location.

Publications

N. Kwatra "Practical Methods for Simulation of Compressible Flow and Structure Interactions," Ph.D. Thesis, Stanford Computer Science Department, June 2011.

C. Schroeder, N. Kwatra, W. Zheng, R. Fedkiw, "Asynchronous Evolution for Implicit Time Integration," Pacific Graphics, 2011.

J.T. Grétarsson, N. Kwatra and R. Fedkiw, "Numerically Stable Fluid-Structure Interactions Between Compressible Flow and Solid Structures," Journal of Computational Physics, Vol. 230, Issue 8, 3062-3084, 2011.

N. Kwatra, J.T. Grétarsson and R. Fedkiw, "Practical Animation of Compressible Flow for Shock Waves and Related Phenomena," SCA 2010.

N. Kwatra, C. Wojtan, M. Carlson, I. Essa, P.J. Mucha and G. Turk, "Fluid Simulation with Articulated Bodies," IEEE TVCG, Vol. 16, No. 1, 2010.

N. Kwatra, J. Su, J. Gretarsson and R. Fedkiw, "A Method for Avoiding the Acoustic Time Step Restriction in Compressible Flow," Journal of Computational Physics, Vol. 228, Issue 11, 4146-4161, 2009.

F. Losasso, J.O. Talton, N. Kwatra, R. Fedkiw, "Two-way Coupled SPH and Particle Level Set Fluid Simulation," IEEE TVCG, Vol. 14, No. 4, 2008.

V. Kwatra, D. Adalsteinsson, T. Kim, N. Kwatra, M. Carlson, M. Lin, "Texturing Fluids," IEEE TVCG, Vol. 13, No. 5, 2007.

V. Kwatra, D. Adalsteinsson, N. Kwatra, M. Carlson, M. Lin, "Texturing Fluids," In *Technical Sketches* Program, ACM SIGGRAPH 2006.

V. Kwatra, I. Essa, A. Bobick, and N. Kwatra, "Texture Optimization for Example-based Synthesis," Proc. ACM Transactions on Graphics, SIGGRAPH 2005, 795-802, August 2005.

D. Mahajan, N. Kwatra, S. Jain, P. Kalra, and S. Banerjee, "A Framework for Activity Recognition and Detection of Unusual Activities," Proc. Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP 2004), December 16-18, 2004.

Patents

V. Raghunathan, D.G. Arthur, R. Jain, E.K. Moxley, S. Venkataraman, N. Kwatra, B.A. McLarnon, D.J. Ganzhorn. "Promoting Content," US Patent 9471551, Oct 2016, Filed March 2012.

V. Raghunathan, D.G. Arthur, R. Jain, E.K. Moxley, S. Venkataraman, N. Kwatra, B.A. McLarnon, D.J. Ganzhorn. "Promoting Content," US Patent 9378191, June 2016, Filed May 2012.

V. Raghunathan, D.G. Arthur, R. Jain, E.K. Moxley, S. Venkataraman, N. Kwatra, B.A. McLarnon, D.J. Ganzhorn. "Promoting Content," US Patent 9304985, Apr 2016, Filed May 2012.

V. Raghunathan, D.G. Arthur, R. Jain, E.K. Moxley, S. Venkataraman, N. Kwatra, B.A. McLarnon, D.J. Ganzhorn. "Promoting Content," US Patent 8712850, Apr 2014, Filed May 2012.

Awards at Google

Spot bonus for project work in Q4, 2012

Spot bonus for project work in Q4, 2011

Spot bonus for project work in Q3, 2011

Top ten accomplishment in Google Engineering for project worked on in Q1, 2011.

Top ten accomplishment in Google Ads for project worked on in Q1, 2011.

Academic Awards

Bronze medal in the 31^{st}International Physics Olympiad'2000, Leicester, England.

Gold Medal in the National Physics Olympiad'2000, Mumbai, India.

Institute Merit Awards at IIT Delhi, in Fall 2003, Spring 2003, Fall 2002, Fall 2001 and Fall 2000.

INRIA-IIT scholarship for the year 2003.

Secured all India rank 56 in JEE 2000 for admission to the Indian Institutes of Technology.

Secured all India rank 1 in CET 2000 for entrance to Panjab Engineering College.

Teaching / Mentoring

Teaching assistant for Graduate course "Mathematical Methods for Computer Vision, Robotics, and Graphics," in Autumn 2007.

Mentored intern at Google in Summer 2011. Created tool to analyse impact of Ad creative features on performance.

Mentored 4 interns at Chekkoo, working on multiple projects including face recognition and clustering, android app development, app UX design.

Software Skills and Experience

Language Skills : C++, Java, Swift, Objective-C, Python.

OS Skills : Linux, Mac OS X