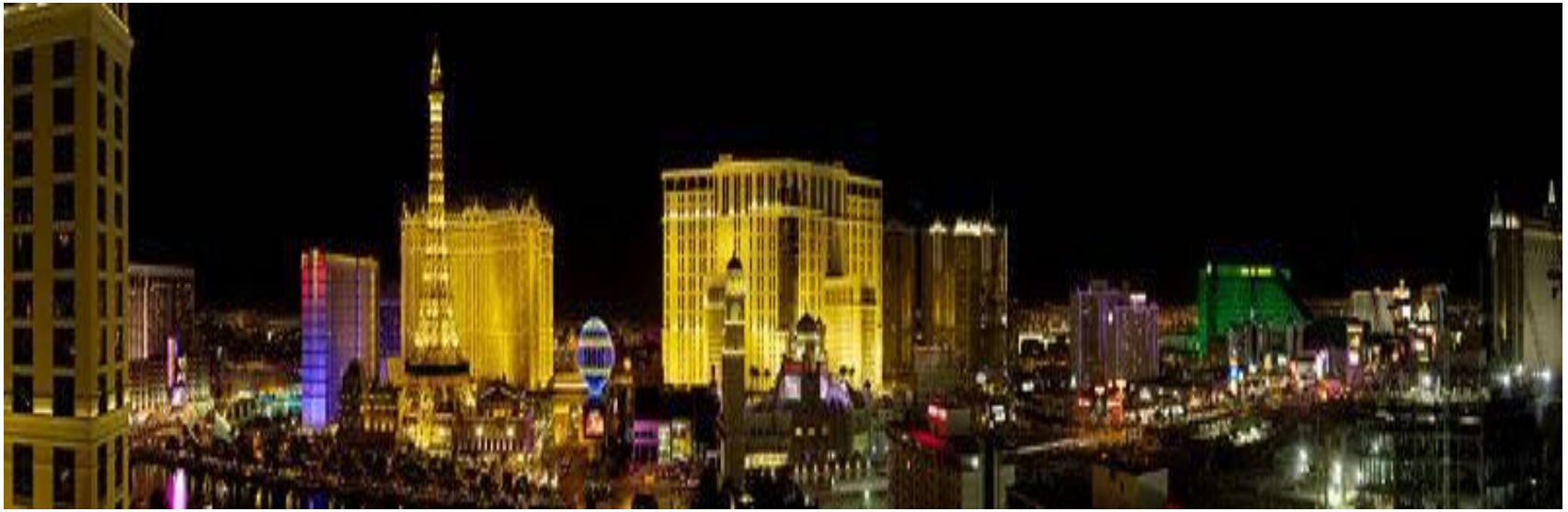
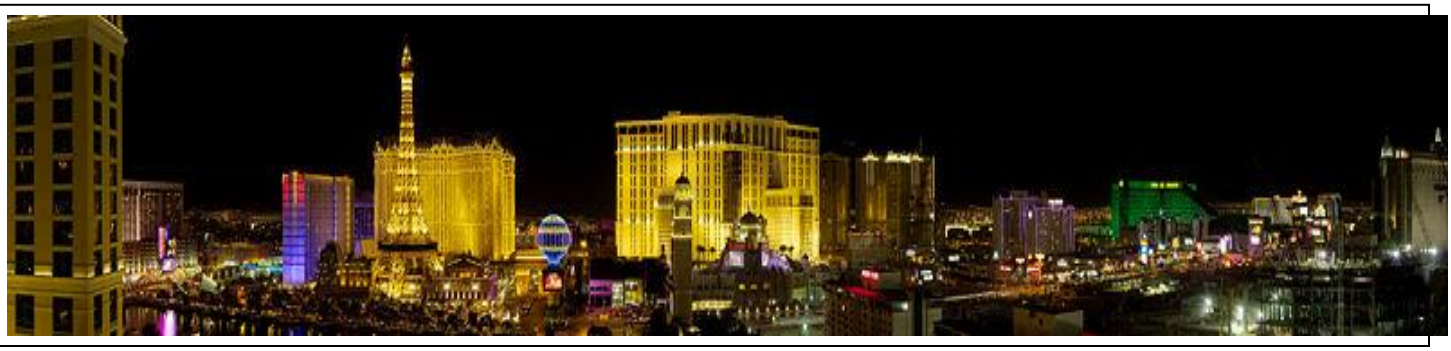
12th International Symposium on Visual Computing (ISVC'16)

December 12-14, 2016, Las Vegas, Nevada, USA



Contents



Final Program
12th International Symposium on Visual Computing (ISVC'16)
December 12-14, 2016, Las Vegas, Nevada, USA

Symposium Overview

	Monday 12th	Tuesday 13th	Wednesday 14th
8:30 am – 9:30 am	**Keynote**		
9:40 am – 10:40 am	**Parallel Sessions**		
10:40 am – 11:10 am	*Coffee Break*		
11:10 am – 12:10 pm	**Parallel Sessions**		
12:10 pm – 1:30 pm	*Lunch Break* (on your own)		
1:30 pm – 2:30 pm	**Keynote**	**Parallel Sessions**	**Keynote**
2:40 pm – 3:40 pm	**Parallel Sessions**	**Parallel Sessions**	**Poster Session***
3:40 pm – 4:10 pm	*Coffee Break***		
4:10 pm – 5:10 pm	**Parallel Sessions**		

Registration Desk hours: Sunday: 5pm - 8pm
Monday – Wednesday: 7:30am – 5:00pm

Banquet Dinner & Keynote: Tuesday: 6:00pm – 9:00pm

*The poster session runs from 2:40pm to 5:00pm.
**On Tuesday, December 13th, the afternoon coffee break is 2:30pm – 3:00pm

Monday, December 12th

8:30-9:30	*Keynote: **James Rehg**, Georgia Institute of Technology, USA* (Ballrooms 313 & 316)		
	Parallel Sessions		
9:40-12:10	**ST: Computational Bioimaging** Chair: Mohamed Shehata (Ballrooms 313 & 316)		**Computer Graphics I** Chair: Takashi Kanai (Ballroom 309)
	9:40	Similarity Metric Learning for 2D to 3D Registration of Brain Vasculature *Alice Tang, Fabien Scalzo*	Adding Turbulence Based on Low-Resolution Cascade Ratios *Masato Ishimuroya and Takashi Kanai*
	10:00	Automatic Optic Disk Segmentation in presence of Disk Blurring *Samra Irshad, Xiaoxia Yin, Lucy Qing Li and Umer Salman*	Creating Feasible Reflectance Data For Synthetic Optical Flow Datasets *Burkhard Gussefeld, Katrin Honauer, Daniel Kondermann*
	10:20	An object splitting model using higher-order active contours for single-cell segmentation *Jozsef Molnar, Csaba Molnar, and Peter Horvath*	Automatic Web Page Coloring *Polina Volkova, Soheila Abrishami, Piyush Kumar*
10:40-11:10	*Coffee Break*		
	11:10	Tensor Voting Extraction of Vessel Centerlines from Cerebral Angiograms *Yu Ding, Mircea Nicolescu, Dan Farmer, Yao Wang, George Bebis, Fabien Scalzo*	Automatic Content-Aware Non-Photorealistic Rendering of Images *Akshay Gadi Patil and Shanmuganathan Raman*
	11:30	Stacked Autoencoders for Medical Image Search *S. Sharma, I. Umar, L. Ospina, D. Wong, H.R. Tizhoosh*	Improved Aircraft Recognition for Aerial Refueling through Data Augmentation in Convolutional Neural Networks *Robert Mash, Brett Borghetti, John Pecarina*
	11:50	CutPointVis: An Interactive Exploration Tool for Cancer Biomarker Cutpoint Optimization *Lei Zhang, Ying Zhu*	
9:40-12:10	**Motion and Tracking** Chair: Mircea Nicolescu (Ballrooms 314 & 315)		**Segmentation** Chair: Laszlo Varga (Ballroom 311)
	9:40	Detecting Tracking Failures From Correlation Response Maps *Ryan Walsh, Henry Medeiros*	Stereo-Image Normalization of Voluminous Objects improves Textile Defect Recognition *Dirk Siegmund, Arjan Kuijper, and Andreas Braun*
	10:00	Real-time Multi-Object Tracking with Occlusion and Stationary Objects Handling for Conveying Systems *Adel Benamara, Serge Miguet, and Mihaela Scuturici*	Reliability-Based Local Features Aggregation for Image Segmentation *Fariba Zohrizadeh, Mohsen Kheirandishfard, Kamran Ghasedidizaji, and Farhad Kamangar*
	10:20	Fast, Deep Detection and Tracking of Birds and Nests *Qiaosong Wang, Christopher Rasmussen, Chunbo Song*	Chan-Vese Revisited: Relation to Otsu's Method and a Parameter-Free Non-PDE Solution via Morphological Framework *Arie Shaus and Eli Turkel*
10:40-11:10	*Coffee Break*		
	11:10	Camera Motion Estimation with Known Vertical Direction in Unstructured Environments *Jae-Hean Kim and Jin Sung Choi*	Image Enhancement by Volume Limitation in Binary Tomography *Laszlo Varga, Zoltan Ozsvar, and Peter Balazs*
	11:30	A Multiple Object Tracking Evaluation Analysis Framework *Dao Huu Hung, Do Anh Tuan, Nguyen Ngoc Khanh, Tran Duc Hien, and Nguyen Hai Duong*	Resolution-independent superpixels based on convex constrained meshes without small angles *Jeremy Forsythe, Vitaliy Kurlin, Andrew Fitzgibbon*
	11:50		Optimizing Intersection-Over-Union in Deep Neural Networks for Image Segmentation *Md Atiqur Rahman and Yang Wang*
12:10-1:30	*Lunch* (on your own)		

1:30-2:30	*Keynote: **Daniel Keefe**, **University of Minnesota, USA*** (Ballrooms 313 & 316)		
	Parallel Sessions		
2:40-5:10	**Pattern Recognition I** Chair: Clark Olson (Ballrooms 313 & 316)		**Visualization I** Chairs: Holger Theisel (Ballroom 309)
	2:40	A Mobile Recognition System for Analog Energy Meter Scanning *Martin Cerman, Gayane Shalunts, and Daniel Albertini*	Adaptive Isosurface Reconstruction Using a Volumetric-Divergence-Based Metric *Cuilan Wang and Shuhua Lai*
	3:00	Towards Landmine Detection Using Ubiquitous Satellite Imaging *Sahar Elkazaz, Mohamed E. Hussein, Ahmed El-Mahdy, and Hiroshi Ishikawa*	Large Image Collection Visualization Using Perception-Based Similarity with Color Features *Zeyuan Chen and Christopher G. Healey*
	3:20	Robustness of rotation invariant descriptors for texture classification *Raissa Tavares Vieira, Tamiris Trevisan Negri, and Adilson Gonzaga*	Chasing Rainbows: A Color-Theoretic Framework for Improving and Preserving Bad Colormaps *Robert Sisneros, Mohammad Raji, Mark W. Van Moer, and David Bock*
3:40-4:10	*Coffee Break*		
	4:10	Feature evaluation for handwritten character recognition with regressive and generative Hidden Markov Models *Kalyan Ram Ayyalasomayajula, Carl Nettelblad, Anders Brun*	Interpolation-Based Extraction of Representative Isosurfaces *Oliver Fernandes, Steffen Frey and Thomas Ertl*
	4:30	DeTEC: Detection of Touching Elongated Cells in SEM Images *A. Memariani, C. Nikou, B.T. Endres, E. Basseres, K.W. Garey, and I.A. Kakadiaris*	Image-based post-processing for realistic real-time rendering of scenes in the presence of fluid simulations and Image-Based Lighting *Julian Puhl, Martin Knuth, and Arjan Kuijper*
	4:50	Object Detection Based on Image Blur Using Spatial-Domain Filtering with Haar-like Features *Ryusuke Miyamoto and Shingo Kobayashi*	
2:40-5:10	**ST: 3D Mapping, Modeling and Surface Reconstruction** Chair: Yoshinori Kuno (Ballrooms 314 & 315)		**ST: Advancing Autonomy for Aerial Robotics** Chair: Kostas Alexis (Ballroom 311)
	2:40	An Efficient Algorithm for Feature-based 3D Point Cloud Correspondence Search *Zili Yi, Yang Li, and Minglun Gong*	Real-Time Detection and Tracking of Multiple Humans from High Bird's-Eye Views in the Visual and Infrared Spectrum *Julius Kummerle, Timo Hinzmann, Anurag Sai Vempati and Roland Siegwart*
	3:00	Extraction of Vascular Intensity Directional Derivative on Computed Tomography Angiography *Elijah Agbayani, Baixue Jia, Graham Woolf, David Liebeskind, Fabien Scalzo*	Combining visual tracking and person detection for long term tracking on a UAV *Gustav Hager, Goutam Bhat, Martin Danelljan, Fahad Shahbaz Khan, Michael Felsberg, Piotr Rudl, Patrick Doherty*
	3:20	Capturing Photorealistic and Printable 3D Models Using Low-Cost Hardware *Christoph Heindl, Sharath Chandra Akkaladevi, and Harald Bauer*	Monocular Visual-Inertial SLAM for Fixed-Wing UAVs Using Sliding Window Based Nonlinear Optimization *Timo Hinzmann, Andreas Schaffner, Simon Lynen, Roland Siegwart, and Igor Gilitschenski*
3:40-4:10	*Coffee Break*		
	4:10	Improved Stereo Vision of Indoor Dense Suspended Scatterers Scenes from De-scattering Images *Chanh D. Tr, Nguyen, Kyeong Yong Cho, You Hyun Jang, Kyung Soo Kim and Soo Hyun Kim*	Change Detection and Object Recognition using Aerial Robots *Shehryar Khattak, Christos Papachristos, Kostas Alexis*
	4:30	Fully Automatic and Robust 3D Modeling for Range Scan Data of Complex 3D Objects *Jungjae Yim and Guoliang Fan*	Parallelized Iterative Closest Point for Autonomous Aerial Refueling *Jace Robinson, Matt Piekenbrock, Lee Burchett, Scott Nykl, Brian Woolley, Andrew Terzuoli*
	4:50		Distributed Optimal Flocking Design for Multi-Agent Two-Player Zero-Sum Games with Unknown System Dynamics and Disturbance *Hao Xu and Luis Rodolfo Garcia Carrillo*

Tuesday, December 13th

8:30-9:30	*Keynote:* **Holger Theisel, University of Magdeburg, Germany** (Ballrooms 313 & 316)		
	Parallel Sessions		
9:40-12:10	**Medical Imaging** Chair: Fabien Scalzo (Ballrooms 313 & 316)		**Virtual Reality I** Chair: Alireza Tavakkoli (Ballroom 309)
	9:40	MinMax Radon Barcodes for Medical Image Retrieval *H.R. Tizhoosh, Shujin Zhu, Hanson Lo, Varun Chaudhari, Tahmid Mehdi*	Enhancing the Communication Spectrum in Collaborative Virtual Environments *Edward Kim, Christopher Moritz*
	10:00	Semantic-based Brain MRI Image Segmentation Using Convolutional Neural Network *Yao Chou, Dah Jye Lee, and Dong Zhang*	Narrative approach to assess fear of heights in virtual environments *Angelo D. Moro, Christian Quintero, and Wilson J. Sarmiento*
	10:20	SAHF: Unsupervised Texture-Based Multiscale With Multicolor Method For Retinal Vessel Delineation *Temitope Mapayi and Jules-Raymond Tapamo*	Immersive Industrial Process Environment from a P&Id Diagram *Víctor H. Andaluz, Washington X. Quevedo, Fernando A. Chicaiza, Catherine Gálvez, Gabriel Corrales, Jorge S. Sánchez, Edwin P. Pruna, Oscar Arteaga, Fabián A. Álvarez, and Galo Ávila*
10:40-11:10	*Coffee Break*		
	11:10	Unsupervised Caries Detection in Non-Standardized Bitewing Dental X-Rays *D. Osterloh and S. Viriri*	Automatic Environment Map Construction for Mixed Reality Robotic Applications *David McFadden, Brandon Wilson, Alireza Tavakkoli, and Donald Loffredo*
	11:30	Vessel Detection on Cerebral Angiograms using Convolutional Neural Networks *Yang Fu, Jiawen Fang, Benjamin Quachtran, Natia Chachkhiani, Fabien Scalzo*	Foveated Path Tracing: a Literature Review and a Performance Gain Analysis *Matias Koskela, Timo Viitanen, Pekka Jaaskelainen, and Jarmo Takala*
	11:50	False Positive Reduction in Breast Mass Detection using the Fusion of Texture and Gradient Orientation Features *Mariam Busaleh, Muhammad Hussain, Hatim A. Aboalsamh, Mansour Zuair, George Bebis*	
9:40-12:10	**ST: Computer Vision as a Service** Chair: Ahmad Pahlavan Tafti (Ballrooms 314 & 315)		**Biometrics** Chair: George Bebis (Ballroom 311)
	9:40	OCR as a Service: an experimental evaluation of Google Docs OCR, Tesseract, ABBYY FineReader, and Transym *Ahmad P. Tafti, Ahmadreza Baghaie, Mehdi Asse, Hamid R. Arabnia, Zeyun Yu, and Peggy Peissig*	Age Classication from Facial Images: Is Frontalization Necessary? *A. Baez-Suarez, C. Nikou, J.A. Nolazco-Flores and I.A. Kakadiaris*
	10:00	Animal identification in low quality camera-trap images using very deep convolutional neural networks and confidence thresholds *Alexander Gomez, German Diez, Augusto Salazar, and Angelica Diaz*	PH-BRINT: Pooled Homomorphic Binary Rotation Invariant and Noise Tolerant Representation for Face Recognition under Illumination Variations *Raqinah Alrabiah, Muhammad Hussain, Hatim A. Aboalsamh, Mansour Zuair, George Bebis*
	10:20	A Gaussian Mixture Model Feature For Wildlife Detection *Shengzhi Du, Chunling Du, Rishaad Abdoola, and Barend Jacobus van Wyk*	Multi-Kernel Fuzzy-Based Local Gabor Patterns for Gait Recognition *Amer G. Binsaadoon and El-Sayed M. El-Alfy*
10:40-11:10	*Coffee Break*		
	11:10		A comparative analysis of deep and shallow features for multimodal face recognition in a novel RGB-D-IR dataset *Tiago Freitas, Pedro G. Alves, Cristiana Carpinteiro, Joana Rodrigues, Margarida Fernandes, Marina Castro, Joao C. Monteiro, Jaime S. Cardoso*
	11:30		
	11:50		
12:10-1:30	*Lunch* (on your own)		

	Parallel Sessions		
1:30-4:00	**Pattern Recognition II** Chair: Christopher Rasmussen (Ballrooms 313 & 316)		**Visualization II** Chair: Jurgen Schulze (Ballroom 309)
	1:30	Rare Class Oriented Scene Labeling Using CNN Incorporated Label Transfer *Liangjiang Yu and Guoliang Fan*	Evaluation of Collaborative Actions to Inform Design of a Remote Interactive Collaboration Framework for Immersive Data Visualizations *Rajiv Khadka, Nikhil Shetty, Eric Whiting, and Amy Banic*
	1:50	Pollen Grain Recognition Using Deep Learning *Amar Daood, Eraldo Ribeiro, and Mark Bush*	Automated Reconstruction of Neurovascular Networks in Knife-Edge Scanning Microscope Rat Brain Nissl Data Set *Wookyung An and Yoonsuck Choe*
	2:10	Classifying Pollen Using Robust Sequence Alignment of Sparse Z-Stack Volumes *Amar Daood, Eraldo Ribeiro, and Mark Bush*	Spatiotemporal LOD-Blending for Artifact Reduction in Multi-Resolution Volume Rendering Sebastian Thiele, Carl-Feofan Matthes, and Bernd Froehlich
2:30-3:00	*Coffee Break*		
	3:00	Complementary Keypoint Descriptors *Clark F. Olson, Sam A. Hoover, Jordan L. Soltman, and Siqi Zhang*	Visual Analytics Using Graph Sampling and Summarization on Multitouch Displays *Nicholas G. Lipari, Christoph W. Borst, Mehmet Engin Tozal*
	3:20	Two Phase Classification For Early Hand Gesture Recognition in 3D Top View Data *Aditya Tewari, Bertram Taetz, Frederic Grandidier, and Didier Stricker*	A bioplausible model for explaining Café Wall illusion: foveal vs peripheral resolution Nasim Nematzadeh, David M. W. Powers
	3:40		
1:30-4:00	**ST: Visual Perception and Robotic Systems** Chair: Kostas Alexis (Ballrooms 314 & 315)		**Applications I** Chair: Hatim A. Aboalsamh (Ballroom 311)
	1:30	Automated Rebar Detection for Ground-Penetrating Radar *Spencer Gibb and Hung Manh La*	A Sparse Representation Based Classification Algorithm for Chinese Food Recognition *Haixiang Yang, Dong Zhang, Dah-Jye Lee, Minjie Huang*
	1:50	Improving Visual Feature Representations by Biasing Restricted Boltzmann Machines with Gaussian Filters *Arjun Yogeswaran and Pierre Payeur*	Guided Text Spotting for Assistive Blind Navigation in Unfamiliar Indoor Environments *Xuejian Rong, Bing Li, J. Pablo Munoz, Jizhong Xiao, Aries Arditi, Yingli Tian*
	2:10	Image Fusion Quality Measure Based on a Multi-Scale Approach *Jorge Martinez, Silvina Pistonesi, Maria Cristina Maciel, and Ana Georgina Flesia*	Leveraging Multi-Modal Analyses and Online Knowledge Base for Video Aboutness Generation *Raj Kumar Gupta and Yang Yinpingf*
2:30-3:00	*Coffee Break*		
	3:00	Vision-based Self-contained Target Following Robot using Bayesian Data Fusion *Andres Echeverri Guevara, Anthony Hoak, Juan Tapiero Bernal, and Henry Medeiros*	Performance Evaluation of Video Summaries using Efficient Image Euclidean Distance *Sivapriyaa Kannappan, Yonghuai Liu and Bernard Paul Tiddeman*
	3:20	Dual Back-to-Back Kinects for 3-D Reconstruction *Ho Chuen Kam, Kin Hong Wong and Baiwu Zhang*	RDEPS: A Combined Reaction-Diffusion Equation and Photometric Similarity Filter for Optical Image Restoration *Xueqing Zhao, Pavlos Mavridis, Tobias Schreck, and Arjan Kuijper*
	3:40		Automatic Oil Reserve Analysis through the Shadows of Exterior Floating Crest Oil Tanks in Highlight Optical Satellite Images *Qingquan Wang, Jinfang Zhang, and Xiaohui Hu*
6:00-9:00	*Banquet Dinner* *Keynote:* **Mubarak Shah, University of Central Florida, USA** (Ballrooms 312 & 317)		

Wednesday, December 14th

8:30-9:30	*Keynote:* **Kristen Grauman, University of Texas at Austin, USA** (Ballrooms 313 & 316)		
	Parallel Sessions		
9:40-12:10	**Visual Surveillance** Chair: Guoliang Fan (Ballrooms 313 & 316)		**Computer Graphics II** Chair: Alireza Tavakkoli (Ballroom 309)
	9:40	Preventing Drowning Accidents using Thermal Cameras *Soren Bonderup, Jonas Olsson, Morten Bonderup and Thomas B. Moeslund*	Adaptive Video Transition Detection Based on Multiscale Structural Dissimilarity *Anderson Carlos Sousa e Santos and Helio Pedrini*
	10:00	Maximum Correntropy based Dictionary Learning framework for physical activity recognition using wearable sensors *Sherin M. Mathews, Chandra Kambhamettu, Kenneth E. Barner*	Fast and Accurate 3D Reconstruction of Dental Models *Seongje Jang, Yonghee Hahm, and Kunwoo Lee*
	10:20	3D Human Activity Recognition Using Skeletal Data from RGBD Sensors *Jiaxu Ling, Lihua Tian, Chen Li*	A Portable and Unified CPU/GPU Parallel Implementation of Surface Normal Generation Algorithm from 3D Terrain Data *Brandon Wilson, Robert Deen, and Alireza Tavakkoli*
10:40-11:10	*Coffee Break*		
	11:10	Unsupervised deep networks for temporal localization of human actions in streaming videos *Binu M. Nair*	Character Animation: An Automated Gait Cycle for 3D Characters Using Mathematical Equations *Mary Guindy and Rimon Elias*
	11:30	A New method for fall detection of elderly based on human shape and motion variation *Abderrazak IAZZI, Mohammed RZIZA, Rachid OULAD HAJ THAMI, Driss ABOUTAJDINE*	Realistic 3D Modeling of the Liver from MRI Images *Andrew Conegliano, Jurgen P. Schulze*
	11:50	Motion of oriented magnitudes patterns for Human Action Recognition *Hai-Hong Phan, Ngoc-Son Vu, Vu-Lam Nguyen, Mathias Quoy*	
9:40-12:10	**Applications II** Chair: Fabien Scalzo (Ballrooms 314 & 315)		**Virtual Reality II** Chair: Christoph W. Borst (Ballroom 311)
	9:40	A Flood Detection and Warning System based on Video Content Analysis *Martin Joshua P. San Miguel and Conrado R. Ruiz, Jr.*	An Integrated Cyber-Physical Immersive Virtual Reality Framework with Applications to Telerobotics *Matthew Bounds, Brandon Wilson, Alireza Tavakkoli, and Donald Loffredo*
	10:00	Efficient CU Splitting Method for HEVC Intra Coding Based on Visual Saliency *Xin Zhou, Guangming Shi, Wei Zhou*	Teacher-Student VR Telepresence with Networked Depth Camera Mesh and Heterogeneous Displays *Sam Ekong, Christoph W. Borst, Jason Woodworth, Terrence L. Chambers*
	10:20	An efficient pedestrian detector based on saliency and HOG features modeling *Mounir ERRAMI and Mohammed RZIZA*	Virtual Reality Integration with Force Feedback in Upper Limb Rehabilitation *Víctor H. Andaluz, Pablo J. Salazar, Miguel Escudero V., Carlos Bustamante D., Marcelo Silva S., Washington Quevedo, Jorge S. Sánchez, Edison G. Espinosa and David Rivas*
10:40-11:10	*Coffee Break*		
	11:10	Comprehensive Parameter Sweep for Learning-based Detector on Traffic Lights *Morten B. Jensen, Mark P. Philipsen, Thomas B. Moeslund and Mohan Trivedi*	Joint keystone correction and shake removal for a hand held projector *Manevarthe Bhargava, Kalpati Ramakrishnan*
	11:30	Video Anomaly Detection Based on Adaptive Multiple Auto-Encoders *Tianlong Bao, Chunhui Ding, Saleem Karmoshi, Ming Zhu*	
	11:50		

12:10-1:30	*Lunch* (on your own)
1:30-2:30	*Keynote:* **James Klosowski, AT&T Research Labs, USA** (Ballrooms 313 & 316)
2:40-5:00	**Poster Session**

Poster Session (Ballrooms 313 & 316)

Wednesday, December 14th (2:40pm-5:00pm)

Global Evolution-Constructed Feature for Date Maturity Evaluation *Meng Zhang, Dah-Jye Lee*
An Image Dataset of Text Patches in Everyday Scenes *Ahmed Ibrahim, A. Lynn Abbott, Mohamed E. Hussein*
Pre-Processing of Video Streams for Extracting Queryable Representation of its Contents *Manish Annappa, Sharma Chakravarthy, and Vassilis Athitsos*
Physiological Features of the Internal Jugular Vein from B-Mode Ultrasound Imagery *Jordan P. Smith, Mohamed Shehata, Ramsey G. Powell, and Peter F.* *McGuire and Andrew J Smith*
Manifold Interpolation for an Efficient Hand Shape Recognition in the Irish Sign Language *Marlon Oliveira, Alistair Sutherland, and Mohamed Farouk*
Leaf Classiffication using Convexity Moments of Polygons *Jules R. Kala, Serestina Viriri, Deshendran Moodley*
Semi-Automated Extraction of Retinal Blood Vessel Network with Bifurcation and Crossover Points *Nougrara, Z., Kihal, N. and Meunier, J.*
SINN: Shepard Interpolation Neural Networks *Phillip Williams*
View-Based 3D Objects Recognition With Expectation Propagation Learning *Adrien Bertrand, Faisal R. Al-Osaimi, and Nizar Bouguila*
Age Estimation by LS-SVM Regression on Facial Images *Shreyank N Gowda*
Video Cut Detector via Adaptive Features using the Frobenius Norm *Youssef Bendraou, Fedwa Essannouni, Ahmed Salam, and Driss Aboutajdine*
Practical Hand Skeleton Estimation Method based on Monocular Camera *Sujung Bae, Jaehyeon Yoo, Moonsik Jeong, and Vladimir Savin*
A Nonparametric Hierarchical Bayesian Model and Its Application on Multimodal Person Identity Verification *Wentao Fan and Nizar Bouguila*
Performance evaluation of 3D keypoints and Descriptors *Zizui CHEN, Stephen Czarnuch, Andrew Smith, and Mohamed Shehata*
Features of Internal Jugular Vein Contours for Classification *Jordan P. Smith, Mohamed Shehata, and Peter F. McGuire and Andrew J Smith*
Gathering event detection by stereo vision *Qian Wang, Wei Jin, Gang Wang*
Abnormal Detection by Iterative Reconstruction *Kenta Toyoda and Kazuhiro Hotta*

Poster Session (cont'd) (Ballrooms 313 & 316)

Wednesday, December 14th (2:40pm-5:00pm)

Optimization-based Multi-view Head Pose Estimation for Driver Behavior Analysis *Huaixin Xiong*
An integrated octree-RANSAC technique for automated LiDAR building data segmentation for decorative buildings *Fatemeh Hamid-Lakzaeian, Debra F. Laefer*
Reduction of Missing Wedge Artifact in Oblique-View Computed Tomography *Kyung-Chan Jin, Jung-Seok Yoon, and Yoon-Ho Song*
Using dense 3D reconstruction for visual odometry based on structure from motion techniques *Marcelo de Mattos Nascimento, Manuel Eduardo Loaiza Fernandez, and Alberto Barbosa Raposo*
Towards Estimating Heart Rates from Video Under Low Light *Antony Lam and Yoshinori Kuno*
Video Tracking with Probabilistic Cooccurrence Feature Extraction *Kaleb Smith and Anthony O. Smith*
3-D Shape Recovery From Image Focus Using Rank Transform *Fahad Mahmood, Jawad Mahmood, Waqar Shahid Qureshi, Umar Shahbaz Khan*
Combinatorial Optimization for Human Body Tracking *Andrew Hynes and Stephen Czarnuch*
Automatic detection of deviations in human movements using HMM: Discrete vs Continuous *Carlos Palma, Augusto Salazar, Francisco Vargas*
Quantitative Performance Optimisation for Corner and Edge based Robotic Vision Systems: A Monte-Carlo Simulation *Jingduo Tian, Neil Thacker and Alexandru Stancu*
Evaluating the Change of Directional Patterns for Fingerprints with Missing Singular Points under Rotation *Kribashnee Dorasamy, Leandra Webb-Ray, and Jules-Raymond Tapamo*
Particle Detection in Crowd Regions Using Cumulative Score of CNN *Kenshiro Nishida and Kazuhiro Hotta*
Preliminary studies on personalized preference prediction from gaze in comparing visualizations *Hamed R.-Tavakoli, Hanieh Poostchi, Jaakko Peltonen, Jorma Laaksonen, Samuel Kaski*
Simulating a predator fish attacking a school of prey fish in 3D graphics *Sahithi Podila, Ying Zhu*
Direct Visual-Inertial Odometry and Mapping for Unmanned Vehicle *Wenju Xu and Dongkyu Choi*
Real-Time Automated Aerial Refueling Using Stereo Vision *Christopher Parsons, Scott Nykl*
Signature Embedding: Writer Independent Offline Signature Verification with Deep Metric Learning *Hannes Rantzsch, Haojin Yang, and Christoph Meinel*

KEYNOTE TALK

Monday, December 12, 2016

8:30 AM – 9:30 AM / (Ballrooms 313 & 316)

Dynamic Scene Understanding for Autonomous Driving

James Rehg

Georgia Institute of Technology

Abstract

Autonomous navigation in complex urban environments requires the ability to recover a holistic model of the dynamic scene as it unfolds in time. Dynamic scene models include a 3D semantic map of the structures in the urban environment, such as buildings, roadway, and sidewalks, which define the substrate for the dynamic behaviors of vehicles and pedestrians. This static model is then augmented with a complete description of the dynamic scene elements via target detection and multi-target tracking. I will describe five recent advances which support the construction of dynamic scene models. Our starting point is a method for recovering a 3D volumetric semantic map of a static scene from monocular video. Given a sparse point cloud from structure-from-motion, we recover a dense 3D volumetric map through a global CRF optimization and the use of structural priors. The recovery of scene semantics is enabled by a novel and fast method for semantic video segmentation which uses feature optimization to enforce temporal continuity. We then describe a deep model for object detection in video frames which can serve as the starting point for multitarget tracking. Our detection architecture was the best-performing single model detector in the 2016 Microsoft COCO Challenge. We present a multiple-hypothesis tracking approach to multi-target tracking which incrementally processes video frames and uses efficient on-line appearance classification to differentiate object instances. We close by showing recent experimental results from our AutoRally project, a 1:5 scale open source vehicle platform which supports research in high-speed autonomous driving. This is joint work with Drs. Evangelos Theodorou and Panos Tsiotras and Ph.D. students Paul Drews, Brian Goldfain, Chanho Kim, Abhijit Kundu, Yin Li, and Grady Williams.

Speaker Bio-Sketch: James M. Rehg (pronounced "ray") is a Professor in the School of Interactiv Computing at the Georgia Institute of Technology, where he is Director of the Center for Behavioral Imaging and co-Director of the Computational Perception Lab (CPL). He received his Ph.D. from CMU in 1995 and worked at the Cambridge Research Lab of DEC (and then Compaq) from 1995-2001, where he managed the computer vision research group. He received an NSF CAREER award in 2001 and a Raytheon Faculty Fellowship from Georgia Tech in 2005. He and his students have received best student paper awards at ICML 2005, BMVC 2010, Mobihealth 2014, and Face and Gesture 2015, and a 2013 Method of the Year Award from the journal Nature Methods. Dr. Rehg serves on the Editorial Board of the Intl. J. of Computer Vision, and he served as the Program co-Chair for ACCV 2012 and General co-Chair for CVPR 2009, and is serving as Program co-Chair for CVPR 2017. He has authored more than 100 peer-reviewed scientific papers and holds 25 issued US patents. His research interests include computer vision, machine learning, robot perception and mobile health. Dr. Rehg was the lead PI on an NSF Expedition to develop the science and technology of Behavioral Imaging, the measurement and analysis of social and communicative behavior using multi-modal sensing, with applications to developmental disorders such as autism. He is currently the Deputy Director of the NIH Center of Excellence on Mobile Sensor Data-to-Knowledge (MD2K), which is developing novel on-body sensing and predictive analytics for improving health outcomes. See www.cbs.gatech.edu and md2k.org for details.

KEYNOTE TALK
Monday, December 12, 2016
1:30 PM – 2:30 PM / Ballrooms 313 & 316

Magic User Interfaces: Interactivity in Immersive Science and Art

Daniel F. Keefe
University of Minnesota – Twin Cities

Abstract

"Beautiful or delightful in such a way as to seem removed from everyday life" – this is how the Oxford English Dictionary defines magical – I can think of no better way to describe the future of visual computing, especially in immersive environments. What will make these environments so compelling is not just the visual quality, but also new tightly coupled, hands-on, data-aware user interfaces that enable us to explore and create in ways we never imagined before. In this talk, I will describe what people might do in these spaces with the aid of user interfaces that are sure to feel, well, magical. These ideas come from experiences collaborating with artists, scientists, engineers, doctors, and humanists at the University of Minnesota Interactive Visualization Lab. I look forward to presenting a number of examples from our current work, which has a special focus on applications to both scientific visualization and art, and discussing with the group how combining visual computing with powerful new interactive techniques can open up a new world of beauty and delight for so many applications of computer science.

Speaker Bio-Sketch: Dan Keefe is an Associate Professor in the Department of Computer Science and Engineering at the University of Minnesota. His research centers on scientific data visualization and interactive computer graphics. Keefe's recent awards include the National Science Foundation CAREER award; the University of Minnesota Guillermo E. Borja Award for research and scholarly accomplishments; the University of Minnesota McKnight Land-Grant Professorship; and the 3M Non-tenured Faculty Award. He shares multiple best paper awards with his students and collaborators, and his research has been funded by the National Science Foundation, the National Institutes of Health, the National Academies Keck Futures Initiative, the US Forest Service, and industry. In addition to his work in computer science, Keefe has also published and exhibited work in top international venues for digital art. Before joining the University of Minnesota, Keefe did post-doctoral work at Brown University jointly with the departments of Computer Science and Ecology and Evolutionary Biology and with the Rhode Island School of Design. He received the Ph.D. in 2007 from Brown University's Department of Computer Science and the B.S. in Computer Engineering summa cum laude from Tufts University in 1999

KEYNOTE TALK
Tuesday, December 13, 2016
8:30 AM – 9:30 AM / Ballrooms 313 & 316

Optimal Streamlines and Streamsurfaces for 3D Flow Visualization

Holger Theisel
University of Magdeburg, Germany

Abstract

Flow Visualization is one of the core topics in Scientific Visualization. Flow data belongs to the largest and most complex data to be analyzed in Visualization. Streamlines and Streamsurfaces are standard tools for the visual analysis of flow data. Nevertheless, their applications still poses challenges concerning their extraction, integration, and visualization. In the talk, we tackle three problems: (i) the selection of suitable stream lines, (ii) a stable integration of stream surfaces, (iii) the selection of suitable stream surfaces. We show that these problems can and should be formulated as global optimization problems. We present the respective error functionals to be minimized and show solutions for several test cases.

Speaker Bio-Sketch: Holger Theisel is a full professor for Visual Computing at the University of Magdeburg (Germany). He received his M.S. (1994), Ph.D. (1996) and habilitation (2001) degrees from the University of Rostock (Germany) where he studied Computer Science (1989 - 1994) and worked as a research and teaching assistant (1995 - 2001). He spent 12 months (1994 - 1995) as a visiting scholar at Arizona State University (USA), and 6 months as a guest lecturer at ICIMAF Havana (Cuba). 2002 - 2006 he was a member of the Computer Graphics group at MPI Informatik Saarbrücken (Germany). 2006-2007 he was a professor for Computer Graphics at Bielefeld University (Germany). Since October 2007 he is at the University of Magdeburg. His research interests focus on scientific visualization as well as on geometric modelling, geometry processing, information visualization and Visual Analytics. He was paper co-chair of EuroVis 2013 and is Associate Editor of IEEE Transactions on Visualization and Computer Graphics.

BANQUET KEYNOTE TALK
Tuesday, December 13, 2016
8 PM – 9 PM / TBD

Analyzing Dense Crowds

Mubarak Shah
Center for Research in Computer Vision
University of Central Florida

Abstract

In this talk, first I will present a new approach for counting people in extremely dense crowds. Our approach relies on multiple sources of information such as low confidence head detections, repetition of texture elements (using SIFT), and frequency-domain analysis to estimate counts, along with confidence associated with observing individuals, in an image region. In addition, we employ a global consistency constraint on counts using Markov Random Field. This caters for disparity in counts in local neighborhoods and across scales.

Next, I will discuss how we explore context for human detection in dense crowds in the form of locally-consistent scale prior which captures the similarity in scale in local neighborhoods and its smooth variation over the image. Using the scale and confidence of detections obtained from an underlying human detector, we infer scale and confidence priors using Markov Random Field. In an iterative mechanism, the confidences of detections are modified to reflect consistency with the inferred priors, and the priors are updated based on the new detections. The final set of detections obtained are then reasoned for occlusion using Binary Integer Programming where overlaps and relations between parts of individuals are encoded as linear constraints.

Finally, I will present a method for tracking in dense crowds using prominence and neighborhood motion concurrence. Our method begins with the automatic identification of prominent individuals from the crowd that are easy to track. Then, we use Neighborhood Motion Concurrence to model the behavior of individuals in a dense crowd, this predicts the position of an individual based on the motion of its neighbors.

Speaker Bio-Sketch: Dr. Mubarak Shah, Agere Chair Professor of Computer Science, is the founding director of Center for Research in Computer Visions at University of Central Florida (UCF). He is a co-author of five books (Motion-Based Recognition (1997); Video Registration (2003); Automated Multi-Camera Surveillance: Algorithms and Practice (2008); Modeling, Simulation and Visual Analysis of Crowds (2013); and Robust Subspace Estimation Using Low-Rank Optimization (2014), all by Springer. He has published extensively on topics related to visual surveillance, tracking, human activity and action recognition, object detection and categorization, shape from shading, geo registration, visual crowd analysis, etc. Dr. Shah is a fellow of IEEE, IAPR, AAAS and SPIE. In 2006, he was awarded the Pegasus Professor award, the highest award at UCF, given to a faculty member who has made a significant impact on the university. He is ACM Distinguished Speaker. He was an IEEE Distinguished Visitor speaker for 1997-2000, and received IEEE Outstanding Engineering Educator Award in 1997. He received the Harris Corporation's Engineering Achievement Award in 1999, the TOKTEN awards from UNDP in 1995, 1997, and 2000; SANA award in 2007, an honorable mention for the ICCV 2005 Where Am I? Challenge Problem, and was nominated for the best paper award in ACM Multimedia Conference in 2005 and 2010. At UCF he received Scholarship of Teaching and Learning (SoTL) award in 20111; College of Engineering and Computer Science Advisory Board award for faculty excellence in 2011; Teaching Incentive Program awards in 1995 and 2003, Research Incentive Award in 2003 and 2009, Millionaires' Club awards in 2005, 2006, 2009, 2010 and 2011; University Distinguished Researcher award in 2007 and 2012. He is an editor of international book series on Video Computing; editor in chief of Machine Vision and Applications journal, and an associate editor of ACM Computing Surveys journal. He was an associate editor of the IEEE Transactions on PAMI, and a guest editor of the special issue of International Journal of Computer Vision on Video Computing. He was the program co-chair of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2008.

KEYNOTE TALK
Wednesday, December 14, 2016
8:30 AM – 9:30 AM / Ballrooms 313 & 316

Learning representations from unlabeled video

Kristen Grauman
University of Texas at Austin

Abstract

The status quo in visual recognition is to learn from batches of unrelated Web photos labeled by human annotators. Yet cognitive science tells us that perception develops in the context of acting and moving in the world---and without intensive supervision. How can unlabeled video augment computational visual learning? I'll describe our recent work exploring how a system can learn effective representations by watching unlabeled video. Fist we consider how the ego-motion signals accompanying a video provide a valuable cue during learning, allowing the system to internalize the link between "how I move" and "what I see". Next, we explore how the temporal coherence of video permits new forms of invariant feature learning, whether by capturing how object-centric regions evolve over time or by representing higher order consistency in visual changes. Incorporating these ideas into various recognition tasks, we demonstrate the power in learning from ongoing, unlabeled visual observations---even overtaking traditional heavily supervised approaches in some cases. Finally, we examine how simply having seen unlabeled human-taken videos, a system can learn to mimic human videographer tendencies, automatically creating normal field of view video out of unedited 360 degree panoramas.

This talk describes work done with Ruohan Gao, Dinesh Jayaraman, and Yu-Chuan Su at UT Austin.

Speaker Bio-Sketch: Kristen Grauman is an Associate Professor in the Department of Computer Science at the University of Texas at Austin. Her research in computer vision and machine learning focuses on visual search and object recognition. Before joining UT-Austin in 2007, she received her Ph.D. in the EECS department at MIT, in the Computer Science and Artificial Intelligence Laboratory. She is an Alfred P. Sloan Research Fellow and Microsoft Research New Faculty Fellow, a recipient of NSF CAREER and ONR Young Investigator awards, the Regents' Outstanding Teaching Award from the University of Texas System in 2012, the PAMI Young Researcher Award in 2013, the 2013 Computers and Thought Award from the International Joint Conference on Artificial Intelligence, and a Presidential Early Career Award for Scientists and Engineers (PECASE) in 2013. She and her collaborators were recognized with the CVPR Best Student Paper Award in 2008 for their work on hashing algorithms for large-scale image retrieval, and the Marr Best Paper Prize at ICCV in 2011 for their work on modeling relative visual attributes. She serves or has served on the Editorial Board for the International Journal of Computer Vision (IJCV), as an Associate Editor in Chief for the Transactions on Pattern Analysis and Machine Intelligence (TPAMI), and as a Program Chair of CVPR 2015 in Boston.

KEYNOTE TALK

Wednesday, December 14, 2016
1:30 PM– 2:30 PM / Ballrooms 313 & 316

Can You See Me Now? The Importance of Visualization in Improving the Customer Experience at AT&T

James Klosowski
AT&T Labs Research

Abstract

AT&T runs one of the most complex and intricate networks in the world with over 50 petabytes of data running across their network on an average day. It is imperative that we have the ability to view, analyze, and act on the billions of data points that indicate how the network is performing. Data visualization helps our network engineers identify trends and pinpoint potential issues in near real-time for our 100 million mobile customers. Furthermore, as we transform our network from specialized hardware to one that is highly configurable via software, we are also implementing many new services for our consumer and business customers. To implement these services, we use visualization to understand the data we are now able to gather and to show how we can use that data to the benefit of the customer. In this talk, we will highlight the importance of visualization in analyzing and understanding the large data at AT&T. Included in this discussion will be several research projects that have been made publicly available via open source so that others can also benefit from AT&T's recent work.

Speaker Bio-Sketch: Jim Klosowski is the Director of the Information Visualization department in the Big Data Research organization at AT&T Labs. His team of researchers develops new techniques for visually exploring and understanding the large data that is generated daily within the company. Jim received dual BS in mathematics and in computer science from Fairfield University, and both MS and PhD in Applied Mathematics and Statistics from Stony Brook University. He has published more than 20 technical papers on interactive visualization techniques and has been awarded over a dozen patents in the United States and abroad. Prior to joining AT&T, Jim was a research staff member at the IBM TJ Watson Research Center for over 10 years working on interactive computer graphics and scalable visualization systems. His current research spans all aspects of information visualization and analysis, but focuses on large geospatial, temporal, and network datasets.

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(Area 4) Visualization

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Bruckner Stefan, Vienna University of Technology, Austria
Brown Ross, Queensland University of Technology, Australia
Bihler Katja, VRVis Research Center, Austria
Burch Michael, University of Stuttgart, Germany
Callahan Steven, University of Utah, USA
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Chiang Yi-Jen, New York University, USA
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ST1: Computational Bioimaging

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ST2: 3D Surface Reconstruction, Mapping, and Visualization

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ST3: Advancing Autonomy for Aerial Robotics

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ST4: Computer Vision as a Service

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ST5: Visual Perception and Robotic Systems

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