11th International Symposium on Visual Computing (ISVC'15)

December 14-16, 2015, Las Vegas, Nevada, USA

Contents

Final Program

11th International Symposium on Visual Computing (ISVC'15)

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Symposium Overview

	Monday 14th	Tuesday 15th	Wednesday 16th
8:30 am – 9:30 am	**Keynote** *(Ballroom 5)*		
9:40 am – 10:40 am	**Parallel Sessions** (Ballrooms 2-5)		
10:40 am – 11:10 am	*Coffee Break*		
11:10 am – 12:10 pm	**Parallel Sessions** (Ballrooms 2-5)		
12:10 pm – 1:30 pm	*Lunch Break* (on your own)		
1:30 pm – 2:30 pm	**Keynote** (Ballroom 5)	**Poster Session** * (Ballrooms 3-5)	**Keynote** (Ballroom 5)
2:40 pm – 3:40 pm	**Parallel Sessions** (Ballrooms 2-5)		
3:40 pm – 4:10 pm	*Coffee Break*		
4:10 pm – 6:00 pm	**Parallel Sessions** (Ballrooms 2-5)		

Registration Desk hours: Sunday, Dec 13th: 5pm - 8pm
Monday, Dec 14th – Wednesday, Dec 16th: 7:30am – 5:30pm

Banquet Dinner: Tuesday, Dec 15th: 7:00pm – 9:30pm (Ballrooms 1-2)

*The poster session runs from 1:30pm to 3:30pm.

Monday, Dcember 14th

8:30-9:30	*Keynote:* ***Ravi Ramamoorthi*****, University of California, San Diego, USA** (Ballroom 5)		
	Parallel Sessions		
9:40-12:10	**ST: Computational Bioimaging I** Chair: João Manuel R. S. Tavares ((Ballroom 5)		**Computer Graphics I** Chair: David Whittinghill (Ballroom 4)
	9:40	Graph-based visualization of neuronal connectivity using matrix block partitioning and edge bundling *Tim McGraw*	As-Rigid-As-Possible Character Deformation Using Point Handles *Zhiping Luo, Remco C. Veltkamp, and Arjan Egges*
	10:00	Fuzzy Skeletonization Improves the Performance of Characterizing Trabecular Bone Micro-Architecture *Cheng Chen, Dakai Jin, and Punam K. Saha*	Image Annotation Incorporating Low-Rankness, Tag and Visual Correlation and Inhomogeneous Errors *Yuqing Hou*
	10:20	Thermal Infrared Image Processing to Assess Heat Generated by Magnetic Nanoparticles for Hyperthermia Applications *Raquel O. Rodrigues, Helder T. Gomes, Rui Lima, Adrián M.T. Silva, Pedro J.S. Rodrigues, Pedro B. Tavares, João Manuel R.S. Tavares*	Extracting Surface Geometry from Particle-Based Fracture Simulations *Chakrit Watcharopas, Yash Sapra, Robert Geist, Joshua A. Levine*
10:40-11:10	*Coffee Break*		
	11:10	Visualization techniques for the developing chicken heart *Ly Phan, Cindy Grimm, and Sandra Rugonyi*	Time-varying surface reconstruction of an actor's performance *L. Blache, M. Desbrun, C. Loscos, and L. Lucas*
	11:30	InVesalius: An Interactive Rendering Framework for Health Care Support *Paulo Amorim, Thiago Moraes, Jorge Silva, and Helio Pedrini*	Interactive Procedural Building Generation Using Kaleidoscopic Iterated Function Systems *Tim McGraw*
	11:50		
9:40-12:10	**Motion and Tracking** Chair: Mircea Nicolescu (Ballroom 3)		**Segmentation I** Chair: Alireza Tavakkoli (Ballroom 2)
	9:40	Motion priors estimation for robust matching initialization in automotive applications *Nolang Fanani, Marc Barnada, and Rudolf Mester*	Segmentation of Partially Overlapping Nanoparticles Using Concave Points *Sahar Zafari, Tuomas Eerola, Jouni Sampo, Heikki Kalviainen, and Heikki Haario*
	10:00	Multi-target Tracking Using Sample-based Data Association for Mixed Images *Ting-hao Zhang, Hsiao-Tzu Chen, and Chih-Wei Tang*	Temporally Object-based Video Co-Segmentation *Michael Ying Yang, Matthias Reso, Jun Tang, Wentong Liao, and Bodo Rosenhahn*
	10:20	A Hierarchical Frame-by-Frame Association Method based on Graph Matching for Multi-Object Tracking *Sourav Garg, Ehtesham Hassan, Swagat Kumar and Prithwijit Guha*	An Efficient Non-Parametric Background Modeling Technique with CUDA Heterogeneous Parallel Architecture *Brandon Wilson and Alireza Tavakkoli*
10:40-11:10	*Coffee Break*		
	11:10	Experimental evaluation of rigid registration using phase correlation under illumination changes *Alfonso Alba and Edgar Arce-Santana*	Finding the N-cuts of Watershed Partitions for Image Segmentation *Chao Zhang and Sokratis Makrogiannis*
	11:30	Multi-modal Computer Vision for the Detection of multi-scale Crowd Physical Motions and Behavior in Confined Spaces *Zoheir Sabeur, Nikolaos Doulamis, Lee Middleton, Banafshe Arbab-Zafar , Gianluca Correndo and Aggelos Amditis*	A Novel Word Segmentation Method Based on Object Detection and Deep Learning *Tomas Wilkinson and Anders Brun*
	11:50	HMM based evaluation of physical therapy movements using Kinect tracking *Carlos Palma, Augusto Salazar, Francisco Vargas*	
12:10-1:30	*Lunch* (on your own)		

1:30-2:30	*Keynote:* ***Evan Suma***, **University of Southern California, USA** (Ballroom 5)		
	Parallel Sessions		
2:40-5:10	**Recognition I** Chair: Andrea Salgian (Ballroom 5)		**Visualization I** Chairs: Robert Geist (Ballroom 4)
	2:40	Estimating the Dominant Orientation of an Object Using Image Segmentation and Principal Component Analysis *Sravan Bhagavatula and Nashlie Sephus*	Visualizing Document Image Collections using Image-based Word Clouds *Tomas Wilkinson and Anders Brun*
	3:00	Label Propagation for Large Scale 3D Indoor Scenes *Keke Tang, Zhe Zhao, and Xiaoping Chen*	Guided Structure-Aligned Segmentation of Volumetric Data *Michelle Holloway, Anahita Sanandaji, Deniece Yates, Amali Krigger, Ross Sowell, Ruth West, and Cindy Grimm*
	3:20	Symmetry Similarity of Human Perception to Computer Vision Operators *Peter M Forrest and Mark S Nixon*	Examining Classic Color Harmony versus Translucency Color Guidelines for Layered Surface Visualization *Sussan Einakian, Timothy S. Newman*
3:40-4:10	*Coffee Break*		
	4:10	UT-MARO: Unscented Transformation and Matrix Rank Optimization for Moving Objects Detection in Aerial imagery Tracking *Agwad ElTantawy, Mohamed S. Shehata*	Guidance on the Selection of Central Difference Method Accuracy in Volume Rendering *Kazuhiro Nagai and Paul Rosen*
	4:30	Architectural Style Classification of Building Facade Towers *Gayane Shalunts*	Deep Learning of Neuromuscular Control for Biomechanical Animation *Masaki Nakada and Demetri Terzopoulos*
	4:50	Investigating pill recognition methods for a new National Library of Medicine image dataset *Daniela Ushizima, Allan Carneiro, Marcelo Souza, and Fatima Medeiros*	NEURONAV: A Tool for Image-Guided Surgery-Application to Parkinson's Disease *Jose Bestier Padilla, Ramiro Arango, Hernan F. Garcia, Hernan Dario Vargas Cardona, Alvaro A. Orozco, Mauricio A. Alvarez and Enrique Guijarro*
2:40-5:10	**ST: 3D Mapping, Modeling and Surface Reconstruction** Chair: Fabien Scalzo (Ballroom 3)		**ST: Advancing Autonomy for Aerial Robotics** Chair: Kostas Alexis (Ballroom 2)
	2:40	Generation of 3D/4D photorealistic building models. The testbed area for 4D Cultural Heritage World project: the historical center of Calw (Germany) *José Balsa-Barreiro and Dieter Fritsch*	Efficient Algorithms for Indoor MAV Flight using Vision and Sonar Sensors *Kyungnam Kim, David J. Huber, Jiejun Xu, Deepak Khosla*
	3:00	Visual Autonomy via 2D Matching in Rendered 3D Models *D. Tenorio, V. Rivera, J. Medina, A. Leondar, M. Gaumer, and Z. Dodds*	Victim Detection from a Fixed-wing UAV: Experimental Results *Anurag Sai Vempati, Gabriel Agamennoni, Thomas Stastny, and Roland Siegwart*
	3:20	Reconstruction of face texture based on the fusion of texture patches *Jerome Manceau, Renaud Seguier, Catherine Soladi*	Autonomous Robotic Aerial Tracking, Avoidance, and Seeking of a Mobile Human Subject *Christos Papachristos, Dimos Tzoumanikas, Kostas Alexis, and Anthony Tzes*
3:40-4:10	*Coffee Break*		
	4:10	Human Body Volume Recovery from Single Depth Image *Jaeho Yi, Seungkyu Lee, Sujung Bae, Moonsik Jeong*	Inspection Operations using an Aerial Robot Powered–over–Tether by a Ground Vehicle *Lida Zikou, Christos Papachristos, Kostas Alexis, and Anthony Tzes*
	4:30	Dense Correspondence and Optical Flow Estimation Using Gabor, Schmid and Steerable Descriptors *Ahmadreza Baghaie, Roshan M. D'Souza, and Zeyun Yu*	Autonomous guidance for a UAS along a staircase *Olivier De Meyst, Thijs Goethals, Haris Balta, Geert De Cubber, Rob Haelterman*
	4:50		Nonlinear Controller of Quadcopters for Agricultural Monitoring *Víctor H. Andaluz, et al.*

Tuesday, December 15th

8:30-9:30	*Keynote:* **Claudio Silva**, **New York University, USA** (Ballroom 5)		
	Parallel Sessions		
9:40-12:10	**Medical Imaging** Chair: Fabien Scalzo (Ballroom 5)		**Virtual Reality I** Chair: Xenophon Zabulis (Ballroom 4)
	9:40	Groupwise Shape Correspondences on 3D Brain Structures Using Probabilistic Latent Variable Models *Hernan F. Garcia, Mauricio A. Alvarez and Alvaro Orozco*	Lateral touch detection and localization for interactive, augmented planar surfaces *A. Ntelidakis, X. Zabulis, D. Grammenos and P. Koutlemanis*
	10:00	Automatic Segmentation of Extraocular Muscles Using Superpixel and Normalized Cuts *Qi Xing, Yifan Li, Brendan Wiggins, Joseph L. Demer and Qi Wei*	A Hybrid Real-time Visual Tracking Using Compressive RGB-D Features *Mengyuan Zhao, Heng Luo, Ahmad P.Tafti, Yuanchang Lin, and Guotian He*
	10:20	More Usable V-EGI for Volumetric Dataset Registration *Chun Dong and Timothy S. Newman*	High-Quality Consistent Illumination in Mobile Augmented Reality by Radiance Convolution on the GPU *Peter Kan, Johannes Unterguggenberger, and Hannes Kaufmann*
10:40-11:10	*Coffee Break*		
	11:10	A Robust Energy Minimization Algorithm for MSLesion Segmentation *Zhaoxuan Gong, Dazhe Zhao , Chunming Li, Wenjun Tan, Christos Davatzikos*	Efficient Hand Articulations Tracking using Adaptive Hand Model and Depth map *Byeongkeun Kang, Yeejin Lee, and Truong Q. Nguyen*
	11:30	Impact of the Number of Atlases in A Level Set Formulation of Multi-atlas Segmentation *Yihua Song, Zhaoxuan Gong, Dazhe Zhao, Chaolu Feng, and Chunming Li*	Eye Gaze Correction with a Single Webcam Based on Eye-Replacement *Yalun Qin, Kuo-Chin Lien, Matthew Turk, and Tobias Hollerer*
	11:50	Probabilistic Labeling of Cerebral Vasculature on MR Angiography *Benjamin Quachtran, Sunil Sheth, Jeffrey L. Saver, David S. Liebeskind,and Fabien Scalzo*	
9:40-12:10	**ST: Observing Humans** Chair: Kyungnam Kim (Ballroom 3)		**ST: Spectral Imaging Processing** Chair: Konstantinos Loupos (Ballroom 2)
	9:40	Gradient Local Auto-Correlations and Extreme Learning Machine for Depth-Based Activity Recognition *Chen Chen, Zhenjie Hou, Baochang Zhang, Junjun Jiang, and Yun Yang*	Learning Discriminative Spectral Bands for Material Classification *Chao Liu, Sandra Skaff, and Manuel Martinello*
	10:00	An RGB-D Camera based Walking Pattern Detection Method for Smart Rollators *He Zhang and Cang Ye*	A Deep Belief Network for Classifying Remotely-Sensed Hyperspectral Data *Justin H. Le, Ali Pour Yazdanpanah, Emma E. Regentova, and Venkatesan Muthukumar*
	10:20	Evaluation of Vision-based Human Activity Recognition in Dense Trajectory Framework *Hirokatsu Kataoka, Yoshimitsu Aoki, Kenji Iwata, Yutaka Satoh*	Variational Inference for Background Subtraction in Infrared Imagery *Konstantinos Makantasis, Anastasios Doulamis, and Konstantinos Loupos*
10:40-11:10	*Coffee Break*		
	11:10	Analyzing Activities in Videos Using Latent Dirichlet Allocation and Granger Causality *Dalwinder Kular and Eraldo Ribeiro*	Image Based Approaches for Tunnels' Defects Recognition Via Robotic Inspectors *Eftychios Protopapadakis and Nikolaos Doulamis*
	11:30	Statistical Adaptive Metric Learning for Action Feature Set Recognition in the Wild *Shuanglu Dai and Hong Man*	Deep Learning-Based Man-made Object Detection from Hyperspectral Data *Konstantinos Makantasis, Konstantinos Karantzalos, Anastasios Doulamis, and Konstantinos Loupos*
	11:50		Hyperspectral Scene Analysis via Structure From Motion *Corey A. Miller and Thomas J. Walls*
12:10-1:30	*Lunch* (on your own)		

1:30-3:30	**Poster Session** (Ballrooms 2-5)		
	Parallel Sessions		
3:30-6:00	**ST: Intelligent Transportation Systems** Chair: Brendan Morris (Ballroom 5)		**Visualization II** Chair: Daniela Ushizima (Ballroom 4)
	3:30	Detecting Road Users at Intersections Through Changing Weather Using RGB-Thermal Video *Chris Bahnsen and Thomas B. Moeslund*	Aperio: A System for Visualizing 3D Anatomy Data Using Virtual Mechanical Tools *T. McInerney and D. Tran*
	3:50	Safety Quantification of Intersections Using Computer Vision Techniques *Mohammad Shokrolah Shirazi and Brendan Morris*	Quasi-Conformal Hybrid Multi-modality Image Registration and Its Application to Medical Image Fusion *Ka Chun Lam and Lok Ming Lui*
4:10-4:40	*Coffee Break*		
	4:40	Vehicles Detection in Stereo Vision Based on Disparity Map Segmentation and Objects Classification *Djamila Dekkiche, Bastien Vincke and Alain Mérigot*	CINAPACT-Splines: A family of Infinitely Smooth, Accurate and Compactly Supported Splines *Bita Akram, Usman R. Alim, Faramarz F. Samavati*
	5:00	Traffic Light Detection at Night: Comparison of a Learning-based Detector and three Model-based Detectors *Morten B. Jensen, Mark P. Philipsen, Chris Bahnsen, Andreas Mogelmose, Thomas B. Moeslund, and Mohan M. Trivedi*	Vis3D+: An Integrated System for GPU-Accelerated Volume Image Processing and Rendering *I. Nisar and T. McInerney*
	5:20	Modelling and Experimental Study for Automated Congestion Driving *Joseph A. Urhahne, Patrick Piastowski, and Mascha C. van der Voort*	Ontology-based Visual Query Formulation: An Industry Experience *Ahmet Soylu, Evgeny Kharlamov, Dmitriy Zheleznyakov, Ernesto Jimenez-Ruiz, Martin Giese, and Ian Horrocks*
	5:40		
3:30-6:00	**ST: Visual Perception and Robotic Systems** Chair: Hung La (Ballroom 3)		**Applications I** Chair: Sokratis Makrogiannis (Ballroom 2)
	3:30	Dynamic Target Tracking and Obstacle Avoidance using a Drone *Alexander C. Woods and Hung M. La*	Hybrid Example-based Single Image Super-Resolution *Yang Xian, Xiaodong Yang, and Yingli Tian*
	3:50	An Interactive Node-Link Visualization of Convolutional Neural Networks *Adam W. Harley*	Automated habit detection system: A feasibility study *Hiroki Misawa, Takashi Obara, and Hitoshi Iyatomi*
4:10-4:40	*Coffee Break*		
	4:40	DPN-LRF: A Local Reference Frame for Robustly Handling Density Differences and Partial Occlusions *Shuichi Akizuki and Manabu Hashimoto*	Conductor Tutoring using the Microsoft Kinect *Andrea Salgian, Leighanne Hsu, Nathaniel Milkosky, David Vickerman*
	5:00	3D Perception for Autonomous Robot Exploration *Jiejun Xu, Kyungnam Kim, Lei Zhang, Deepak Khosla*	Lens Distortion Rectification Using Triangulation Based Interpolation *Burak Benligiray and Cihan Topal*
	5:20	Group Based Asymmetry - A Fast Saliency Algorithm *Puneet Sharma, and Oddmar Eiksund*	A Computer Vision System for Automatic Classification of Most Consumed Brazilian Beans *S. A. Araujo, W. A. L. Alves, P. A. Belan and K. P. Anselmo*
	5:40	Prototype of super-resolution camera array system *Daiki Hirao and Hitoshi Iyatomi*	
7:00-9:30	*Banquet Dinner* (Ballrooms 1-2) *Keynote:* **Luc Vincent, Google, USA**		

Wednesday, December 16th

8:30-9:30	*Keynote:* **Oncel Tuzel**, **Mitsubishi Electric Research Laboratories, USA** (Ballroom 5)		
	Parallel Sessions		
9:40-12:10	**3D Computer Vision** Chair: Paul Rosen (Ballroom 5)		**Computer Graphics II** Chair: Tim McGraw (Ballroom 4)
	9:40	Stereo-Matching in the Context of Vision Augmented Vehicles *Waqar Khan and Reinhard Klette*	Guided High-Quality Rendering *Thorsten Roth, Martin Weier, Jens Maiero, Andre Hinkenjann, and Yongmin Li*
	10:00	A Real-Time Depth Estimation Approach for a Focused Plenoptic Camera *Ross Vasko, Niclas Zeller, Franz Quint, and Uwe Stilla*	User-assisted Inverse Procedural Facade Modeling and Compressed Image Rendering *Huilong Zhuo, Shengchuan Zhou, Bedrich Benes, and David Whittinghill*
	10:20	Range Image Processing For Real Time Hospital-Room Monitoring *Alessandro Mecocci, Francesco Micheli, Claudia Zoppetti*	Facial Fattening and Slimming Simulation Based on Skull Structure *Masahiro Fujisaki and Shigeo Morishima*
10:40-11:10	*Coffee Break*		
	11:10	Real–time 3-D Surface Reconstruction from Multiple Cameras *Yongchun Liu, Huajun Gong, and Zhaoxing Zhang*	Many-Lights Real Time Global Illumination using Sparse Voxel Octree *Che Sun and Emmanuel Agu*
	11:30	Stereo Correspondence Evaluation Methods: A Systematic Review *Camilo Vargas, Ivan Cabezas, John W. Branch*	WebPhysics: A High Performance Physics Simulation Framework for Web Applications *Robert (Bo) Li,Tasneem Brutch, Guodong Rong, Yi Shen, and Chang Shu*
	11:50		
9:40-12:10	**Segmentation II** Chair: George Bebis (Ballroom 3)		**ST: Biometrics** Chair: Alireza Tavakkoli (Ballroom 2)
	9:40	A Markov Random Field and Active Contour Image Segmentation Model for Animal Spots Patterns *Alexander Gomez, German Diez, Jhony Giraldo, Augusto Salazar, and Juan M. Daza*	Segmentation of Saimaa ringed seals for identification purposes *Artem Zhelezniakov et al.*
	10:00	Segmentation of Building Facade Towers *Gayane Shalunts*	Fingerprint Matching with Optical Coherence Tomography *Yaseen Moolla, Ann Singh, Ebrahim Saith, and Sharat Akhoury*
	10:20	Effective Information and Contrast based Saliency Detection *Aditi Kapoor, K.K. Biswas, and M.Hanmandlu*	Improve Non-graph Matching Feature-based Face Recognition Performance by Using a Multi-stage Matching Strategy *Xianming Chen, Wenyin Zhang, Chaoyang Zhang, and Zhaoxian Zhou*
10:40-11:10	*Coffee Break*		
	11:10	Edge Based Segmentation of Left and Right Ventricles Using Two Distance Regularized Level Sets *Yu Liu, Yue Zhao, Shuxu Guo, Shaoxiang Zhang, and Chunming Li*	Neighbors Based Discriminative Feature Difference Learning for Kinship Verification *Xiaodong Duan and Zheng-Hua Tan*
	11:30	Automatic Crater Detection Using Convex Grouping and Convolutional Neural Networks *Ebrahim Emami, George Bebis, Ara Nefian, and Terry Fong*	A Comparative Analysis of Two Approaches to Periocular Recognition in Mobile Scenarios *Joao C. Monteiro et al.*
	11:50		
12:10-1:30	*Lunch* (on your own)		

1:30-2:30	*Keynote:* **Benjamin Kimia, Brown University, USA** (Ballroom 5)		
	Parallel Sessions		
2:40-4:50	**Applications II** Chair: Hitoshi Iyatomi (Ballroom 5)		**Pattern Classification** Chair: Marçal Rusiñol (Ballroom 4)
	2:40	Visual Perception and Analysis as First Steps Toward Human{Robot Chess Playing *Andreas Schwenk and Chunrong Yuan*	Automatic Verification of Properly Signed Multi-page Document Images *Marcal Rusinol, Dimosthenis Karatzas and Josep Llados*
	3:00	A Gaussian mixture representation of gesture kinematics for on-line Sign Language video annotation *Fabio Martınez, Antoine Manzaner, Michele Gouiffes, and Annelies Braffort*	CRFs and HCRFs based Recognition for Off-line Arabic Handwriting *Moftah Elzobi, Ayoub Al-Hamadi, Laslo Dings, and Sherif El-etriby*
	3:20	Automatic affect analysis: from children to adults *Rizwan Ahmed Khan, Alexandre Meyer, and Saida Bouakaz*	Classifying Frog Calls Using Gaussian Mixture Models *Dalwinderjeet Kular, Kathryn Hollowood, Olatide Ommojaro, Katrina Smart, Mark Bush, and Eraldo Ribeiro*
3:40-4:10	*Coffee Break*		
	4:10	A Study Of Hand Motion/Posture Recognition in Two-Camera Views *Jingya Wang and Shahram Payandeh*	Ice Detection on Electrical Power Cables *Binglin Li, Gabriel Thomas, Dexter Williams*
	4:30		Facial Landmark Localization using Robust Relationship Priors and Approximative Gibbs Sampling *Karsten Vogt, Oliver Muller and Jorn Ostermann*
	4:50		
2:40-4:50	**Recognition II** Chair: Minh-Triet Tran (Ballroom 3)		**Virtual Reality II** Chair: Amy Ulinski Banic (Ballroom 2)
	2:40	Off-the-Shelf CNN Features for Fine-Grained Classification of Vessels in a Maritime Environment *Fouad Bousetouane and Brendan Morris*	Relighting for an Arbitrary Shape Object under Unknown Illumination Environment *Yohei Ogura and Hideo Saito*
	3:00	Joint Visual Phrase Detection to Boost Scene Parsing *Keke Tang, Zhe Zhao, and Xiaoping Chen*	Evaluation of Fatigue Measurement using Human Motor Coordination for Gesture-Based Interaction in 3D Environments *Neera Pradhan, Angela Benavides, Qin Zhu, and Amy Ulinski Banic*
	3:20	If we did not have ImageNet: Comparison of Fisher Encodings and Convolutional Neural Networks on limited training data *Christian Hentschel, Timur Pratama Wiradarma, and Harald Sack*	JackVR: A Virtual Reality Training System for Landing Oil Rigs *Ahmed E. Mostafa, Kazuki Takashima, Mario Costa Sousa, and Ehud Sharlin*
3:40-4:10	*Coffee Break*		
	4:10	Realtime Face Verification with Lightweight Convolutional Neural Networks *Nhan Dam, Duc-Minh Pham, Vinh-Tiep Nguyen, Minh N. Do, Anh-Duc Duong, Minh-Triet Tran*	DAcImPro: A novel database of acquired image projections and its application to object recognition *Aleksandr Setkov, Fabio Martinez Carillo, Michele Gouiffes, Christian Jacquemin, Maria Vanrell, and Ramon Baldrich*
	4:30		Deformable Object Behavior Reconstruction Derived through Simultaneous Geometric and Material Property Estimation *Shane Transue and Min-Hyung Choi*

Poster Session (Ballrooms 2-5)

Tuesday, December 15th (1:30pm-3:30pm)

Accidental Fall Detection based on Skeleton Joint Correlation and Activity Boundary *Martha Magali Flores Barranco, Mario-Alberto Ibarra-Mazano, Irene Cheng*
Generalized Wishart processes for interpolation over diffusion tensor fields *Hernan Dario Vargas Cardona, Mauricio A. Alvarez and Alvaro A. Orozco*
Spatio-Temporal Fusion for Learning of Regions of Interests over Multiple Video Streams *Samaneh Khoshrou, Jaime S. Cardoso, Eric Granger, Luis F. Teixeira*
Patch Selection for Single Image Deblurring Based on a Coalitional Game *Jung-Hsuan Lin , Rong-Sheng Wang, Jing-wei Wang*
A Robust Real-Time Road Detection Algorithm Using Color and Edge Information *Jae-Hyun Nam, Seung-Hoon Yang, Woong Hu, Byung-Gyu Kim*
SeLibCV: A Service Library for Computer Vision Researchers *Ahmad P. Tafti, Hamid Hassannia, Dee Piziak, and Zeyun Yu*
Bicycle Detection using HOG, HSC and MLBP *Farideh Foroozandeh Shahraki, Ali Pour Yazdanpanah, Emma E. Regentova, and Venkatesan Muthukumar*
On Calibration and Alignment of Point Clouds in a Network of RGB-D Sensors for Tracking *George Xu and Shahram Payandeh*
SemanticWeb Technologies for Object Tracking and Video Analytics *Benoit Gauzere, Claudia Greco, Pierluigi Ritrovato, Alessia Saggese and Mario Vento*
Home Oriented Virtual e-Rehabilitation *Yogendra Patil, Iara Brandao, Guilherme Siqueira, and Fei Hu*
WHAT2PRINT: Learning Image Evaluation *Bohao She and Clark F. Olson*
Use of a Large Image Repository to Enhance Domain Dataset for Flyer Classification *Payam Pourashraf and Noriko Tomuro*
Illumination Invariant Robust Likelihood Estimator for Particle Filtering based Target Tracking *Buti Al Delail, Harish Bhaskar, M. Jamal Zemerly, Mohammed Al-Mualla*
Adaptive Flocking Control of Multiple Unmanned Ground Vehicles by Using a UAV *Mohammad Jafari, Shamik Sengupta, and Hung Manh La*
Basic Study of Automated Diagnosis of Viral Plant Diseases using Convolutional Neural Networks *Yusuke Kawasaki, Hiroyuki Uga, Satoshi Kagiwada, and Hitoshi Iyatomi*
Efficient Training of Evolution-COnstructed Features *Meng Zhang, Dah-Jye Lee*
Ground Extraction from Terrestrial LiDAR Scans using 2D-3D Neighborhood Graphs *Yassine Belkhouche, Prakash Duraisamy, and Bill Buckles*
Mass segmentation in Mammograms based on the combination of the Spiking Cortical Model (SCM) and the improved CV Model *Xiaoli Gao, Keju Wang, Yanan Guo, Zhen Yang, Yide Ma*

Poster Session (cont'd) (Ballrooms 2-5)

Tuesday, December 15th (1:30pm-3:30pm)

High Performance and Ecient Facial Recognition Using Norm of ICA/Multiwavelet Features *Ahmed Aldhahab, George Atia, and Wasfy B. Mikhael*
Dynamic Hand Gesture Recognition Using Generalized Time Warping and Deep Belief Networks *Cristian A. Torres-Valencia, Hernan F. Garcia, German A. Holguin, Mauricio A. Alvarez and Alvaro Orozco*
Gaussian processes for slice-based super-resolution MR images *Hernan Darıo Vargas Cardona, Andres F. Lopez-Lopera, Alvaro A. Orozco, Mauricio A. Alvarez, Juan Antonio Hernandez Tamames and Norberto Malpica*
Congestion-Aware Warehouse Flow Analysis and Optimization *Sawsan AlHalawani and Niloy J. Mitra*
Building of readable decision trees for automated melanoma discrimination *Keiichi Ohki, M.Emre Celebi, Gerald Schaefer, and Hitoshi Iyatomi*
A Novel Infrastructure for Supporting Display Ecologies *Christian Eichner, Martin Nyolt and Heidrun Schumann*
Visualizing Software Metrics in a Software System Hierarchy *Michael Burch*
Region Growing Selection Technique for Dense Volume Visualization *Lionel B. Sakou, Daniel Wilches, and Amy Banic*
Computing Voronoi Diagrams of Line Segments in R^k in O(n log n) Time *Jeffrey W. Holcomb, Jorge A. Cobb*
Visualizing Aldo Giorgini's Ideal Flow *Esteban Garcia Bravo and Tim McGraw*
Restoration of Blurred-noisy Images through the concept of Bilevel Programming *Jessica Wong Soo Mee and Chan Chee Seng*
Free-Form Tetrahedron Deformation *Ben Kenwright*
Vision-based Vehicle Counting with High Accuracy for Highways with Perspective View *Mohammad Shokrolah Shirazi and Brendan Morris*
Automatic Motion Classification for Advanced Driver Assistance Systems *Alok Desai, Dah-Jye Lee and Shreeya Mody*
Shared Autonomy Perception and Manipulation of Physical Device Controls *Matthew Rueben and William D. Smart*
Condition Monitoring for Image-Based Visual Servoing Using Kalman Filter *Mien Van, Denglu Wu, Shuzi Sam Ge, Hongliang Ren*
Innovative Virtual Reality application for road safety education of children in urban areas *Taha Ridene, Laure Leroy, and Safwan Chendeb*

KEYNOTE TALK

Monday, December 14, 2015

8:30 AM – 9:30 AM / Ballroom 5

ISVC 2015: 11th International Symposium on Visual Computing

Sampling and Reconstruction of High-Dimensional Visual Appearance

Ravi Ramamoorthi

University of California, San Diego, USA

Abstract

Many problems in computer graphics and computer vision involve high-dimensional 3D-8D visual datasets. Real-time image synthesis with changing lighting and view is often accomplished by pre-computing the 6D light transport function (2 dimensions each for spatial position, incident lighting and viewing direction). Realistic image synthesis also often involves acquisition of appearance data from real-world objects; a BRDF (Bi-Directional Reflection Distribution Function) that measures the scattering of light at a single surface location is 4D and spatial variation and subsurface scattering involve 6D-8D functions. In computer vision, problems like lighting insensitive facial recognition similarly involve understanding the space of appearance variation across lighting and view. Since hundreds of samples may be required in each dimension, and the total size is exponential in the dimensionality brute force acquisition or pre-computation is often not even feasible. In this talk, we describe a signal-processing approach that exploits the coherence, sparsity and inherent low-dimensionality of the visual data, to derive novel efficient sampling and reconstruction algorithms. We describe a variety of new computational methods and applications, from affine wavelet transforms for real-time rendering with area lights, to space-time and space-angle frequency analysis for motion blur and global illumination, to compressive light transport acquisition. In computer vision, we introduce a new framework of differential photometric reconstruction to tame the complexity of real-world reflectance functions. The results point toward a unified sampling theory applicable to many areas of signal processing, computer graphics and computer vision.

Speaker Bio-Sketch: Ravi Ramamoorthi is a professor of Computer Science and Engineering at the University of California, San Diego, and Director of the UC San Diego Center for Visual Computing. He joined the department in Jul 2014, moving from a tenured faculty appointment at the EECS department in UC Berkeley, where he had been since January 2009. Earlier, he was on the faculty of the Computer Science Department at Columbia University since August 2002, when he received his PhD from Stanford University. He obtained his BS and MS degrees in computer science and physics from the California Institute of Technology in 1998. Prof. Ramamoorthi is an author of more than 100 refereed publications in computer graphics and computer vision, including 50 at ACM SIGGRAPH/TOG, and has played a key role in building multi-faculty research groups that have been recognized as leaders in computer graphics and computer vision at Columbia, Berkeley and UCSD. His research has been recognized with a half-dozen early career awards, including the ACM SIGGRAPH Significant New Researcher Award in computer graphics in 2007, and the Presidential Early Career Award for Scientists and Engineers (PECASE) for his work in physics-based computer vision in 2008. Prof. Ramamoorthi's work has had substantial impact in industry, with techniques like spherical harmonic lighting being adopted in industry-standard RenderMan software, and widely used in interactive applications and movie productions; he has consulted with Pixar and startups in computational imaging. He has graduated more than 20 postdoctoral, Ph.D. and M.S. students, many of whom have taken positions at leading universities or research labs, and he has taught the first open online course in computer graphics as one of the first nine classes on the EdX platform, with more than 80,000 registrations to date and a Chinese translation available via XuetangX; his online videos have been watched more than 300,000 times.

KEYNOTE TALK
Monday, December 14, 2015
1:30 PM – 2:30 PM / Ballroom 5

ISVC 2015: 11th International Symposium on Visual Computing

Making Small Spaces Feel Large: Practical Illusions in Virtual Reality

Evan Suma
University of Southern California

Abstract

Over the past few years, virtual reality has experienced a remarkable resurgence. Fueled by a proliferation of consumer-level head-mounted display and motion tracking devices, an unprecedented quantity of immersive experiences and content has become available for both desktop and mobile VR platforms. However, the problem of locomotion - human movement through a virtual world - remains a significant practical challenge. Many of the VR applications available to date require seated use or limit body movement within a small area, instead relying a gamepad or mouse/keyboard for movement within the virtual environment. Lacking support for natural walking, these virtual locomotion mechanisms do not fully replicate the physical and perceptual cues from the real world and subsequently often fall short in maintaining the illusion that the user has been transported to another location. In this talk, I will introduce a number of perceptual illusions that can overcome the spatial limitations imposed by the real world. This approach, known as redirected walking, has stunning potential to fool the senses. I will present a series of perceptual experiments that have convinced users that they were walking along a straight path while actually traveling in a circle, or that the virtual environment was much larger than it actually was. Additionally, I will discuss algorithmic approaches that leverage these illusory techniques for the dynamic exploration of arbitrary virtual environments, thus enabling the creation of systems that can automatically steer users away from the boundaries of the physical space while walking through a potentially infinite virtual world.

Speaker Bio-Sketch: Evan Suma is the Associate Director of the MxR Lab at the Institute for Creative Technologies and a Research Assistant Professor in the Department of Computer Science at the University of Southern California. He received his Ph.D. in 2010 from the Department of Computer Science at the University of North Carolina at Charlotte. His interests broadly include the research and development of techniques and technologies that enhance immersive virtual environments and 3D human-computer interfaces. He is also particularly interested in leveraging virtual reality for the empirical study of human perception and cognition Dr. Suma has written or co-authored over 60 academic publications, eight of which have been recognized with conference awards, and is a five-time SIGGRAPH presenter. His gesture interaction middleware toolkit (FAAST) has been widely adopted by the research and hobbyist communities, and his online research videos have been viewed over 2.4 million times. His team received first place at the 2015 SIGGRAPH Immersive Realities AR/VR Contest.

KEYNOTE TALK
Tuesday, December 15, 2015
8:30 AM – 9:30 AM / Ballroom 5

ISVC 2015: 11th International Symposium on Visual Computing

Visualization and Analysis of Urban Data

Cláudio Silva
New York University

Abstract

Today, 50% of the world's population lives in cities and the number will grow to 70% by 2050. Urban data opens up many new opportunities to improve cities and people's lives. In NYC, by integrating and analyzing data sets from multiple city agencies, the Bloomberg administration was able improve the success rate of inspections. A marked reduction in crime both in New York and Los Angeles has been in part attributed to data-driven policing. Policy changes have also been triggered by data-driven studies that, for example, showed correlations between foreclosures and increase in crime, the effects of subsidized housing on surrounding neighborhoods, and how low income households use the flexibility provided by vouchers to reach neighborhoods with high performing schools. But in each of these successes, the level of effort required to gather, integrate, analyze the relevant data, design and refine models, or develop and deploy apps, is staggering. Further as data volumes and data complexity continue to explode, these problems are only getting worse. In this talk, we will provide an overview of research in the development of new methods and systems for enabling interdisciplinary teams to better understand cities. We will also show some applications of our work.

Speaker Bio-Sketch: Cláudio Silva is a professor of computer science and engineering and data science at New York University. Claudio's research lies in the intersection of visualization, data analysis, and geometric computing, and recently he has been interested in the analysis of urban data and sports analytics. He has published over 220 journal and conference papers, is an inventor of 12 US patents. His work received over 10,000 citations according to Google Scholar and an h-index of 50. Cláudio has served on the editorial boards of several journals, including IEEE Transactions on Big Data, ACM Transactions on Spatial Algorithms and Systems, Computer Graphics Forum, The Visual Computer, Graphical Models, Computer and Graphics, Computing in Science and Engineering, and IEEE Transactions on Visualization and Computer Graphics. He helped developed a number of award-winning software systems, most recently Major League Baseball (MLB) MLB.com's Statcast player tracking system. He is an IEEE Fellow and was the recipient of the 2014 IEEE VGTC Visualization Technical Achievement Award "in recognition of seminal advances in geometric computing for visualization and for contributions to the development of the VisTrails data exploration system." He is currently Chair of the IEEE Technical Committee on Visualization and Graphics.

BANQUET KEYNOTE TALK
Tuesday, December 15, 2015
8 PM – 9 PM / Ballrooms 1-2

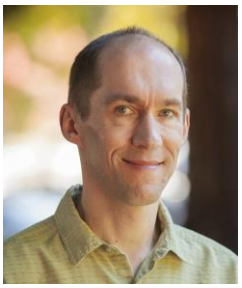
ISVC 2015: 11th International Symposium on Visual Computing

Google Street View: Overview & Computer Vision Challenges

Luc Vincent
Google, USA

Abstract

From its humble beginnings in 2007, Google Street View has grown to become a global product available in over 50 countries, and an indispensable feature of Google Maps. It is the result of a massive engineering effort by a team including software engineers, product managers, optical designers, mechanical engineers, UI designers, computer vision scientists, operations experts, and scores of others. The initial vision for Street View was provided by Google co-founder Larry Page: back in 2002, he personally collected street scene videos from his moving car in order to bootstrap a new research initiative focused on making street level imagery useful. Turning this initial vision into a product required developing major new pieces of technology, including robust data collection platforms (vans, cars, tricycles, snowmobiles, "trekkers", etc.), systems for computing accurate pose from imperfect sensors, various software components to stitch, blend, color correct and warp collected imagery, a number of systems to address privacy issues, and a lot more. This presentation will give an overview and brief history of the Street View project, and highlight some of the unique computer vision challenges that are keeping the engineering team busy.



Speaker Bio-Sketch: Luc Vincent joined Google in 2004 to work on the Google Books project. While he was ramping up Google's Optical Character Recognition efforts, he got involved in an early stage project whose goal was to capture a large amount of street level imagery and make it universally accessible and useful. Under Luc's leadership, this project became Google Street View and launched officially in May 2007. Luc is now an engineering director in charge of Street View and other map-related imagery projects. Before Google, Luc was Chief Scientist, and then Vice President of Document Imaging at LizardTech, a developer of advanced image compression software. Prior to this, he led an R&D team at the prestigious Xerox Palo Alto Research Center (PARC). He was also Director of Software Development at Scansoft (now Nuance) and held various technical management and individual contributor positions at Xerox Corporation. Luc has over 60 publications in the area of computer vision, image analysis, and document understanding. He has served as an Associate Editor for the IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), and for the Journal of Electronic Imaging. He has also chaired SPIE's conferences on Document Recognition, the International Symposium on Mathematical Morphology (ISMM), and been in the program committee of numerous conferences and workshops. Luc earned his B.S. from Ecole Polytechnique, M.S. in Computer Science from University of Paris XI, and PhD in Mathematical Morphology from the Ecole des Mines de Paris in 1990.

KEYNOTE TALK
Wednesday, December 16, 2015
8:30 AM – 9:30 AM / Ballroom 5

ISVC 2015: 11th International Symposium on Visual Computing

Machine vision for robotic bin-picking: Sensors and algorithms

Oncel Tuzel
Mitsubishi Electric Research Laboratories (MERL)

Abstract

For over four years, at MERL, we have worked on the robot "bin-picking" problem: using a 2D or 3D camera to look into a bin of parts and determine the pose, 3D rotation and translation, of a good candidate to pick up. We have solved the problem several different ways with several different sensors. I will briefly describe the sensors and the algorithms. In the first half of the talk, I will describe the Multi-Flash camera, a 2D camera with 8 flashes, and explain how this inexpensive camera design is used to extract robust geometric features, depth edges and specular edges, from the parts in a cluttered bin. I will present two pose estimation algorithms, (1) Fast directional chamfer matching-- a sublinear time line matching algorithm and (2) specular line reconstruction, for fast and robust pose estimation of parts with different surface characteristics. In the second half of the talk, I will present a voting-based pose estimation algorithm applicable to 3D sensors. We represent three-dimensional objects using a set of oriented point pair features: surface points with normals and boundary points with directions. I will describe a max-margin learning framework to identify discriminative features on the surface of the objects. The algorithm selects and ranks features according to their importance for the specified task which leads to improved accuracy and reduced computational cost.

Speaker Bio-Sketch: Oncel Tuzel is a senior principal member of the research staff in Mitsubishi Electric Research Laboratories, Cambridge. He received his BS and the MS degrees in computer engineering from the Middle East Technical University, Ankara, Turkey in 1999 and 2002 respectively, and the Ph.D. from the computer science department at Rutgers University in 2008. Prior to his Ph.D., Oncel worked as a lead software engineer for four years in Ankara, Turkey developing 3D games and simulations. His research interests are broadly in computer vision, machine learning and robotics. His current research topics include deep learning and structured learning for scene labeling and object classification, learning based image enhancement and reinforcement learning. He has co-authored over 40 peer-reviewed publications and holds 25 patents. His work has received the best paper runner-up award in 2007 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), honorable mention award in 2015 Robotics Science and Systems Conference (RSS), and the 2014 R&D 100 award-- awarded to 100 most innovative technology introduced in 2013.

KEYNOTE TALK

Wednesday, December 16, 2015
1:30 PM– 2:30 PM / Ballroom 5

ISVC 2015: 11th International Symposium on Visual Computing
Las Vegas, NV, USA

Back to the Drawing Board: Extracting 3D Drawings from Multiview Imagery

Benjamin B. Kimia
Brown University

Abstract

The three-dimensional reconstruction of scenes from multiple view geometry has made impressive strides in recent years, chiefly by methods correlating isolated feature point and intensities across views. In the general setting, i.e., without requiring controlled acquisition, limiting the number of objects, or requiring patterns on objects, the vast majority of these methods produce unorganized point clouds, meshes, or voxel representations of the reconstructed scene. Many applications, e.g., robotics, urban planning, and industrial design, however, require structured representations, which make explicit 3D curves, 3D surfaces, and their spatial relationships. We present an approach to produce a **3D drawing** of a scene, i.e., a set of 3D curve fragments together with their spatial relations captured in the form of a graph, from a large set of multiview data. The 3D drawing is complementary to extracting surface representations which can now be constrained by the 3D drawing acting like a scaffold to hang on the computed representations, leading to increased robustness and quality of reconstruction. The integration of curve geometry is a promising direction for multiview reconstruction.

Speaker Bio-Sketch: Benjamin Kimia is a Professor in the Department of Electrical Sciences and Computer Engineering at **Brown University** School of Engineering. He is also the associate director of the Laboratory for Engineering Man/Machine Systems (LEMS), an interdisciplinary group focused on signal and image processing, control, multimedia, and computer engineering. Dr. Kimia received the B.Eng. Honors degree from McGill University, Montreal, Canada in 1982, followed by M. Eng. (1986) and Ph.D. (1991) degrees in the areas of Computer Vision and Image Processing. Prof. Kimia's current research interests are focused on mathematical, psychophysical, and computational models for visual processing with applications to assistive devices for the visually impaired, medical imaging, animal behavior analysis, digital archaeology. His research program is based on skeletal representations of shapes and images, multiview reconstructions based on differential geometry, etc.

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