Hamid Laga

Excel Tachibanadai 301, 1-1-12 Tachibanadai, Aobaku,
Yokohama, Japan 227-0046
+81 (0)90 3537 6369 hamid.laga@gmail.com

Sept. 8th, 2009

Application for the Junior Professorship for Sensorics and Sensor Data Processing
Faculty of Electrical Engineering and Computer Science, University of Siegen.

Dear Professor Elmar Griese

I am writing in response to your advertisement for the Junior Professorship for Sensorics and Sensor Data Processing position at the University of Siegen. I am currently an Assistant Professor at the Global Edge Institute of Tokyo Institute of Technology. I am extremely interested in obtaining a faculty position at your University, as its engineering research programs have a worldwide reputation.

I believe that my academic training and my three years of working experience as an assistant professor prepare me to be an effective senior researcher and instructor in your department. My doctoral dissertation has been conducted under the direction of Prof. Masayuki Nakajima and introduces new methodology for the recognition, classification, and retrieval of 3D shapes. The results and extensions I introduced later have been awarded twice a Best Paper Award, and once the Award of Best International Paper published by a Japanese affiliated researcher in the last three years.

As an Assistant Professor at Tokyo Institute of Technology, I have gained valuable experience in establishing and managing a research laboratory, and obtaining significant grants for research (more than JPY19,000,000 in the last three years). I have initiated and worked on various projects spanning several fields of Computer Vision (people detection and tracking), Pattern Recognition, Visual Information Retrieval, Digital Geometry Processing, and Computer Graphics. Further details are provided in my Curriculum Vitae.

During my graduate training, I served as a teaching assistant and regularly supervised less senior graduate students. In my three years experience as assistant professor I have developed confidence and interest in teaching and I look forward to the opportunity to both teach assigned classes and to develop my own classes.

I would enjoy discussing this position with you in the weeks to come. In the meantime, I am enclosing my Curriculum Vitae, my list of publications, and a research proposal. If you require any additional materials or information, I am happy to supply it. Thank you very much for your consideration.

Sincerely,

Hamid Laga

HAMID LAGA, PhD

Excel Tachibanadai 301, 1-1-12 Tachibanadai, Aobaku, Yokohama, Japan 227-0046

+81 (0)90 3537 6369 hamid.laga@gmail.com http://www.img.cs.titech.ac.jp/~hamid

SUMMARY

Assistant professor, with educational background in Computer Science. Advanced skills in image processing, 3D computer vision, pattern recognition, computer graphics, and digital geometry processing. Working experience with Virtual Reality and Virtual Agents.

- **Specialties:**
  - People detection and tracking, 3D shape analysis (classification, recognition, and retrieval), 3D model reconstruction, digital geometry processing, High Performance Computing for Vision and Graphics.
- **Education:** PhD in Computer Science, Tokyo Institute of Technology, March 2006.
  PhD Dissertation: "Shape *Descriptors and Algorithms for Content-based 3D Model Retrieval".*
- **Programming:**
  - C/C++ (10 years +), Java (2 years +), Matlab (9 years +), experience with GP-GPU and CUDA, OpenGL, OpenCV, BOOST, GSL.
- **Languages:**
  - English (business), Japanese (intermediate), French, Arabic, and Berber (native level).

HONORS AND AWARDS

- International CG Paper Grand Prix Award- Japan, 2008, the Society of Art and Science Japan.
- Best Paper Award at the 23rd NICCOGRAPH Paper Contest - Japan, November 2007, for the paper: "Supervised Learning of Salient 2D Views of 3D Models".
- Best Paper Award at the IEEE Int. Conference on Shape Modeling and Applications SMI2006 (2006) for the paper "Spherical Wavelet Descriptors for Content-based 3D Model Retrieval".
- Japanese Government Scholarship for graduate studies (April 2000 ~ March 2006).
- Algerian Government Scholarship for University studies (October 1992 ~ September 1997).

EDUCATION

1. Tokyo Institute of Technology,
Graduate School of Information Science and Engineering

- **PhD in Computer Science,** **April 2003 - March 2006**
  Dissertation: "Shape Descriptors and Algorithms for Content-based 3D Model Retrieval".
  Advisor: Prof. Masayuki Nakajima.
- **Masters in Computer Science,** **April 2001 - March 2003**
  Thesis: "A Study on 3D Model Reconstruction and Animation using Implicit Functions".
  Advisor: Prof. Masayuki Nakajima.
- **Research student,** **Oct 2000 - March 2001**
  Project: Synthetic Aperture Radar Image Analysis using Markov Random Fields.
- **Japanese Language Trainee,** **April 2000 - Sept. 2000**
  Certificate of Completion of Japanese Language training program (Level 4 – beginner).

2. Institut National d'Informatique (Algeria) **Oct. 1992 - Sept. 1997**

- **State Engineer in Computer Science (Ingénieur d'Etat en Informatique)**
  Major: Computer Systems (Systèmes Informatiques).

OTHER TRAINING PROGRAMS

1. International Computer Vision Summer School (Sicily, Italy) **July 9 - 14, 2007**
Detection, Recognition, and Segmentation in Context http://svg.dmi.unict.it/icvss2007/

2. International Machine Learning Summer School (Taiwan) **July 24- August 4, 2006**
http://www.iis.sinica.edu.tw/MLSS2006/

WORK HISTORY

1. Global Edge Institute,
Tokyo Institute of Technology, Tokyo, JAPAN **Oct 2006 – Present**

Assistant Professor.

- Research projects:
  - 3D People detection and tracking.
  - Real-time 3D reconstruction of objects undergoing rigid / non-rigid motion.
  - Search engines for 3D model databases.
  - Nano-particle detection and tracking.
  - GPU-based 3D reconstruction from multiple cameras.
  - Face detection and recognition for HCI.
  - Computer vision for interactive digital art.
- Activities:
  - Leader of the Image Processing and Computer Vision group (currently 9 members).
  - Co-supervising graduate students (currently 2 PhDs, 3 Masters).
- Teaching:
  - Advanced Topics in Computer Graphics for graduate students. Details available at: http://www.img.cs.titech.ac.jp/~hamid/index.php?view=lectures
  - Chairing a weekly seminar on Computer Vision and Image Processing (review research progress of the students, review recent research papers and study basic concepts).

2. Image Processing Laboratory
Nara Institute of Science and Technology (NAIST), JAPAN **April, 2006 - Sept, 2006**

Post-Doctoral fellow under the support of the Japan Society for the Promotion of Science (JSPS).

- Projects:
  - Data mining for knowledge extraction from databases of 3D models.
  - People detection and tracking using networked camera systems.

3. Embassy of Algeria, Tokyo – JAPAN **March 2002 – March 2006**

Part time System Administrator. Duties included daily administration tasks, and website development.

4. Azazga Informatique, Azazga – ALGERIA **Feb.1999 – March 2000**

- Co-founder, manager, and software engineer. Duties included:
  - Development of software for stock control, inventory, and invoice management.
  - Customer services (hardware and software).

5. Society of Industrial Maintenance,
Engineering and Testing (SIMET) – ALGERIA **Oct. 1999 – March 2000**

Consulting services in software engineering (C++).

6. Ecole Polytechnique d'Informatique et de Techniques
de Comptabilité (EPITEC), ALGERIA **Nov.1997 – March2000**

System administrator, software engineer, and teacher of Operations Research, Math, and Computer Architecture.

7. Advanced Technologies Development Center (CDTA), ALGERIA **Oct. 1996 – Sept. 1997**

Internship at the Robotics and Artificial Intelligence Laboratory. I worked on:

- Multi-resolution image de-noising and segmentation using Markov Random Fields and wavelet analysis.
- Implementation of a stereo matching algorithm.
- Segmentation of Synthetic Aperture Radar images.

RESEARCH & GRANT ACQUISITION EXPERIENCE

1. Grant in Aid for Young Scientists (Kakenhi Wakate-B) No.21700096.
   Japan Society for the Promotion of Science (JSPS).
   Project title: Example-based 3D scene reconstruction and completion.
   Main investigator.
   April 2009 – March 2012 (JPY 3,560,000)

2. Global Edge Institute's startup fund, Japan Science and Technology Agency (JST).
   Title of project1: People Detection and Tracking using Networks of Sparsely Distributed Cameras
   Title of Project2: 3D Shape Analysis, Classification, Recognition and Retrieval.
   Main Investigator.
   October 2006 ~ September 2008 (JPY 12,000,000)

3. Center of Excellence (COE) program Ubiquitous Networked Media Computing.
   Nara Institute of Science and Technology.
   Project title: People Detection and Tracking using Networks of Sparsely Distributed Cameras.
   Collaborator.
   Oct. 2006 ~ Dec. 2006 (JPY 3,000,000)

4. Grant in Aid for Scientific Research , Japan Society for the Promotion of Science (JSPS)
   Project title: Data Mining System for Knowledge Extraction from 3D Databases.
   Main Investigator.
   April 2006 ~ Sept. 2006 (JPY 1,200,000)

TEACHING EXPERIENCE

1. **Tokyo Institute of Technology, JAPAN,**
   Graduate School of Information Science and Engineering. **2007 and 2008**
   - Advanced Topics in Computer Graphics for graduate students.
     Details and course notes available at:
     http://www.img.cs.titech.ac.jp/~hamid/courses/index.php
   - Seminars in Image Processing and Computer Vision for graduate students (2003-2005, 2007, 2008, 2009). Topics include:
     - Introduction to image processing and computer vision (Semester 1 of the academic year).
     - Advanced topics in computer vision and pattern recognition (Semester 2 of the academic year).
     - Chairing paper reading sessions (Semester 2 of the academic year, once every two weeks).

2. **Ecole Polytechnique d'Informatique et de Techniques de Comptabilité,**
   ALGERIA **Nov.1997 – March 2000**
   - Mathematics, Computer Architecture, Graph Theory, Databases, Algorithms and Programming.
   - Audience: undergraduate students.

3. **Alpha Language School, Tokyo, JAPAN** **Jan. 2003 – March 2006**
   Part time French teacher.

SERVICES

1. Program Committee member
   - InfoScale 2009 (http://www.infoscale.org/2009/)
   - Virtual Reality Continuum and its Application in Industry (VRCAI2009) (http://www.vrcai2009.com/index.html)
2. Local organization committee
   - Virtual Reality Continuum and its Application in Industry (VRCAI2009).
   - 3rd International Conference on Cyberworlds 2004 (CW2004), 18-20 Nov.2004, Tokyo, Japan (IEEE Computer Society).
3. Reviewer
   - 3rd International Conference on Cyberworlds 2004 (CW 2004).
   - IEICE Transactions on Information and Systems.
   - Nicograph Paper Contest (autumn 2007).
   - Irish Machine Vision and Image Processing 2008.
   - Journal of Computer Aided Design (Elsevier) – 2008.
   - Journal of Zhejiang University-SCIENCE A (Springer) – 2008.
   - International Journal of Pattern Recognition & Artificial Intelligence (World Scientific) – 2008.
   - International Journal of Computer Vision (IJCV), special issue on 3D Object Retrieval.
   - International Conference on Image Processing ICIP'2009
4. Grant proposal review for the Netherlands Organisation for Scientific Research (NWO).

OTHERS

1. French – Arabic – Japanese interpreter with Ashinaga (www.ashinaga.org) during the International Orphan Camps (August 2004, January 2006, August 2006).
2. Co-founder and President of Azazga Chess Club – Algeria (1996 - 1998).
3. Design and implementation of the home page of the International Affairs Division of Tokyo Institute of Technology (http://www.rcd.titech.ac.jp/iad/gaibu/home.php?view=home).
4. Design and implementation of the website of the Algerian Embassy in Tokyo (http://www.algerianembassy-japan.jp)

Selected publications

Following are my three major publications related to the position. A complete list of publications is provided separately.

1. **Hamid LAGA, M.Nakajima, and K.Chihara, "Discriminative Spherical Wavelet Features for Content-based 3D Model Retrieval", International Journal on Shape Modeling, Vol.13, No1, pp. 51-72, June 2007.**

   - **Best Paper Award at IEEE International Conference on Shape Modeling and Applications SMI'2006.**

   This paper is a part of my PhD dissertation. It deals with the problem of extracting global features that allow to discriminate between 3D models. It involves Digital Geometry Processing, Pattern Recognition, and Information Retrieval. The conference version of the paper received two awards:
   - The best paper award at IEEE International Conference of Shape Modeling and Applications (SMI2006), 2006.
   - International CG Paper Grand Prix Award- Japan 2008, the Society of Art and Science Japan.

   The main contributions of this paper are: (1) a new spherical parameterization methods that maps the 3D shape features onto a unit sphere, and (2) A set of spherical wavelet features extracted from the spherical representation of 3D shapes and used for estimating the similarity between two 3D models.

2. **Sofiane Yous, Hamid Laga, Kunihiro Chihara, "GPU-based Shape from Silhouettes", in the 5th International Conference on Computer Graphics and Interactive Techniques in Australasia and South East Asia GRAPHITE 2007, Australia, pp.71-77, Nov. 2007.**

   This work in collaboration of Dr. Sofiane Yous deals with the problem of real-time 3D reconstruction for 3D video applications. In the context of 3D video project of Nara Institute of Science and Technology, a cluster of 128 PCs has been used for 3D reconstruction. We proposed in this paper to replace the cluster of PCs with one PC equipped with a Graphics Processing Unit achieving real-time 3D reconstruction.

3. **Sofiane Yous, Hamid Laga, Kunihiro Chihara "People Detection and Tracking with World-Z map from a Single Stereo Camera", in the 8th International Workshop on Visual Surveillance, ECCV 2008 Workshop, October 2008.**

   In this paper, we proposed a new algorithm for 3D people tracking in complex environments. The algorithm operates on 3D range data which can be obtained using passive sensors, such as a stereo camera, or active sensors, such as TOF cameras. We introduced the concept of World-Z map which allows robust people segmentation in the presence of high occlusions. A patent is pending, and videos demonstrating the system are available at: http://www.img.cs.titech.ac.jp/~hamid/publications/VS2008/PeopleTracking.html

PATENTS

S.Yous and Hamid Laga, "A Method and System for 3D Tracking of People", Japanese Patent application No. 2008-222253, August 29, 2008 [Pending].

References

1. Prof. Masayuki Nakajima, thesis Advisor.
   Computer Science Department. Tokyo Institute of Technology.
   Tel.: +81-3 -5734-2183 Fax: +81-3-5734- 3965 Email: nakajima@img.cs.titech.ac.jp

2. Prof. Sadaoki Furui.
   Graduate School of Information Science and Engineering. Tokyo Institute of Technology.
   Tel.: +81-3-5734-3480 Fax: +81-3-5734-3480 Email: furui@cs.titech.ac.jp

3. Prof. Masaru Kono.
   Mentor at Global Edge Institute, Tokyo Institute of Technology.
   Tel.: +81-3-5734-3835 Email: kono.m.aa@m.titech.ac.jp

4. Prof. Kunihiro Chihara, Professor.
   Graduate School of Information Science, Nara Institute of Science and Technology, Japan
   Tel.: +81-743-72-5270 Fax: +81-743-72-5279 Email chihara@is.naist.jp

5. Dr. Sofiane Yous, Collaborator.
   Research Scientist, Trinity College of Dublin.
   Email: sofiane.yous@cs.tcd.ie

List of Courses

Advanced topics in Computer Graphics [2007, 2008, 2009]

Department of Computer Science, Tokyo Institute of Technology

Audience: Graduate Students (Master and PhDs).

Summary: In the last years triangle meshes have become increasingly popular with applications in many different areas of computer graphics. In this lecture I will introduce the geometry processing pipeline based on triangular meshes. In the first lecture I will introduce the basic concepts and focus on different representations of shape surfaces. Then in the second lecture I will introduce the discrete differential geometry and its application to the extraction of local geometric features upon on which we can build more advanced feature detector algorithms.

Course Syllabus

- Introduction, applications, surface representations.
- Mesh data structures.
- Discrete differential Geometry and its application to Mesh Smoothing and Feature Detection.
- Introduction to Point-based Graphics.
- 3D Shape Analysis
- 3D Shape Representations for Retrieval and Matching.

Course website: http://www.img.cs.titech.ac.jp/~hamid/index.php?view=lectures

3D Computer Vision: Algorithms and Applications (Invited Lecture)

SAE Student Chapter of the University of Monterrey – Mexico, Feb. 2-7, 2008.

Audience: Undergraduate Students.

Summary: The purpose of this course is to provide an overview of basic concepts as well as the recent advances and trends in 3D Computer Vision (3DCV) technology. In the first lecture, we will present the basic ideas that inspired researchers in the field and led to the most advanced 3DCV systems. Then in the second lecture, we will present different projects we are working on. The afternoon session (Lecture 3) will be more practical; we will present different software and hardware ingredients for building your own 3D vision system. We will conclude with an open discussion session in which we will discuss the future trends.

Course Syllabus

- Introduction and Basic Concepts
    - Introduction to Computer Vision, Modeling a Camera
    - Stereo Vision: Modeling a Pair of Cameras, Multiview Geometry
- Recent Advances in 3D Computer Vision
    - 3D Video, People detection and tracking, Distributed vision processing in smart camera networks.
    - Optical Motion Capture, 3D Digital Art, New Trends in Image Retrieval.
- Demo Time and Applications
    - People tracking with a single stereo camera
    - People tracking with a networked of heterogeneous camera system
- Summary, questions, and open discussion

List of Publications

Book chapters (1)

Journal papers with review (8 published, 2 under review)

International Conferences (23 accepted, 1 under review)

Domestic conferences and posters (16)

Following, I provide the details of publications classified according to different research topics.

1. 3D Shape analysis, recognition, and retrieval

Book Chapters

[1] Hamid Laga, "3D Shape Classification and Retrieval Using Heterogenous Features and Supervised Learning", in Machine Learning, Chapter 15, pp. 305-324. ISBN 978-953-7619-56-1, Hard cover, 450 pages, Edited by: Abdelhamid Mellouk and Abdennacer Chebira, Publisher: IN-TECH, January 2009.

Journals with review

[1]. Hamid Laga, "Supervised Learning of Class-specific Features for 3D Shape Classification and Retrieval", Submitted to IEICE transactions on Information and Systems 2009.

[2]. Hamid Laga and Hiroki Takahashi, "3D Model Databases and Tools", in the Journal of the Institute of Image Information and Television Engineers (ITE), Vol. 63, No. 2, pp.52-56, 2009 (paper in Japanese).

[3]. Hamid Laga and Masayuki Nakajima, "Supervised Learning of Salient 2D Views of 3D Models", The Journal of the Society for Art and Science, Vol. 7, No.4, pp.124-131, 2008.

[4]. Hamid LAGA, Masayuki Nakajima, Kunihiro Chihara, "Discriminative Spherical Wavelet Features for Content-based 3D Model Retrieval", International Journal on Shape Modeling, Vol.13, No.1, pp. 51-72, June 2007.

[5]. Hamid LAGA, Hiroki Takahashi, Masayuki Nakajima, "Spherical Parameterization and Geometry Image-based 3D Shape Similarity Estimation (CGS 2004 Special Issue)", The Visual Computer Journal, Vol.22, issue 5, pp. 324 – 331, May 2006.

[6]. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, "Scale-Space Processing of Point-Sampled Geometry for Efficient 3D Object Segmentation". IEICE Transactions on Information and Systems, Vol. E88-D, No. 5, pp. 963-970, May 2005.

International conferences

[1]. Hamid Laga and Masayuki Nakajima, "Supervised Learning of Similarity Measures for Content-based 3D Model Retrieval. In The 3rd International Conference on Large Scale Knowledge Resources (LKR), Lecture notes in Computer Science (Springer), Vol. 4938, pp.210-225, March 2008.

[2]. Hamid Laga and Masayuki Nakajima, "A Boosting Approach to Content-based 3D Model Retrieval", in the 5th International Conference on Computer Graphics and Interactive Techniques in Australasia and South East Asia GRAPHITE 2007, Perth - Australia, pp. 227-234, Nov. 2007.

[3]. Hamid Laga and Masayuki Nakajima, "Statistical Spherical Wavelet Moments for Content-based 3D Model Retrieval", Computer Graphics International (CGI 2007), RJ-Brazil, pp.47-54, May 2007.

[4]. Hamid Laga, Chihara K., and Nakajima, M. 3D model retrieval using spherical extent functions and wavelet descriptors. SHREC2006: 3D Model Retrieval Evaluation Contest UUCS-2006-030, pp28-31, Utrecht University, 2006.

[5]. Hamid LAGA, Hiroki Takahashi, Masayuki Nakajima, "Spherical Wavelet Descriptors for Content-based 3D Model Retrieval", IEEE International Conference on Shape Modeling and Applications (SMI2006), Sendai, Japan, pp75-85, June 2006 **[received the Best Paper Award]**.

[6]. Hamid LAGA, Hiroki Takahashi, Masayuki Nakajima, "Spherical Wavelet Descriptors for Content-based 3D Model Retrieval", International Workshop on Advanced Imaging Techniques (IWAIT), Japan, January 2006.

[7]. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, Scale-space Framework for Efficient Segmentation of Point-sampled Geometry, IWAIT 2005: International Workshop on Advanced Imaging Techniques, Korea, January 2005.

[8]. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, Scale-Space Processing of Point-Sampled Geometry for Efficient 3D Object Segmentation International Conference on Cyber worlds CW2004, Tokyo, Japan, pp.377-383, December 2004.

[9]. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, Geometry Image Matching for Similarity Estimation of 3D Shapes. Computer Graphics International CGI2004, Greece, pp490-496, June 2004

[10]. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, Geometry Image based Similarity Estimation for 3D Model Retrieval, Nicograph International 2004, Taiwan, pp.133-138, May 2004.

Posters

[1] Hamid Laga and Masayuki Nakajima, *Boosting Content-based 3D Model Retrieval,* In the 1st International Summer School on Computer Vision (ICVSS2007), Sicily, Italy, July 2007.

2. People detection and tracking

International conferences

[1]. Sofiane Yous, Hamid Laga, Kunihiro Chihara "People Detection and Tracking with World-Z map from a Single Stereo Camera", the 8th International Workshop on Visual Surveillance (VS 2008), ECCV 2008 Workshop, October 2008.

3. 3D Reconstruction

Journal papers

[1]. Hamid LAGA, Romanos Piperakis, Hiroki Takahashi, Masayuki Nakajima, "Radial Basis Function Based Approach for Polygon-free Reconstruction and Representation of 3D Objects from Range Data", The Journal of the Institute of Image Information and Television Engineers ITE, 57(11), pp.1526-1533, 2003.

International conferences

[1]. Jacob Montiel, Hamid Laga, and Masayuki Nakajima, "Prototype-based Intra-class Pose Recognition of Partial 3D Scans", to appear at NICOGRAPH International 2009.

3. Hamid LAGA, Piperakis Romanos; Takahashi Hiroki & Nakajima Masayuki, A Radial Basis Function Based Approach for 3D Object Modeling and Reconstruction, IWAIT 2003, International Workshop on Advanced Imaging Techniques, Japan, pp.139-144, January 2003.

4. Human Computer Interaction

International conferences

[1]. Luis Ricardo Sapaico, Hamid Laga, and Masayuki Nakajima, "The Use of Tongue Protrusion Gestures for Video-based Communication", to appear at the IEEE International Workshop on Human-Computer Interaction (HCI2009), an ICCV2009 Workshop.

[2]. Luis R.Sapaico, Hamid Laga, and Masayuki Nakajima, "Mouth Region Localization based on Gabor Features and

Active Appearance Models", to appear at NICOGRAPH International 2009.

5. Virtual Agents

Journal papers

[1]. Toshitaka Amaoka, Hamid Laga, and Masayuki Nakajima, "A Dynamic Model of the Personal Space of Virtual Agents for Non-verbal Communication in Virtual Worlds", Submitted to IEICE transactions on Information and Systems 2009.

International Conferences

[1]. Hamid Laga, Toshitaka Amaoka, and Masayuki Nakajima, "Modeling the Spatial Behavior of Virtual Agents in Groups for Non-verbal Communication in Virtual Worlds", to appear at the 3rd International Universal Communication Symposium (2009).

[2]. Toshitaka Amaoka, Hamid Laga, and Masayuki Nakajima, "Modeling the Personal Space of Virtual Agents for Behavior Simulation", to appear at the IEEE International Conference on Cyber Worlds (CW2009), Sept. 2009.

[3]. Toshitaka Amaoka, Hamid Laga, and Masayuki Nakajima, "Personal Space Modeling for Human-Computer Interaction", to appear at the 8th International Conference on Entertainment Computing ICEC'2009.

[4]. Toshitaka Amaoka, Hamid Laga, Suguru Saito, Masayuki Nakajima, "Personal Space-based modeling of relationships between people for new Human-Computer interaction", in the International Workshop on Advanced Imaging Techniques (IWAIT), January 2009.

Posters

[1]. Toshitaka Amaoka, Hamid Laga, and Masayuki Nakajiam, "Modeling the Personal Space of Virtual Agents for Behavior Simulation", in NICOGRAPH International Sept. 2009.

6. Image processing and analysis

Journal papers

[1]. Achour Karim; Zenati Nadia & Hamid LAGA, "Contribution to Image and Contours Restoration", Journal of Real-Time Imaging, Academic Press, Vol. 7, No 4, pp.315-326, August 2001.

International conferences

[1]. Karim Achour, Nadia Zenati, Hamid LAGA, Contribution to Restoration of Degraded Scene Images, Conference Africaine sur la Recherche en Informatique et en Automatique CARI98, Senegal, pp.523-532, October 1998 [Paper in French].

[2]. Karim Achour, Nadia Zenati, Hamid LAGA, M. Belhocine: Contribution to Restoration of Degraded Images, SSCC'98 International Conference on Systems, Signals, Control, Computers, South Africa, pp.22-24, 1998.

7. Non photo realistic rendering

International conferences with review

[1]. Xie Ning, Hamid Laga, Suguru Saito, and Masayuki Nakajima, "Contour-driven Brush Stroke Synthesis", Submitted to Siggraph Asia 2009 – Sketch and Applications.

[2]. Ning Xie, Suguru Saito, Hamid Laga, and Masayuki Nakajima, "Shape-driven Oriental Brush Stroke Synthesis", to appear at NICOGRAPH International 2009.

8. High Performance Computing for Vision and Graphics

Journal papers with review

[1]. Hamid Laga and Hiroki Takahashi, "CUDA (Compute Unified Device Architecture)", in the Journal of the Institute of Image Information and Television Engineers (ITE), Vol. 62, No. 4, pp. 64-69, 2009.

International Conferences

[1]. Sofiane Yous, Hamid Laga, Kunihiro Chihara, "GPU-based Shape from Silhouettes", the 5th International Conference on Computer Graphics and Interactive Techniques in Australasia and South East Asia GRAPHITE 2007, Perth - Australia, pp.71-77, Nov. 2007.

National conferences – not classified (13)

13. Luis Ricardo Sapaico, Hamid Laga, and Masayuki Nakajima, "Automatic Mouth Detection from Video Using Gabor Wavelets", to appear at the NICOGRAPH national conference (March 2009).

12. Ning Xie, Suguru Saito, Hamid Laga, and Masayuki Nakajima, "Oriental Brush Stroke Synthesis Using Dynamic Programming", to appear in the IEICE National Conference (March 2009).

11. Jacob Montiel. Hamid Laga, Suguru Saito, and Masayuki Nakajima, "Pose Recognition of Hand Scans Using Prototypes", to appear in the IEICE National Conference (March 2009).

10. Luis R. SAPAICO, Hamid LAGA, Suguru SAITO, Masayuki NAKAJIMA, "Tongue Detection from Video for Human-Computer Interaction", IEICE Annual Conference, Japan, March 2008.

9. Hamid Laga and Masayuki Nakajima, "Supervised Learning of Salient 2D Views of 3D Models", in the 23rd NICOGRAPH paper contest, Japan, November 2007 **[Best Paper Award].**

8. Hamid LAGA, Takahashi Hiroki; Suguru Saito & Nakajima Masayuki, A Multiscale Decomposition of Point-sampled 3D Objects, 119th IPSJ Technical Report on Graphics and CAD, Japan, May 2005.

7. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, A Scale-space Approach for Features of Intermediate Complexity Detection from Point-sampled 3D Objects, IEICE Annual Conference, Japan, pp.D-12-135, 2005.

6. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, Geometry Image Matching for Similarity Estimation of 3D Shapes, IEICE Annual Conference, Japan, pp.D-12-156, March 2004.

5. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, Boundary Constraints based Implicit Representation and Reconstruction of Complex 3D Objects, ITE Technical Report Vol.27, No.46, pp.29-32, July 2003

4. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, A Polygon-free based Approach for 3D Shape Transformation, IEICE Annual Conference, Japan, pp.D-12-88, March 2003

3. Hamid LAGA, Piperakis Romanos; Takahashi Hiroki & Nakajima Masayuki, 3D Object Reconstruction from Scanned Data using Radial Basis Functions and Volumetric Processing. Nicograph 2002, Japan, pp.133-138, Oct. 2002.

2. Hamid LAGA, Piperakis Romanos; Takahashi Hiroki & Nakajima Masayuki, A New Approach for Automatic Reconstruction of 3D Urban Objects, IEICE Annual Conference, Japan, pp. D-12-161, March 2002.

1. Hamid LAGA, Takahashi Hiroki & Nakajima Masayuki, A Markov Random Field based Method for Synthetic Aperture Radar Image Segmentation, IEICE Annual Conference, Japan, pp.D-12-6, March 2001.

Others (1)

1. Hamid Laga, Masaru Kono, "Content-based 3D Model Retrieval", TokyoTech Chronicle No.437, pp.8-12, Nov. 2008.

Research Proposal

Major research fields of my interest:

- Probabilistic estimation methods for surveillance.
- Person recognition, biometrics and material identification.

Other research fields

- Processing of mono- and multi-modal sensor data, data fusion
- Visualization and visual analysis

Title of the research proposal:

Challenges and Opportunities in Learning and Recognition of Objects from Internet-scale Visual Media.

Summary

The 21st century is the era of digital media where visual information are created, stored, and shared at large scale, thanks to the internet technology. This has created new challenging problems that current technologies fail to deal with. On the other hand, it creates new opportunities for solving pattern recognition problems that suffer from the lack of training data. This proposal focus is on:

1. When the identity of a person taken by a security camera takes committing an infraction, is unknown, can we automatically gather from the internet information about that person given only his facial image in the same way we use text-based search engines to find information based on text queries?
2. Detection of copyright infringement and illegal use of photographs of people: in fact existing text-based search tools of visual information cannot list up all websites that publish a photograph of a person since the text attached to photos are not reliable when used for illegal purposes.

The state-of-the art visual surveillance (people identification) systems identify people by comparing their images to pre-established databases (of wanted / suspicious people). Similarly, the state of the art internet technologies do not allow tracking images of people over the WWW when text data is not available. The challenging aspects are particularly in terms of *scalability* to the internet size and *robustness to noisy and sparse massive associated metadata* (say surrounding text, tags, and comments) of the pattern recognition and computer vision algorithms.

This proposal investigates on how to take the people identification to the internet scale by automatically searching for the identity of a person over the internet given **only his photograph**, and by using large-scale internet resources for supervised learning in pattern recognition. Finding, from internet, information about people given only their facial images facilitates information gathering and allows identifying suspicious people. This is an important step forward towards secure and safe society.

Application areas include robust person recognition in video surveillance, efficient probabilistic learning for object detection and recognition, and identity theft and copyright infringement detection.

Other projects

I am currently working on real-time registration for non-rigid partial scans applied to 3D reconstruction of objects undergoing rigid and non-rigid deformations during the scanning process. I believe also that this complements very well with the areas of interest of the Research Training Group (Sensor development for 2D/3D imaging, Processing of mono- and multi-modal sensor data, data fusion). I would like also to continue working on this project.