

# INDRIYATI ATMOSUKARTO

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## RESEARCH INTEREST

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I am interested in applying computer vision and machine learning techniques to analyze and quantify 3D shapes for similarity-based retrieval and classification. The quantification of 3D shapes is useful for a number of fields including medical research, cultural heritage, architectural design, and games development.

## EDUCATION

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2006 – Present University of Washington, PhD candidate Computer Science  
Project: 3D Shape Quantification for Retrieval and Classification  
2004 – 2006 University of Washington, M.Sc Computer Science  
Project: An Interactive 3D User Interface for Bronchoscopy  
2000 – 2001 National University of Singapore, M.Sc Computer Science  
Thesis: Frontier Advancing Delaunay Triangulation of unorganized 3D points.  
1996 – 2000 National University of Singapore, B.Sc Computer Science (First Class Honours)  
Project: Polygonization of Noisy 3D Surface Points

## RESEARCH AND PROFESSIONAL EXPERIENCE

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Sept 2006 – Present: *Research Assistant and Teaching Assistant* (Advisor: Prof Linda Shapiro)

Department of Computer Science, University of Washington

- Research on 3D shape analysis and quantification for classification and retrieval
- Collaborating with doctors at Seattle Children's Hospital to develop a method for automatic quantification and localization of abnormal children's skulls due to plagiocephaly and facial anomalies in children with 22q11.2DS
- Developed the first online multimedia information retrieval for biomedical data prototype that includes eye and skull retrieval systems.
- Teaching Assistant for Computer Vision Graduate Class (Spring 2007 and Winter 2008)
- Coordinated Computer Vision seminar reading group Fall 2007.

June 2006 – Aug 2006: *Intern* (Advisor: Arun Krishnan, Sarang Lakare, Lucas Bologni)

Siemens Medical Solutions, Malvern, PA – Computer Aided Diagnosis group

- Automatic detection of lymph nodes in CT scan

Mar 2005 – June 2006: *Research Assistant* (Advisor: Prof Linda Shapiro and Assoc. Prof Eric Seibel)

Human Interface Technology Laboratory, University of Washington

- Designed and implemented a user interface that serves as navigation guide for doctors when performing endoscopic examination for biopsy of lung cancer: OpenGL and particle filter
- Performed research on camera tracking for endoscope video: object recognition, EM segmentation and optical flow

Sept 2004 – Mar 2005: *Research Assistant* (Advisor: Prof Linda Shapiro)

Department of Computer Science, University of Washington

- Conducted experiments for object recognition and image classification in VACE (Video Analysis and Content Exploitation) project under ARDA funding: EM training and feature extraction (color, texture and structure)

Nov 2001 – Aug 2004: Research Assistant (Advisor: A/P Leow Wee Kheng)

School of Computing, National University of Singapore

- Research and development on 3D model retrieval system: describe geometric and topological features to represent 3D object, calculate distance measure between two 3D objects
- Research and development on image labeling and content based image retrieval: color, texture

June 2001 – November 2001: Software Engineer

Silicon Illusions Pte Ltd., Singapore

- Projects: Ministry of Environment broadband webpage (Three Loops) in charge of game development using Macromedia and Flash

July 1999 – June 2001: Teaching Assistant

School of Computing, National University of Singapore

- Teaching IT1001 Introduction to Computing as a cross faculty module
- Teaching IC1101C Introduction to Programming Languages in C
- Teaching IC1103 Digital Logic Design, including tutorials and labs.

June 1999 – June 2001: Freelance Programmer

- Projects: HP Global Portal System. Develop an e-commerce application for inventory bidding using technologies such as HTML, JSP and Java

## **HONORS**

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2004 Graduate Assistantship from University of Washington

2000 Graduate Research Scholarship from National University of Singapore

2000 Second prize in project exhibition at School of Computing, National University of Singapore

1998 Lim Boon Seng Book Prize for best student in Computer Science year 1997/1998

1996 - 1999 Dean's List in School Of Computing, National University of Singapore

1995 Sembawang Corporation and Singapore Technologies scholarship for undergraduate studies in Singapore

## **PUBLICATIONS AND PATENTS**

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**I. Atmosukarto**, L. G. Shapiro, J. R. Starr, C. L. Heike, B. Collett, M. L. Cunningham, M. L. Speltz. 3D Head Shape Quantification for Infants with and without Deformational Plagiocephaly. Accepted for publication in *The Cleft-Palate Craniofacial Journal*, 2009.

**I. Atmosukarto**, K. Wilamowska, C. Heike, L. G. Shapiro. 3D Object Classification using Salient Point Patterns With Application to Craniofacial Research. Accepted for publication in *Pattern Recognition*, 2009.

L. Shapiro, K. Wilamowska, **I. Atmosukarto**, J. Wu, C. Heike, M. Speltz, and M. Cunningham. Shape-Based Classification of 3D Head Data. *Accepted in International Conference on Image Analysis and Processing*, 2009.

**I. Atmosukarto**, L. Shapiro, M. Cunningham, and M. Speltz. Automatic 3D Shape Severity Quantification and Localization for Deformational Plagiocephaly. *In Proc. SPIE Medical Imaging: Image Processing*, 2009.

- R. F. Tungaraza, L. G. Shapiro, J. Guan, **I. Atmosukarto**, S. M. Rolfe, J. Ojemann, A. Poliakov, E. Aylward, N. M. Kleinhans, J. F. Brinkley. A similarity retrieval method for functional magnetic resonance imaging (fMRI) statistical maps. *In Proc. SPIE Medical Imaging: Image Processing*, 2009.
- S. Yang, **I. Atmosukarto**, J. Franklin, J. Brinkley, D. Suci, L. Shapiro. A model of multimodal fusion for medical applications. *In Proc. SPIE Multimedia Content Access*, 2009.
- I. Atmosukarto**, L. G. Shapiro. A Learning Approach to 3D Object Classification. *In Proc. Joint LAPR International Workshops S+SSPR*, 2008.
- I. Atmosukarto**, L. G. Shapiro. A Salient-Point Signature for 3D Object Retrieval. *In Proc. ACM Multimedia Information Retrieval*, 2008.
- I. Atmosukarto**, L. G. Shapiro. Global 3D Mesh Segmentation using Local Operators. *Proc. Eurographics Workshop on 3D Object Retrieval*, 2008.
- I. Atmosukarto**, R. Travillian, J. Franklin, L. Shapiro, J. Brinkley, and D. Suci. A unifying framework for combining content-based image retrieval with relational database queries for biomedical applications, *Society for Imaging Informatics for Medicine Annual Meeting*, 2008.
- L. G. Shapiro, **I. Atmosukarto**, H. Cho, H. J. Lin, S. Ruiz-Correa, J. Yuen, Similarity-Based Retrieval for Biomedical Applications, in *Case-Based Reasoning on Images and Signals*, P. Perner (ed.), Springer-Verlag, Berlin, pp. 356-387, 2008.
- I. Atmosukarto**, T. Soper, E. Seibel, R. Glenny, and L. Shapiro. An Interactive 3D User Interface for Bronchoscopy. *Proc. SPIE Medical Imaging: Visualization and Image Guided Procedure*, 2007.
- T. D Soper, **I. Atmosukarto**, E. J Seibel, R. W Glenny. Interactive 3D Interface for Guiding an Ultrathin Catheterscope in the Peripheral Lung. *Proc. ACM Symposium on User Interface Software and Technology*, 2005.
- Y. Li, **I. Atmosukarto**, M. Kobashi, J. Yuen and L. Shapiro. Object and Event Recognition for Aerial Surveillance. *Proc. SPIE Optics and Photonics in Global Homeland Security*, 2005.
- I. Atmosukarto**, W. K. Leow, and Z. Huang. Feature Combination and Relevance Feedback for 3D Model Retrieval. *Proc. IEEE Multimedia Modelling 2005*.
- M. Yu, **I. Atmosukarto**, W. K. Leow, and Z. Huang, and R. Xu. 3D model retrieval with morphing-based geometric and topological feature maps. *Proc. IEEE Computer Vision and Pattern Recognition*, 2003.
- L. Zhou, **I. Atmosukarto**, W. K. Leow, and Z. Huang. Reconstructing surface discontinuities by intersecting tangent planes of advancing mesh frontiers. *Proc. Computer Graphics International*, 2002.
- I. Atmosukarto**, L. Zhou, W. K. Leow, and Z. Huang. Polygonizing Non-uniformly distributed 3D points by advancing mesh frontiers, *Proc. IEEE Computer Graphics International*, 2001.
- W. K. Leow, Z. Huang, L. Zhou, **I. Atmosukarto**, and Y. Zhang. Acquiring 3D Models from Images for Multimedia Systems, *Proc. International Conference on Multimedia Modeling*, Japan, 2000.
- I. Atmosukarto**, W. K. Leow, Z. Huang, Y. Zhang, and K. K. Sung. Mesh Construction from Non-Uniformly Distributed and Noisy 3D Points Recovered from Image Sequence, *Proc. Pacific Conference on Computer Graphics and Applications*, 2000.

## **THESES**

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**Indriyati Atmosukarto.** Frontier Advancing Delaunay Triangulation of unorganized 3D points. Master's Thesis. School of Computing, National University of Singapore, 2001.

**Indriyati Atmosukarto.** Polygonization of Noisy 3D Surface Points. Honour's Thesis. School of Computing, National University of Singapore, 2000.

## **PATENT**

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Inventor for patent publication No. US-2003-0063085-A1. Wee Kheng Leow, Zhiyong Huang, Luping Zhou, and **Indriyati Atmosukarto.** Frontier Advancing Polygonization, 3 April 2003