17th International Symposium on Visual Computing

October 3-5, 2022, San Diego, CA, USA

ISVC 2022

Contents

Registration Desk Hours:
Monday – Wednesday 8:00am – 5:00pm

Monday, October 3rd

8:50 – 9:00	*Welcome* – **George Bebis, University of Nevada, Reno**	
9:00–10:00	*Keynote:* **Eli Shechtman, Adobe Research, USA** Chair: George Bebis (Mission Ballrooms 1&2)	
	Parallel Sessions	
10:10-12:10	Session I: **Deep Learning I** Chair: Alireza Tavakkoli (Mission Ballrooms 1&2)	
	10:10	**Shima Shahfar and Charalambos Poullis**. Unsupervised Structure-Consistent Image-to-Image Translation **(RECORDED)**
	10:30	**Zaigham Randhawa, Shivang Patel, Donald Adjeroh and Gianfranco Doretto**. Learning Representations for Masked Facial Recovery
	10:50	**Patricia Suarez, Angel Sappa, Henry Velesaca, Dario Carpio, Patricia Urdiales and Fransisca Burgos**. Deep Learning based Shrimp Classification **(RECORDED)**
11:10-11:30	*Coffee Break*	
	11:30	**Yajurv Bhatia, Asm Hossain Bari and Marina Gavrilova**. Gait Emotion Recognition using a Bi-Modal Deep Neural Network
	11:50	**Jue Ding, Jun Yin, Jingyu Dun, Wanwan Zhang and Yayun Wang**. Attacking Frequency Information with Enhanced Adversarial Networks to Generate Adversarial Samples **(RECORDED)**
10:10-12:10	Session II: **Visualization** Chair: Kenneth Moreland (Mission Ballroom 3)	
	10:10	**Huimin Han, Rebecca Faust, Brian Felipe Keith Norambuena, Ritvik Prabhu, Timothy Smith, Song Li and Chris North**. Explainable Interactive Projections for Image Data
	10:30	**Tommy Dang and Ngan Nguyen**. MultiProjector : Temporal projection for multivariates time series
	10:50	**Sudarshan Devkota and Sumanta Pattanaik**. Deep Learning based Super-Resolution for Medical Volume Visualization with Direct Volume Rendering
11:10-11:30	*Coffee Break*	
	11:30	**Thomas Marrinan, Jifu Tan, Joseph Insley, Alina Kanayinkal and Michael Papka**. Interactive Virtual Reality Exploration of Large-scale Datasets using Omnidirectional Stereo Images
	11:50	**Bryson Lingenfelter, Sara Davis and Emily Hand**. A Quantitative Analysis of Labeling Issues in the CelebA Dataset
12:10-1:30	*Lunch Break* (on your own)	

1:30-2:30	*Keynote:* **Justin Solomon**, **MIT, USA** Chair: Mircea Nicolescu (Mission Ballrooms 1&2)	
	Parallel Sessions	
2:40-5:00	Session III: **Object Detection and Recognition** Chair: Mircea Nicolescu (Mission Ballrooms 1&2)	
	2:40	**Shaif Chowdhury and Greg Hamerly**. Recognition of Aquatic Invasive Species Larvae using Autoencoder-based Feature Averaging
	3:00	**Azubuike Okorie and Sokratis Makrogiannis**. Subspace Analysis for Multi-temporal Disaster Mapping using Satellite Imagery
	3:20	**Ola Badreldeen Bdawy Mohamed, Tuomas Eerola, Kaisa Kraft, Lasse Lensu and Heikki Kälviäinen**. Open-Set Plankton Recognition Using Similarity Learning
3:40-4:00	*Coffee Break*	
	4:00	**Morteza Mousa-Pasandi, Tianran Liu, Yahya Massoud and Robert Laganière**. Sensor Fusion Operators for Multimodal 2D Object Detection
	4:20	**Nicholas Kashani Motlagh, Jim Davis, Tim Anderson and Jeremy Gwinnup**. Learning When to Say "I Don't Know"
	4:40	**Mohsen Mohaidat, Janos Grantner, Saad Shebrain and Ikhlas Abdel-Qader**. Multi-Class Detection and Tracking of Intracorporeal Suturing Instruments in an FLS Laparoscopic Box Trainer Using Scaled-YOLOv4
2:40-5:00	Session V: **Deep Learning II** Chair: Marina Gavrilova (Mission Ballroom 3)	
	2:40	**Alankrit Mishra and Garima Bajwa**. A New Approach to Visual Classification Using Concatenated Deep Learning for Multimode Fusion of EEG and Image Data **(RECORDED)**
	3:00	**Sean Wu, Reem Al Dabagh, Anna Jacobsen, Helen Holmlund and Fabien Scalzo**. Deep Learning-Based Classification of Plant Xylem Tissue from Light Micrographs
	3:20	**Trong-Lanh Nguyen, Thierry Chateau and Guillaume Magniez**. VampNet : Unsupervised Vampirizing of Convolutional Networks
3:40-4:00	*Coffee Break*	
	4:00	**Mirtha Lucas, Miguel Lerma, Jacob Furst and Daniela Raicu**. RSI-Grad-CAM: Visual Explanations from Deep Networks via Riemann-Stieltjes Integrated Gradient-Based Localization
	4:20	**Sejal Ghate, Alberto Santamaria-Pang, Ivan Tarapov, Haris Sair and Craig Jones**. Deep Labeling of fMRI Brain Networks Using Cloud Based Processing **(RECORDED)**
	4:40	**Seyedalireza Khoshsirat and Chandra Kambhamettu**. Semantic Segmentation using Neural Ordinary Differential Equations

Tuesday, October 4th

9:00-10:00	Keynote: **Doug Bowman**, **Virginia Tech, USA** Chair: Rajiv Khadka (Mission Ballrooms 1&2)	
	Parallel Sessions	
10:10-12:10	Session I: **Video Analysis and Event Recognition** Chair: Gianfranco Doretto (Mission Ballrooms 1&2)	
	10:10	**Jiaxin Zhou and Takashi Komuro**. Detecting Fall Actions of Videos by using Weakly-supervised Learning and Unsupervised Clustering Learning **(RECORDED)**
	10:30	**Victoria Manousaki, Konstantinos Papoutsakis and Antonis Argyros**. Graphing the Future: Activity & Next Active Object Prediction using Graph-based Activity Representations **(RECORDED)**
	10:50	**Nikolaos Bakalos, Nikolaos Doulamis, Anastasios Doulamis and Konstantinos Makantasis**. Multi-Property Tensor-Based Learning for Abnormal Event Detection **(RECORDED)**
11:10-11:30	*Coffee Break*	
	11:30	**Filip Malawski and Bartosz Jankowski**. Depth-based vs. color-based pose estimation in human action recognition
	11:50	**Konstantinos Bacharidis and Antonis Argyros**. Cross-domain Learning in Deep HAR Models via Natural Language Processing on Action Labels **(RECORDED)**
10:10-12:10	Session II: **Computer Graphics** Chair: Alireza Tavakkoli (Mission Ballrooms 3)	
	10:10	**Ying Zhu**. Visualizing Data Flows in Computer Graphics Programs for Code Comprehension and Debugging **(RECORDED)**
	10:30	**Philip Smith and Vitaliy Kurlin**. A practical algorithm for degree-k Voronoi domains of three-dimensional periodic point sets
	10:50	**Gaëtan Landreau and Mohamed Tamaazousti**. Pruning-based Topology Refinement of 3D Mesh using a 2D Alpha Mask
11:10-11:30	*Coffee Break*	
	11:30	**Jingtao Huang and Takashi Komuro**. End-to-end Deep Neural Network for Illumination Consistency and Global Illumination **(RECORDED)**
	11:50	N/A
12:10-1:30	*Lunch Break* (on your own)	

1:30 – 3:40	**Poster Session** (set up from 12:10pm to 1:30pm) (Mission Terrace)	
3:40 – 4:00	*Coffee Break*	
	Parallel Sessions	
4:00-5:20	Session III: **ST: Biomedical Imaging Techniques for Cancer Detection, Diagnosis and Management** Chair: Sokratis Makrogiannis (Mission Ballrooms 1&2)	
	4:00	**Prithul Sarker, Sushmita Sarker, George Bebis and Alireza Tavakkoli**. ConnectedUNets++: Mass Segmentation from Whole Mammographic Images
	4:20	**Md Farhad Mokter, Azeez Idris, Junghwan Oh, Wallapak Tavanapong and Piet C. de Groen**. Severity Classification of Ulcerative Colitis in Colonoscopy Videos by Learning from Confusion
	4:40	**Anwesh Kabiraj, Tanushree Meena, Balakrishna Reddy and Sudipta Roy**. Detection and Classification of Lung Disease Using Deep Learning Architecture from X-ray images **(RECORDED)**
	5:00	**Chau Nguyen Minh, Giang Le Truong and Sang Dinh Viet.** PolypDEQ: Towards Effective Transformer-based Deep Equilibrium Models for Colon Polyp Segmentation **(RECORDED)**
4:00-5:20	Session V: **ST: Neuro-inspired Artificial Intelligence** Chair: Edward Kim (Mission Ballroom 3)	
	4:00	**Jonnatan Arias Garcia, Hernán Felipe García Arias, Gloria Liliana Porras Hurtado, Alvaro Angel Orozco Gutiérrez and Jorge Iván Ríos Patiño**. Brain Shape Correspondence Analysis Using Functional Maps **(RECORDED)**
	4:20	**Taasin Saquib and Demetri Terzopoulos**. Biomimetic Oculomotor Control With Spiking Neural Networks
	4:40	**Tianlong Chen, Xuemei Cheng and Thomas Tsao**. Border Ownership, Category Selectivity and Beyond
	5:00	**Edward Kim, Trang Ha and Garrett Kenyon.** Sparse Kernel Transfer Learning
6:00-8:45	*Banquet Dinner* Keynote: **Ce Liu, Microsoft Azure AI, USA** (at 7pm) Chair: George Bebis (Regatta Pavilion)	

Wednesday, October 5th

9:00-10:00	*Keynote:* **David Jacobs**, **University of Maryland, USA** Chair: Emily Hand (Mission Ballrooms 1&2)	
	Parallel Sessions	
10:10-12:10	Session I: **Applications** (Mission Ballrooms 1&2) Chair: Emily Hand	
	10:10	**Sai Pavan Kumar Prakya, Manju Venkata Sainath Madamanchi, Vatsa Patel, Samah Baraheem and Tam Nguyen**. Photobombing Removal Benchmarking
	10:30	**Noureddine Mohtaram and Farouk Achakir**. Automatic Detection and Recognition of products and planogram conformity analysis in real time on store shelves
	10:50	**Bijan Shahbaz Nejad, Peter Roch, Marcus Handte and Pedro Jose Marron**. Enhancing Privacy in Computer Vision Applications: An Emotion Preserving Approach to Obfuscate Faces
11:10-11:30	*Coffee Break*	
	11:30	**Sai Surya Vaddi, Amira Yousif, Samah Baraheem, Ju Shen and Tam Nguyen**. House Price Prediction via Visual Cues and Estate Attributes
	11:50	**Kianoush Falahkheirkhah, Kevin Yeh, Matthew Confer and Rohit Bhargava**. DRB-Net: Dilated residual block network for infrared image restoration
10:10-12:10	Session II: **Segmentation and Tracking** (Mission Ballroom 3) Chair: Fabien Scalzo	
	10:10	**Veysel Kocaman, Ofer Shir, Ahmed Nabil Belbachir and Thomas Baeck**. Saliency Can Be All You Need In Contrastive Self-Supervised Learning
	10:30	**Hung Nguyen Tuan, Lan Phan Ngoc, Oanh Nguyen Thi, Thuy Nguyen Thi and Sang Dinh Viet**. GCEENet: A Global Context Enhancement and Exploitation for Medical Image Segmentation **(RECORDED)**
	10:50	**Dimitrios Kastrinakis and Euripides Petrakis**. V2F: Real-Time Video Segmentation with Apache Flink **(RECORDED)**
11:10-11:30	*Coffee Break*	
	11:30	**Sinan Sabri, Zaigham Randhawa and Gianfranco Doretto**. Joint Discriminative and Metric Embedding Learning for Person Re-Identification
	11:50	**Amar Alikadic, Hideo Saito and Ryo Hachiuma**. Transformer Networks for Future Person Localization in First-Person Videos
12:10-1:30	*Lunch Break* (on your own)	

1:30-2:30	*Keynote:* **Chris North, Virginia Tech, USA** Chair: Kenneth Moreland (Mission Ballrooms 1&2)	
	Parallel Sessions	
2:40-4:20	Session III: **Virtual Reality** (Mission Ballrooms 1&2) Chair: Rajiv Khadka	
	2:40	**Prithul Sarker, Nasif Zaman and Alireza Tavakkoli**. VR-SFT: Reproducing Swinging Flashlight Test in Virtual Reality to Detect Relative Afferent Pupillary Defect
	3:00	**Taylor Hayase, Kayla Davis, Humer Irene, Brandon Woodard and Christian Eckhardt**. A Quantitative Analysis of Redirected Walking in Virtual Reality using Saccadic Eye Movements
	3:20	**Menghe Zhang, Weichen Liu, Nadir Weibel and Jurgen Schulze**. A DirectX-Based DICOM Viewer for Multi-User Surgical Planning in Augmented Reality
3:40-4:00	*Coffee Break*	
	4:00	**Khondker Fariha Hossain, Sharif Amit Kamran, Prithul Sarker, Philip Pavilionis, Isayas Adhanom, Nicholas Murray and Alireza Tavakkoli**. Virtual-Reality based Vestibular Ocular Motor Screening for Concussion detection using Machine-learning
4:30-5:30	Tutorial: **Visualizing Spatial Data on the Web Using RStudio, Leaflet, & Shiny** Ann McNamara, Department of Visualization at Texas A&M University, USA (Mission Ballrooms 1&2)	

Poster Session

Tuesday, October 4th (1:30pm-3:40pm)

Peter Roch, Bijan Shahbaz Nejad, Marcus Handte and Pedro Jose Marron. GUILD - A Generator for Usable Images in Large-Scale Datasets
Connor Onweller, Edward Kim, Kathleen McCoy and Andrew O'Brien. Distributional Semantics of Line Charts for Trend Classification
Adarsh Sehgal, Muskan Sehgal, Hung La and George Bebis. Deep Learning Hyperparameter Optimization for Breast Mass Detection in Mammograms
Alaaidin Dwaik and Yassine Belkhouche. Analysis of deep learning-based image steganalysis methods under different steganographic algorithms
Mocanu Bogdan and Ruxandra Tapu. Emotion recognition in video streams using intramodal and intermodal attention mechanisms
Radovan Fusek, Eduard Sojka, Jan Gaura and Jakub Halman. Driver State Detection from In-Car Camera Images
Constantine Maganaris, Eftychios Protopapadakis, Nikolaos Bakalos, Nikolaos Doulamis, Dimitris Kalogeras and Aikaterini Angeli. Transferability limitations for Covid 3D Localization Using SARS-CoV-2 segmentation models in 4D CT images
Tamanna Yasmin, Chuong Le and Hung La. Deep Architecture Based Spalling Severity Detection System Using Encoder-Decoder Networks
Antony Smith, Shengzhi Du and Anish Kurien. Overview on Machine Vision Based Surface Defect Detection and Quality Classification in the Leather Manufacturing Process
Prasenjit Mondal and Sachin Soni. Efficient Shadow Removal and Enhancement of Light Texts in Scanned Documents
Khondker Fariha Hossain, Alireza Tavakkoli and Shamik Sengupta. A Game Theoretical vulnerability analysis of Adversarial Attack
Farnaz Farahanipad, Mohammadsadegh Nasr, Mohammad Rezaei, Farhad Kamangar and Vassilis Athitsos. 2D Fingertip Localization on Depth Videos Using Paired Video-To-Video Translation
Yusuke Nonaka, Hideo Saito, Hideaki Uchiyama, Shoji Yachida and Kota Iwamoto. Difference-in-level Detection from RGB-D Images
Yihua Wang, Dazhou Chai, Jiatong Zhang, Wenhui Bao, Ruiru Li and Longhui Qin. A Contour Extraction Method for Garment Recognition Based on Improved Segmentation and Gabor Filter
Samson Akinpelu and Serestina Viriri. A Robust Deep Transfer Learning Model for Accurate Speech Emotion Classification
Prithul Sarker, Khondker Fariha Hossain, Isayas Adhanom, Philip Pavilionis, Nicholas Murray and Alireza Tavakkoli. Analysis of Smooth Pursuit Assessment in Virtual Reality and Concussion Detection using BiLSTM

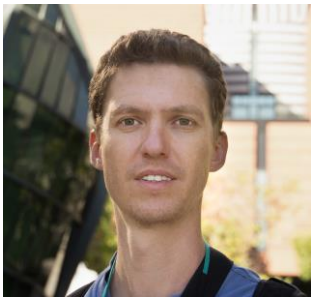
KEYNOTE TALK

Monday, October 3, 2022 at 9:00am

Towards Scaling Up GANs

Eli Shechtman
Adobe Research, USA

Abstract: Generative adversarial networks (GANs) have progressed tremendously since their introduction in 2014. They can generate high-quality imagery and their latent space lends itself to editing real images in an intuitive and controllable way. However, they are known to have limitations related to their scalability. They work well when trained on datasets of a single object category, but struggle with more complex scenes. GANs are also limited in the resolution of images they can generate and train on, typically showing results up to 1K pixel resolution that push the current hardware to the limits in memory and training time. To address these, I will first describe a mid-level image representation for a generative model of scenes. The representation is mid-level in that it is neither per-pixel nor per-image; rather, scenes are modeled as a collection of spatial, depth-ordered "blobs" of features. When trained on scenes, our model learns to associate different blobs with different entities in the scene and to arrange these blobs to capture scene layout. We demonstrate this emergent behavior by showing that, despite training without any supervision, our method enables applications such as easy manipulation of objects within a scene and scales well to a diverse dataset of multiple scene categories. I will then describe 'any-resolution' training of GANs that can exploit the variety of image resolutions available in the wild, learning from pixels that are usually discarded, to enable high- and continuously-variable resolution synthesis. We achieve this by switching from the common fixed-resolution thinking, to a novel 'any-resolution' approach, where the original size of each training image is preserved. We introduce a new class of generators that can learn from this multi-resolution signal to synthesize images at any resolution, and show how to train them by sampling patches at multiple scales. Our experiments show generated images from several categories with both coherent global layouts and realistic local details, going beyond 2K and up to 8K resolution. Finally, I will relate these scalability efforts to other recent large-scale generative models (such as
Dall-E 2, Imagen and others).



Speaker Bio-Sketch: Dr. Eli Shechtman is a Senior Principal Scientist at Adobe Research. He received his B.Sc. in Electrical Engineering from Tel-Aviv University in 1996 and his M.Sc. and Ph.D. in Applied Math and Computer Science from the Weizmann Institute of Science in 2003 and 2007. He then joined Adobe and also shared his time as a post-doc at the University of Washington between 2007-2010. His research interests include computer vision, computer graphics and machine learning. In particular, he is focusing on generative modeling and editing of visual data. He has published over 100 academic publications, most of them in top venues and journals in computer vision, graphics and machine learning. He served as a Technical Paper Committee member at SIGGRAPH 2013/14, was an Area Chair at CVPR 2015/17/20, ICCV 2015/19/21, ECCV 2022 and was an Associate Editor for TPAMI from 2016 to 2020. He has received several honors and awards, including the Best Paper prize at ECCV 2002, a Best Paper award at WACV 2018 and Helmholtz "Test of Time" prize at ICCV 2017. Two of his papers were chosen to be published as "Research Highlight" papers in the Communication of the ACM (CACM) journal. Some of his research can be found in Adobe's products such as Photoshop's Content Aware Fill, Smart Portrait and Landscape Mixer, Content Aware Fill for Video in After Effects, Upright in Lightroom and Characterizer in Character Animator.

KEYNOTE TALK

Monday, October 3, 2022 at 1:30pm

Sensible Machine Learning for Geometry

Justin Solomon
MIT
USA

Abstract: From 3D modeling to autonomous driving, a variety of applications can benefit from data-driven reasoning about geometric problems. The available data and preferred shape representation, however, varies widely from one application to the next. Indeed, the one commonality among most of these settings is that they are not easily approached using data-driven methods that have become de rigueur in other branches of computer vision and machine learning. In this talk, I will summarize recent efforts in my group to develop learning architectures and methodologies paired to specific applications, from point cloud processing to mesh and implicit surface modeling. In each case, we will see how mathematical structures and application-specific demands drive our design of the learning methodology, rather than bending application details or eliding geometric details to apply a standard data analysis technique.

Speaker Bio-Sketch: Justin Solomon is an associate professor in the MIT Department of Electrical Engineering and Computer Science. He leads the Geometric Data Processing Group in MIT's Computer Science and Artificial Intelligence Laboratory, which studies problems at the intersection of geometry, large-scale optimization, and applications like computer graphics and machine learning.

KEYNOTE TALK

Tuesday, October 4, 2022 at 9:00am

Designing Augmented Reality for the Future of Work

Doug Bowman
Virginia Tech
USA

Abstract: Augmented Reality (AR) technology has improved significantly in recent years, to the point where it is expected that major technology companies will release consumer-focused AR glasses in the near future. Technical challenges in optics, power, and tracking remain, but are solvable. But what will we use these AR glasses for, and how will they provide value? In this talk, I will argue that some of the most impactful applications of future AR glasses will be those that transform the way we work. Using examples from my research on AR for knowledge work and intelligent AR for construction work, I will explain why user experience considerations are crucial to the adoption of AR for future work. Studying the design of these applications today will lead to guidelines that can help ensure the success of AR for the future of work tomorrow.

Speaker Bio-Sketch: Doug A. Bowman is the Frank J. Maher Professor of Computer Science and Director of the Center for Human-Computer Interaction at Virginia Tech. He is the principal investigator of the 3D Interaction Group, focusing on user experience and user interface design for virtual reality and augmented reality systems. Dr. Bowman is one of the co-authors of 3D User Interfaces: Theory and Practice. He has served in many roles for the IEEE Virtual Reality Conference, including program chair, general chair, and steering committee chair. He also co-founded the IEEE Symposium on 3D User Interfaces (now part of IEEE VR). He received a CAREER award from the National Science Foundation for his work on 3D Interaction, and has been named an ACM Distinguished Scientist. He received the Technical Achievement award from the IEEE Visualization and Graphics Technical Committee in 2014, and the Career Impact award from IEEE ISMAR in 2021. His undergraduate degree in mathematics and computer science is from Emory University, and he received his M.S. and Ph.D. in computer science from the Georgia Institute of Technology.

BANQUET KEYNOTE TALK

Tuesday, October 4, 2022 at 7:00pm

The Future of Visual Computing via Foundation Models

Ce Liu
Azure Cognitive Services
Microsoft
USA

Abstract: Thanks to big data, computing power and modern network architecture, we are seeing a wave of continuous breakthroughs find their way into people's everyday lives. While modern AI has reached human parity on a few well-defined research benchmarks, a rapidly growing number of disjointed AI tasks are needed to mimic human intelligence in understanding the open and complex world. As each AI task is often defined by the statistics manifested from large amounts of task-specific data, we end up building expensive silos without a synergistic way of knowledge sharing and transferring among the different AI tasks.

In this keynote I will share the future of visual computing via large-scale image-language foundation models, such as CLIP and Florence (image to text) and Dall-E (text to image), as a new AI paradigm to integrate fragmented tasks. Empowered by a semantic layer learned from the latest transformers, these foundation models have demonstrated not only unprecedented capabilities in zero-shot and few-shot transfer learning for new tasks in the wild, but also fascinating potentials to unify common visual computing tasks such as recognition, detection, segmentation, captioning and image editing. I will also discuss how the research communities can develop disruptive and creative AI systems using foundation models of various modalities.

Speaker Bio-Sketch: Ce Liu received his B.E. and M.E. from Tsinghua University in 1999 and 2002, respectively. He received a PhD from MIT Department of Electrical Engineering and Computer Science in 2009. He worked at Microsoft Research Asia from 2002 to 2003, Microsoft Research New England from 2009 to 2014, and Google Research from 2014 to 2021. He was appointed as an adjunct assistant professor at Boston University to teach machine learning in 2013. He has published more than 70 papers in peer-reviewed conferences and journals. He received the best student paper award at NIPS 2006 and CVPR 2009, and the best paper award honorable mention at CVPR 2019. He is a recipient of TPAMI Young Research Award in 2016. His team won ECCV'2020 robust vision challenge on optical flow. He has been serving as area chairs for CVPR/ICCV/ECCV/NeurIPS/ICML/ICLR, an associate editor for TPAMI, and served as a Program co-Chair for CVPR 2020.

KEYNOTE TALK

Wednesday, October 5, 2022 at 9:00am

3D Reconstruction: Leveraging Synthetic Data for Lightweight Reconstruction

David Jacobs
University of Maryland
USA

Abstract: Reconstruction and regression tasks are central problems in computer vision. We consider, for example, using a single image to recover the 3D structure of an indoor or outdoor scene, or of a human face or body, or recovering the reflectance properties of surfaces or the lighting in a scene. However, in such tasks it is challenging to obtain large amounts of accurately labeled real training data; it's easy to label an image by saying: "this is a picture of a dog", but much harder to label the shape of an object or its reflectance properties, or the lighting in a scene. In many cases, computer graphics provides access to large quantities of labeled data, but there is a domain gap between real images and images generated by graphics. I'll discuss a series of works that address the challenge of using labeled synthetic data to infer properties of the world from real images. I'll discuss methods that are lightweight, in the sense of requiring only a single image or a few easily acquired images.

Speaker Bio-Sketch: Dr. David W. Jacobs is a professor in the Department of Computer Science at the University of Maryland with a joint appointment in the University's Institute for Advanced Computer Studies (UMIACS). He is currently on leave as an AI Research Scientist at Meta. He received a PhD from MIT and then conducted research at the NEC Research Institute, until he joined the CS department at the University of Maryland. Dr. Jacobs has worked in many areas of computer vision and machine learning. He has served as an Associate Editor of IEEE PAMI, an Area Editor for Computer Vision and Image Understanding, and as Program co-Chair for CVPR. He and his co-authors received honorable mention for the best paper award at CVPR 2000. He also co-authored a paper that received the best student paper award at UIST 2003, and he and his co-authors received the best paper award in Eurographics 2016. Dr. Jacobs and his collaborators have been awarded the 2011 Edward O. Wilson Biodiversity Technology Pioneer Award for the development of Leafsnap, an app for tree species identification that has been downloaded over 1.5 million times and widely used in education and biodiversity studies.

KEYNOTE TALK

Wednesday, October 5, 2022 at 1:30pm

Human-AI Interaction in Visual Analytics: Designing for the "Two Black Boxes" Problem

Chris North
Virginia Tech
USA

Abstract: Human-AI interaction plays a crucial role in visual analytics, enabling analysts to use AI to help analyze data. In support of this goal, explainable-AI visualizations seek to unmask the underlying details of black box AI learning algorithms, enabling human analysts to understand algorithmic state and results. However, to truly enable human-AI interaction, we will argue that there exists a second black box representing the cognitive process of the user, containing information which must be communicated to the algorithm. Using this "Two Black Boxes" problem as motivation, we propose a design philosophy for human-AI interaction. We discuss usability challenges associated with each phase of communication between the pair of cooperatively-learning entities and the benefits that emerge from opening the black boxes of human and AI for data analysis tasks.

Speaker Bio-Sketch: Dr. Chris North is a Professor of Computer Science at Virginia Tech in Blacksburg, VA, USA. He is Associate Director of the Sanghani Center for AI and Data Analytics (https://sanghani.cs.vt.edu), and leads the Visual Analytics research group (http://infovis.cs.vt.edu). He has served as General Co-Chair of IEEE VIS, and as Papers Co-Chair of the IEEE Information Visualization (InfoVis) and IEEE Visual Analytics Science and Technology (VAST) Conferences. He co-founded the Workshop on Machine Learning from User Interactions (https://learningfromusersworkshop.github.io). He served on editorial boards of IEEE Transactions on Visualization and Computer Graphics (TVCG) and the Information Visualization journal. He was awarded over $15M in grants, and co-authored over 125 peer-reviewed publications (http://scholar.google.com/citations?user=yBZ7vtkAAAAJ). As a leader in data science education at Virginia Tech, he founded the Graduate Certificate in Data Analytics and co-organized the Computation Modeling and Data Analytics undergraduate major. His research and education agenda seeks to enable effective human-AI interaction for big data analysis.

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