

Kong-man (German) Cheung

Work Address

Robotics Institute, Carnegie Mellon University
5000 Forbes Avenue
Pittsburgh PA 15213
Phone: 412-268-3127
Fax: 412-268-5571
Email: german@ux2.sp.cs.cmu.edu
Web: www.cs.cmu.edu/~german

Education

- | | | |
|-----------|---|---|
| 1996-2003 | Robotics Institute
Carnegie Mellon University | PhD in Robotics
PhD Thesis: “Visual Hull Construction,
Alignment and Refinement for Human Body
Modeling, Motion Capture and Rendering”
Thesis Advisors: Professors Takeo Kanade and Simon Baker |
| 1992-1994 | Hong Kong University of
Science and Technology | M.Phil in Electrical and Electronic Engineering (1994)
Master Thesis (with Distinction):
“Perturbation Analysis and Compensating Algorithm
for Subspace Fitting Array Signal Processing Methods”
Thesis Advisor: Professor Mark S.F. Yau |
| 1989-1992 | The University of
Hong Kong | B.Eng in Electrical and Electronic Engineering (1992)
Graduated with First Class Honors |

Research Experience

- | | | |
|-----------|---|---|
| 2003- | Asimo Laboratory
Carnegie Mellon University | Maintain and conduct research with
the Honda humanoid robot ASIMO |
| 1998- | Virtualized Reality Laboratory
Carnegie Mellon University | Hardware set up and maintenance,
software development, virtualized
reality video production |
| 1997-1998 | Medical Robotics Laboratory
Carnegie Mellon University | 3D reconstruction of skeletal
anatomy of mouse fetuses |
| 1996-1997 | Computational Sensor Laboratory
Carnegie Mellon University | Research in computational sensors |
| 1994-1995 | Department of Electrical & Electronic Engineering
Hong Kong University of Science and Technology | Motion and path planning
for CNC machines |
| 1992-1994 | Department of Electrical & Electronic Engineering
Hong Kong University of Science and Technology | Direction-of-Arrival estimation
and blind deconvolution |

Related Working Experience

Nov. 2003-	Robotics Institute Carnegie Mellon University	Postdoctoral Fellow (Professors Jessica Hodgins and Takeo Kanade) Manage and conduct research in both the the Asimo Lab. and the Virtualized Reality Lab, conduct research in computer vision/graphics
June-August 1999	Visual Interactivity Group Microprocessor Research Laboratory Intel Corporation	Summer Internship Project: Real-time 3D human voxel model reconstruction and motion fitting
1995-1996	Visual Inspection Center Hong Kong University of Science and Technology	Assistant Computer Engineer Project: Factory inspection of IC label markings

Research Interests

I am interested in computer vision with applications in other fields such as computer graphics, surveillance and robotics. Particularly I am interested in 3D shape/reflectance reconstruction from single/multiple videos, motion across time, building digital humans (detailed human kinematic modeling, marker-less motion tracking, skin deformation estimation and realistic rendering), visual effects for movies and games, image based rendering and virtual reality.

Research Projects

1. Temporal Shape-From-Silhouette: reconstruct 3D shape and appearance models of objects from multiple video sequences. Details can be found at <http://www.cs.cmu.edu/~german>.
2. Human Kinematic Modeling, Motion Capture and Rendering: construct detailed human kinematic models (with both shape and joint information) from multiple video sequences. The models are then used for non-invasive (no optical or magnetic markers) human motion tracking and video-based motion re-rendering. Details can be found at <http://www.cs.cmu.edu/~german>.
3. Virtualized Reality: create photo-realistic images of a recorded dynamic event from any viewpoint of virtual fly-through. Responsibilities include hardware maintenance of a synchronized real-time video capturing system (with 48 cameras), software development for 3D shape/appearance reconstruction and virtualized reality video production from scene/data capture to data processing to final rendering. Details of the Virtualized Reality Laboratory can be found at <http://www.cs.cmu.edu/~virtualizedr>.

Related Computer Skills

1. Programming languages: C/C++, OpenGL, Matlab, Mathematica.
2. Operating Systems: Windows, Linux, IRIX, Solaris, OSX.
3. Softwares: Microsoft Visual Studio, Microsoft PowerPoint, LaTeX.
4. Graphical User Interface Development Packages: Fast Light ToolKit (FLTK), X-forms, Microsoft Foundation Class (MFC).

Reference Contacts

1. Professor Takeo Kanade, Robotics Institute, Carnegie Mellon University
Phone: 412-268-3016, Email: tk+@cs.cmu.edu
2. Professor Simon Baker, Robotics Institute, Carnegie Mellon University
Phone: 412-268-5746, Email: simonb@cs.cmu.edu
3. Professor Jessica Hodgins, Computer Science Department, Carnegie Mellon University
Phone 412-268-6795, Email: jkh@cs.cmu.edu
4. Professor Steve Seitz, Department of Computer Science and Engineering, University of Washington
Phone: 206-616-9431, Email: seitz@cs.washington.edu
5. Professor Bob Collins, Robotics Institute, Carnegie Mellon University
Phone: 412-268-6186, Email: rcollins@cs.cmu.edu
6. Dr. Gary Bradski, Intel Corporation
Email: gary.bradski@intel.com

Publications

1. German K.M. Cheung, S. Baker, J. Hodgins and T. Kanade. "Markerless Human Motion Transfer", in *Proceedings of the Second International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT 04)*, September, 2004.
2. German K.M. Cheung, S. Baker and T. Kanade. "Shape-From-Silhouette Across Time Part I: Theory and Algorithms", accepted by *International Journal of Computer Vision*.
3. German K.M. Cheung, S. Baker and T. Kanade. "Shape-From-Silhouette Across Time Part II: Applications to Human Modeling and Markerless Motion Tracking", accepted (subject to minor revision) by *International Journal of Computer Vision*.
4. German K.M. Cheung, "Visual Hull Construction, Alignment and Refinement for Human Kinematic Modeling, Motion Tracking and Rendering", PhD Thesis, *Technical Report CMU-RI-TR-03-44*, Robotics Institute, Carnegie Mellon University, October, 2003.
5. German K.M. Cheung, S. Baker and T. Kanade. "Visual Hull Alignment and Refinement Across Time: A 3D Reconstruction Algorithm Combining Shape-From-Silhouette with Stereo", in *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition 2003 (CVPR'03)*, Vol. 2, pages 375-382, Madison WI, June 2003.
6. German K.M. Cheung, S. Baker and T. Kanade. "Shape-From-Silhouette of Articulated Object and its Use for Human Body Kinematics Estimation and Motion Capture", in *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition 2003 (CVPR'03)*, Vol.1, pages 77-84, Madison WI, June 2003.
7. German K.M. Cheung. "Visual Hull Construction, Alignment and Refinement Across Time", Thesis Proposal, *Technical Report CMU-RI-TR-02-05*, Robotics Institute, Carnegie Mellon University, January 2002.

8. K.M. Cheung, T. Kanade, J. Bouguet, and M. Holler. "A Real Time System for Robust 3D Voxel Reconstruction of Human Motions", in *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition 2000 (CVPR'00)*, Vol. 2, pages 714 - 720, Hilton Head Island SC, June 2000.
9. S. Baba, H. Saito, S. Vedula, K.M. Cheung and T.Kanade. "Appearance-Based Virtual-View Generation for Fly Through in a Real Dynamic Scene", in *Proceedings of Joint Eurographics IEEE TCVG Symposium on Visualization 2000 (VisSym'00)*, May 2000.
10. K.M. Cheung and S.F. Yau. "Statistical Analysis and CRB Study of Modified MUSIC under DOA-Dependent Perturbations", in *Proceedings of Fourth International Symposium on Signal Processing and Its Applications*, pages 349-352, Gold Coast Australia, August 1996.
11. K.M. Cheung and S.F. Yau. "A Compensation Method for Model Deviations in Parametric Estimation by ESPRIT", in *Proceedings of International Conference on Neural Network and Signal Processing 1995*, Vol. II, pages 1079-1082, Nanking China, December 1995.
12. K.M. Cheung and S.F. Yau. "Improved ESPRIT for DOA Estimation in the Presence of DOA Dependent and Independent Deviations", in *Proceedings of International Conference on Signal and Image Processing 1995 (SIP'95)*, Las Vegas United States, November 14-17 1995.
13. K.M. Cheung and S.F. Yau. "Blind Deconvolution of System with Unknown Response Excited by Cyclostationary Impulses", in *Proceedings of International Conference on Acoustics, Speech and Signal Processing 1995 (ICASSP'95)*, Detroit MI, May 8-12 1995.
14. K.M. Cheung. "Perturbation Analysis and Compensating Algorithm for Subspace Fitting Array Signal Processing Methods", Master's Thesis, Hong Kong University of Science and Technology, Hong Kong, May 1994.
15. K.M. Cheung and S.F. Yau. "A Novel Method in Compensating Random Perturbations in Eigen-based Subspace Methods", in *Proceedings of International Symposium on Circuits And Systems 1994 (ISCAS'94)*, London England, May 31-June 2 1994.