

16th International Symposium on Visual Computing

October 4-6, 2021, Virtual (Pacific Standard Time – PST)



ISVC 2021

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Registration Desk Hours: N/A

Publishers



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Monday, October 4th

8:50 – 9:00	Welcome – George Bebis , University of Nevada, Reno	
9:00–10:00	Keynote: Deva Ramanan , Carnegie Mellon University, USA Moderator: George Bebis	
	Parallel Sessions	
10:10-12:10	Deep Learning I Chair: Alireza Tavakkoli	Computer Graphics I Chair: Emily Hand
	10:10 Moaaz Allahham, Andreas Aakerberg, Kamal Nasrollahi and Kamal Nasrollahi . Real-World Thermal Image Super-Resolution	Haru Otani and Takashi Komuro . BRDF Measurement of Real Materials using Handheld Cameras
	10:30 Haisheng Li, Huafeng Huang and Fan Xue . QR Code Style Transfer Method Based on Conditional Instance Regularization	Antonio Ledesma and Robert R. Lewis . SORGATE: Extracting Geometry and Texture from Images of Solids of Revolution
	10:50 Rafaela Carvalho, João Pedrosa and Tudor-Ionut Nedelcu . Multimodal Multi-Tasking for Skin Lesion Classification using Deep Neural Networks	Mohammad Rakib Hasan, Debajyoti Mondal, Jarin Tasnim and Kevin Schneider . Putting Table Cartograms into Practice
11:10-11:30	Coffee Break	
	11:30 Dominic Ferreira and Brandon Haworth . DeepSolfège: Recognizing Solfège Hand Signs using Convolutional Neural Networks	Xingyu Lei, Nicoletta Adamo-Villani, Bedrich Benes, Alyssa Lawson, Richard Mayer, Zhiquan Wang and Zachary Meyer . Perceived Naturalness of Interpolation Methods for Character Upper Body Animation
	11:50 Tahjid Ashfaque Mostafa and Irene Cheng . Image Prior Transfer and Ensemble Architectures for Parkinson's Disease Detection	Xiao. S Zeng, Surya Dwarakanath, Wuyue Lu, Masaki Nakada and Demetri Terzopoulos . Neuromuscular Control of the Face-Head-Neck Biomechanical Complex With Learning-Based Expression Transfer From Images and Videos
10:10-12:10	Segmentation Chair: Mircea Nicolescu	
	10:10 Henry Velesaca Lara, Patricia Suarez, Dario Carpio and Angel Sappa . Synthesized Image Datasets: Towards an Annotation-Free Instance Segmentation Strategy	
	10:30 Tinghuai Wang, Guangming Wang and Kuan Eeik Tan . Holistically-Nested Structure-Aware Graph Neural Network for Road Extraction	
	10:50 Jian Shu, Yuehui Chen, Yi Cao and Yaou Zhao . Extraction and Merging of Stroke Structure of Chinese Characters	
11:10-11:30	Coffee Break	
	11:30 Alireza Rezaei, Sylvie Le Hégarat, Emanuel Aldea, Piercarlo Dondi and Marco Malagodi . Analysis of multi-temporal image series for the preventive conservation of varnished wooden surfaces	
	11:50	
12:10-1:30	Lunch Break	

1:30-2:30	<p><i>Keynote: Holly Rushmeier, Yale University, USA</i></p> <p><i>Moderator: Jim Klosowski</i></p>	
	Parallel Sessions	
2:40-4:40	<p>Visualization</p> <p>Chair: <u>Jim Klosowski</u></p>	
	2:40	Bijan Shahbaz Nejad, Peter Roch, Marcus Handte and Pedro José Marrón. Evaluating User Interfaces for a Driver Guidance System to Support Stationary Wireless Charging of Electric Vehicles
	3:00	Robin Horst, Micha Lanvers, László von Kacsoh and Ralf Dörneri. MOBA Coach: Exploring and Analyzing Multiplayer Online Battle Arena Data
	3:20	Ngan V.T. Nguyen, Huyen N. Nguyen and Tommy Dang. JobNet: 2D and 3D Visualization for Temporal and Structural Association in High-Performance Computing System
3:40-4:00	<i>Coffee Break</i>	
	4:00	Hamid Gadirov, Gleb Tkachev, Thomas Ertl and Steffen Frey. Evaluation and Selection of Autoencoders for Expressive Dimensionality Reduction of Spatial Ensembles
	4:20	Harsh Bhatia, Steve N Petruzza, Rushil Anirudh, Attila G Gyulassy, Robert M Kirby, Valerio Pascucci and Peer-Timo Bremer. Data-Driven Estimation of Temporal-Sampling Errors in Unsteady Flows
2:40-4:40	<p>Object Detection/Recognition</p> <p>Chair: <u>Vassilis Athitsos</u></p>	
	2:40	Yunlong Zhang and Seiji Hotta. Chicken Detection in Occlusion Scenes with Modified Single Shot MultiBox Detector
	3:00	Afsana Ahsan Jeny, Masum Shah Junayed and Md Baharul Islam. PoseTED: A Novel Regression-Based Technique for Recognizing Multiple Pose Instances
	3:20	Haitao Tian, Shiru Qu and Pierre Payeur. Unsupervised Pixel-wise Weighted Adversarial Domain Adaptation
3:40-4:00	<i>Coffee Break</i>	
	4:00	Kostas Blekos and Dimitrios Kosmopoulos. A Quantum 3D Convolutional Neural Networkwith Application in Video Classification
	4:20	

Tuesday, October 5th

9:00-10:00	<i>Keynote:</i> <u>Silvia Miksch</u>, Vienna University of Technology, Austria Moderator: <u>Peter Lindstrom</u>	
	Parallel Sessions	
10:10-12:10	Deep Learning II Chair: <u>Alireza Tavakkoli</u>	
	10:10	Xu Wang, Yuyan Li and Ye Duan. Fast Point Voxel Convolution Neural Network with Selective Feature Fusion for Point Cloud Semantic Segmentation
	10:30	Lakshya Lakshya. Behaviour of Sample Selection Techniques under explicit Regularization
	10:50	Ashiq Imran and Vassilis Athitsos. Adaptive Feature Norm for Unsupervised Subdomain Adaptation
11:10-11:30	<i>Coffee Break</i>	
	11:30	Hiroki Kobayashi, Ryo Miyoshi and Manabu Hashimoto. Normal Image Generation-based Defect Detection by Generative Adversarial Network with Chaotic Random Images
	11:50	Xu Wang, Yuyan Li, Chuanmao Fan and Ye Duan. SPNet: Multi-Shell Kernel Convolution for Point Cloud Semantic Segmentation
10:10-12:10	Computer Graphics II Chair: <u>Yan Tong</u>	
	10:10	Wanwan Li. Procedural Modeling of the Great Barrier Reef
	10:30	Yiyun Wang and Tim Mcgraw. Art-Directable Cloud and Smoke Animation
	10:50	Daljit Singh Dhillon. Physically-based Rendering of Simple Thin Volume Natural Nanostructures
11:10-11:30	<i>Coffee Break</i>	
	11:30	Vasileios Toulatzis and Ioannis Fudos. Deep Tiling: Texture Tile Synthesis Using a Constant Space Deep Learning Approach
	11:50	Abishek Kumar and Stefan Rank. BEAPS: Integrating volumetric dynamics in virtual agent prototyping
12:10-1:30	<i>Lunch Break</i>	

1:30-2:30	Keynote: Marc'Aurelio Ranzato, Facebook AI Research, USA Moderator: <u>Mircea Nicolescu</u>	
	Parallel Sessions	
2:40-3:40	ST: 3D Vision Chair: <u>Ken Moreland</u>	Virtual Reality Chairs: <u>Tim McGraw</u>
	2:40 Max Hermann, Thomas Pollok, Daniel Brommer and Dominic Zahn. iVS3D: An Open Source Framework for Intelligent Video Sampling and Preprocessing Alleviating 3D Reconstruction	Masamichi Iimori and Takashi Komuro. Wearable Augmented Reality System Using Head-mounted Projector
	3:00 Sixiong Xu, Pei Gong, Yanchao Dong, Lingling Gi, Cheng Huang and Sibiao Wang. Pose Estimation of Texture-less Targets for Unconstrained Grasping	Satoshi Moro and Takashi Komuro. Generation of Virtual Reality Environment Based on 3D Scanned Indoor Physical Space
	3:20 Su Wai Tun, Takashi Komuro and Hajime Nagahara. 3D Registration of Deformable Objects Using a Time-of-Flight Camera	Shubham Jain, Thomas Schweiss, Simon Bender and Dirk Werth. Omnichannel Retail Customer Experience with Mixed-Reality Shopping Assistant Systems
3:40-4:00	<i>Coffee Break</i>	
2:40-3:40	Motion and Tracking Chair: <u>Mircea Nicolescu</u>	
	2:40 Stefan Becker, Ronny Hug, Wolfgang Hübner, Michael Arens and Brendan Tran Morris. MissFormer: (In-) attention-based handling of missing observations for trajectory filtering and prediction	
	3:00 Lakshya Lakshya, Suneel Kota, Mallikarjun Volleti and Shivraj Singh. Compressed Domain Consistent Motion based Frame Scoring for IoT Edge Surveillance Videos	
	3:20 Nima Aghli and Eraldo Ribeiro. A Data-Driven Approach to Improve 3D Head-Pose Estimation	
3:40-4:00	<i>Coffee Break</i>	
4:00-5:30	Poster Session I	

Wednesday, October 6^h

9:00-10:00	<i>Keynote: Anatole Lécuyer, INRIA, France</i> <i>Moderator: Christos Mousas</i>	
	Parallel Sessions	
10:10-12:10	Applications <i>Chair: Christos Mousas</i>	
	10:10	Naser Damer, Kiran Raja, Marius Süßmilch, Sushma Venkatesh, Fadi Boutros, Meiling Fang, Florian Kirchbuchner, Raghavendra Ramachandra and Arjan Kuijper. ReGenMorph: Visibly Realistic GAN Generated Face Morphing Attacks by Attack Re-generation
	10:30	Peter Roch, Bijan Shahbaz Nejad, Marcus Handte and Pedro José Marrón. Car Pose Estimation through Wheel Detection
	10:50	Pedro Pinho, Isabel Rio-Torto and Luís F. Teixeira. Improving automatic quality inspection in the automotive industry by combining simulated and real data
11:10-11:30	<i>Coffee Break</i>	
	11:30	Naser Damer, Noemie Spiller, Meiling Fang, Fadi Boutros, Florian Kirchbuchner and Arjan Kuijper. PW-MAD: Pixel-wise Supervision for Generalized Face Morphing Attack Detection
	11:50	Giuseppe Placidi, Giovanni De Gasperis, Filippo Mignosi, Matteo Polsinelli and Matteo Spezialetti. Integration of a BCI with a hand tracking system and a motorized robotic arm to improved decoding of brain signals related to hand and finger movements
10:10-12:10	ST: Medical Image Analysis <i>Chair: Fabien Scalzo</i>	
	10:10	Ryota Matsui, Takafumi Koyama, Koji Fujita, Hideo Saito and Yuta Sugiura. Ensemble Video-Based Hand Tracking for Screening Cervical Myelopathy
	10:30	Lan Phan Ngoc, An Nguyen Sy, Hang Dao Viet, Long Dao Van, Trung Tran Quang, Thuy Nguyen Thi and Sang Dinh Viet. NeoUNet: Towards accurate colon polyp segmentation and neoplasm detection
	10:50	Rosiel Jazmine Villareal and Patricia Angela Abu. Patch-based Convolutional Neural Networks for TCGA-BRCA Breast Cancer Classification
11:10-11:30	<i>Coffee Break</i>	
	11:30	Kellen Cheng, Kunakorn Atchaneeyasakul, Zeid Barakat, David Liebeskind and Fabien Scalzo. CT Perfusion Imaging of the Brain with Machine Learning
	11:50	Bingnan Zhou, Farnaz Mohammadi, Jung S. Lim, Negin Forouzesh, Hassan Ghasemzadeh and Navid Amini. Analysis of Macular Thickness Deviation Maps for Diagnosis of Glaucoma
12:10-1:30	<i>Lunch Break</i>	

1:30-2:30	<p><i>Keynote:</i> Pedro Felipe Felzenszwalb, Brown University, USA Moderator: <u>Alireza Tavakkoli</u></p>	
	Parallel Sessions	
2:40-3:40	<p>Pattern Recognition Chair: <u>Brandon Haworth</u></p>	
	2:40	Konstantinos Panagiotis Panousis, Sotirios Chatzis and Sergios Theodoridis. Variational Conditional Dependence Hidden Markov Models for Skeleton-Based Action Recognition
	3:00	Veysel Kocaman, Ofer M. Shir and Thomas Bäck. The Unreasonable Effectiveness of the Final Batch Normalization Layer
	3:20	
3:40-4:00	Coffee Break	
2:40-3:40	<p>ST: Video Analysis and Event Recognition Chair: <u>Vassilis Athitsos</u></p>	
	2:40	Saif Sayed and Vassilis Athitsos. Cross Your Body: A Cognitive Assessment System for Children
	3:00	Michael Bidstrup, Jacob V. Dueholm, Kamal Nasrollahi and Thomas B. Moeslund. Privacy-aware Anomaly Detection using Semantic Segmentation
	3:20	Sudha Krishnamurthy. Learning Self-Supervised Audio-Visual Representations for Sound Recommendations
3:40-4:00	Coffee Break	
4:00-5:30	Poster Session II	

Poster Session I

Tuesday, October 5th (4:00pm-5:30pm)

Andre Coleiro and Daren Scerri . Security automation through a non-invasive multi-processing real-time system for the re-identification of persons or objects
Takahiro Suzuki and Manabu Hashimoto . A Method for Transferring Robot Motion Parameters using Functional Attributes of Parts
Jingrui Song, Shuling Hao and Kefeng Xu . Uncooperative Satellite 6D Pose Estimation with Relative Depth Information
Patricia Suárez, Dario Carpio and Angel Sappa . Non-Homogeneous Haze Removal through a Multiple Attention Module Architecture
Oumayma Messoussi, Felipe Gohring de Magalhães, Francois Lamarre, Francis Perreault, Ibrahima Sogoba, Guillaume-Alexandre Bilodeau and Gabriela Nicolescu . Vehicle Detection and Tracking From Surveillance Cameras in Urban Scenes
Vitor Peres and Soraia Musse . Towards the creation of spontaneous datasets based on Youtube Reaction Videos
Marufi Rahman, Junghwan Oh, Wallapak Tavanapong, Johnny Wong and Piet C. de Groen . Automated Bite-block Detection to distinguish Colonoscopy from Upper endoscopy using Deep Learning
Bidur Khanal and Christopher Kanan . How Does Heterogeneous Label Noise Impact Generalization in Neural Nets?
Daniel N. Nissani-Nissensohn . A Simple Generative Network
Vahid Khorasani Ghassab and Nizar Bouguila . Hyperspectral Video Super-Resolution using Beta process and Bayesian dictionary learning
Robert Laurensen and Clark Olson . Adding Color Information to Spatially-Enhanced, Bag-of-Visual-Words Models
Tae Hong, Farnaz Mohammadi, Rohan Chetterjee, Eric Chan, Mohammad Pourhomayoun, Kouros Nouri-Mahdavi, Vahid Mohammadzadeh and Navid Amini . A Novel Similarity Measure for Retinal Optical Coherence Tomography Images
Eri Mochizuki, Haruka Sone, Hayato Itoh and Atsushi Imiya . Subspace Discrimination Method for Images Using Singular Value Decomposition
Eduardo Silva, Ana Sampaio, Luís Teixeira and Maria Vasconcelos . Cervical cancer detection and classification in cytology images using a hybrid approach
Alonso Cerpa, Graciela Meza-Lovon and Manuel Loaiza . Ensemble Learning with instance segmentation models synthetically trained to perform segmentation on real machinery images
Biao Yang, Fanghui Xue, Yingyong Qi and Jack Xin . Improving Efficient Semantic Segmentation Networks by Enhancing Multi-Scale Feature Representation via Resolution Path Based Knowledge Distillation and Pixel Shuffle

Poster Session II

Wednesday, October 6th (4:00pm-5:30pm)

Hassan Imani and Md Baharul Islam . Towards Stereoscopic Video Deblurring Using Deep Convolutional Networks
Luis Ronald Istaña Chipana and Manuel Eduardo Loaiza Fernández . Color Point Pair Feature Light
Marnim Galib, Giffy Jerald Chris and Vassilis Athitsos . Semi Automatic Hand Pose Annotation using a Single Depth Camera
Michael Burch, Günter Wallner, Huub van de Wetering, Shahrukh Tufail, Linda Zandt-Sloot, Stasius Gladkis, Minji Hong and Carlo Lepelaars . FamSearch: Visual Analysis of Genealogical Data
William Porter, Conor Murphy, Dane Williams, Brendan O'Handley and Chaoli Wang . Hierarchical Sankey Diagram: Design and Evaluation
Chad Mourning and Simbo Odunaiya . Dynamic Antenna Pattern Visualization for Aviation Safety Incorporating Multipath and Situational Awareness
David Desobry, François Protais, Nicolas Ray, Etienne Corman and Dmitry Sokolov . Frame Fields for CAD models
Bastian Krayner and Stefan Müller . Hierarchical Point Distance Fields
Rubén Cuba and Manuel Loaiza . Parallel Sphere Packing for Arbitrary Domains
Ankita Christine Victor and Jaya Sreevalsan-Nair . Building 3D Virtual Worlds From Monocular Images of Urban Road Traffic Scenes
Zachary Meyer, Nicoletta Adamo and Bedrich Benes Bodily Expression of Emotions in Animated Agents
Vivek Sridhar, Michael Breuß and Marvin Kahra . Fast Approximation of Color Morphology
Steffen Moritz, Christoph Schlüter and Benjamin Wagner Vom Berg . Augmented Reality Gamification of Intra- and Production Logistics
Mauricio Chiliquinga, Edison Mañay and Edgar Rivera . Virtual Training System Based on the Physiological Cycle of the Potato INIAP Suprema
Ying Zhu and Julia Gumieniak . Computer-Assisted Heuristic Evaluation of Data Visualization

KEYNOTE TALK

Monday, October 4, 2021 at 9am

Embodied perception in-the-wild

Deva Ramanan
Carnegie-Mellon University
USA

Abstract: Computer vision is undergoing a period of rapid progress, rekindling the relationship between perception, action, and cognition. Such connections may be best practically explored in the context of autonomous robotics. In this talk, I will discuss perceptual understanding tasks motivated by embodied "in-the-wild" autonomous robots, focusing on the illustrative case of autonomous vehicles. I will argue that many challenges that surface are not well-explored in contemporary computer vision. These include streaming perception with bounded resources, generalization via spatiotemporal grouping, rethinking the interface between perception and action, and robust processing that can recognize anomalous out-of-sample events. I will conclude with a description of open challenges for embodied perception in-the-wild.



Speaker Bio-Sketch: Deva Ramanan is a Professor in the Robotics Institute at Carnegie-Mellon University and the director of the CMU Argo AI Center for Autonomous Vehicle Research. His research interests span computer vision and machine learning, with a focus on visual recognition. He was awarded the David Marr Prize in 2009, the PASCAL VOC Lifetime Achievement Prize in 2010, the IEEE PAMI Young Researcher Award in 2012, named one of Popular Science's Brilliant 10 researchers in 2012, named a National Academy of Sciences Kavli Fellow in 2013, won the Longuet-Higgins Prize in 2018 for fundamental contributions in computer vision, and was recognized for best paper awards in CVPR 2019 and ECCV 2020. His work is supported by NSF, ONR, DARPA, as well as industrial collaborations with Intel, Google, and Microsoft. He served at the program chair

of the IEEE Computer Vision and Pattern Recognition (CVPR) 2018. He is on the editorial board of the International Journal of Computer Vision (IJCV) and is an associate editor for the IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI). He regularly serves as a senior program committee member for CVPR, the International Conference on Computer Vision (ICCV), and the European Conference on Computer Vision (ECCV). He also regularly serves on NSF panels for computer vision and machine learning.

KEYNOTE TALK

Monday, October 4, 2021 at 1:30pm

Design Tools for Material Appearance

Holly Rushmeier
Yale University
USA

Abstract: The design of material appearance for both virtual and physical design remains a challenging problem. There aren't straightforward intuitive techniques as there are in geometric design where shapes can be sketched or assembled from geometric primitives. In this talk I will present a series of contributions to developing intuitive appearance design tools. This includes studies of material appearance perception which form the basis of the development of perceptual axes for reflectance distribution design. I will also present novel interfaces for design including hybrid slider/image navigation and augmented reality interfaces. I will discuss the unique problems involved in designing appearance for objects to be physically manufactured rather than simply displayed in virtual environments. Finally, I will show how exemplars of spatially varying materials can be inverted to produce procedural models.



Speaker Bio-Sketch: Holly Rushmeier is the John C. Malone professor of Computer Science at Yale University. She received the BS (1977), MS (1986), and PhD (1988) in Mechanical Engineering from Cornell University. Since receiving the PhD she has held positions at Georgia Tech, NIST and IBM TJ Watson Research. Her area of interest is computer graphics. Her current research focuses on material appearance modeling, applications of perception to computer graphics, and applications of computer graphics to cultural heritage preservation. Her past projects include a project to create a digital model of Michelangelo's Florence Pieta and models of Egyptian cultural artifacts in a joint project between IBM and the Government of Egypt. She is coauthor of the text "Digital Modeling of Material Appearance." Dr. Rushmeier has served as the co-chair of the ACM Publications Board, the Editor-in-Chief of ACM Transactions on Graphics and as co-Editor-in-Chief of Computer Graphics Forum. She is an ACM Fellow, a Fellow of the Eurographics Association and recipient of the 2013 ACM SIGGRAPH Computer Graphics Achievement Award.

KEYNOTE TALK

Tuesday, October 5, 2021 at 9am

Guidance-Enriched Visual Analytics: Challenges and Opportunities

Silvia Miksch
TU Wien
Austria

Abstract: On the one hand, we investigate appropriate, expressive, and effective Visual Analytics concepts and solutions for particular users, their data, and their tasks in mind. On the other hand, we explore the usage and potential of guidance. Guidance aims to support the user while working with Visual Analytics solutions. Guidance assists users with the selection of appropriate visual means and interaction techniques, the utilization of analytical methods, as well as the configuration instantiation of these algorithms with suitable parameter settings and the combinations thereof. After a visualization or Visual Analytics method and parameters are selected, guidance is also needed to explore the data, identify interesting data nuggets and findings, collect and group insights to explore high level hypotheses, and gain new insights and knowledge. In this talk, I will contextualize the different aspects of guidance-enriched Visual Analytics. I will present a framework for guidance designers which comprising requirements, a set of specific phases with quality criteria designers should go through when designing guidance-enriched Visual Analytics. Various examples will illustrate what has been achieved so far and show possible future directions and challenges.



Speaker Bio-Sketch: Silvia Miksch is University Professor and head of the Research Division “Visual Analytics” (CVASt), Institute of Visual Computing and Human-Centered Technology, TU Wien. She served as paper co-chair of several conferences including IEEE VAST 2010, 2011 and 2020 and VIS Overall Papers Chair (IEEE VIS 2021) as well as EuroVis 2012 and on the editorial board of several journals including IEEE TVCG and CGF. She acts in various strategic committees, such as the VAST steering committee and the VIS Executive Committee. In 2020 she was inducted into The IEEE Visualization Academy. Her main research interests are Visualization/Visual Analytics (particularly Focus+Context and Interaction) and Time.

KEYNOTE TALK

Tuesday, October 5, 2021 at 1:30pm

Learning and accruing knowledge over time using modular architectures

Marc'Aurelio Ranzato
Facebook AI Research
USA

Abstract: A typical trait of any intelligent system is the ability to learn new skills quickly without too many interactions with a teacher. Over time we also would expect an intelligent system to become better at solving new tasks, coming up with a better solution in even less time if the new task relates to something already learned in the past. While nowadays machine learning methods excel at learning a single task from large amounts of labeled data, and more recently, even from little labeled data provided suitable pretraining on a vast amount of unlabeled data, knowledge is seldom accrued over time. Whenever more data and compute are available, bigger models are often retrained from scratch. In this talk, I argue that by considering the sequence of learning tasks, and more generally, the sequential nature of the data acquisition process, we may grant our artificial learners an unprecedented opportunity to transfer knowledge and even accrue knowledge over time, potentially leading to more efficient and effective learning of future tasks. From the modeling side, I will introduce a few variants of hierarchical mixtures of experts, which are deep modular networks. These architectures are appealing for a twofold reason. First, since they are modular it is natural to add modules over time to accommodate the acquisition of new knowledge. The modularity also leads to computational efficiency since run time can be made constant with respect to the number of modules. Second, by recombining modules in novel ways compositional generalization emerges, yielding learners that learn faster as time goes by. I will demonstrate these ideas on several learning settings applied to vision, namely compositional 0-shot learning, continual learning and anytime learning. Although these are admittedly baby steps towards our grand goal, I believe there is an untapped potential for more effective and efficient learning once we frame learning as a life-long learning experience.



Speaker Bio-Sketch: Marc'Aurelio Ranzato is a research scientist at DeepMind in London. His research interests are in the area of unsupervised learning, continual learning and transfer learning, with applications to vision, natural language understanding and speech recognition. In 2009 Marc'Aurelio earned a PhD in Computer Science at New York University under Yann LeCun's supervision. After a postdoc with Geoffrey Hinton at University of Toronto, he joined the Google Brain team in 2011. In 2013 he moved to Facebook and was a founding member of the Facebook AI Research lab. He then joined DeepMind in 2021. Marc'Aurelio has served as program chair for ICLR 2017, ICLR 2018 and NeurIPS 2020. He is now serving as the general chair of NeurIPS 2021.

KEYNOTE TALK

Wednesday, October 6, 2021 at 9am

Combining Brain-Computer Interfaces and Virtual Reality: Novel 3D Interactions and Promising Applications

Anatole Lécuyer
INRIA
France

Abstract: In this talk I will present a research path on Brain-Computer Interfaces (BCI) aiming to establish a solid connection with Virtual Reality (VR) and Augmented Reality (AR). I will first evoke the great success of OpenViBE, an open-source software platform dedicated to BCI research used today all over the world, notably with VR systems. Then, I will illustrate how BCI and VR/AR technologies can be combined to design novel 3D interactions and effective applications, e.g. for health, sport, entertainment, or training.



Speaker Bio-Sketch: Anatole Lécuyer is Senior Researcher and Head of Hybrid research team, at Inria, the French National Institute for Research in Computer Science and Control, in Rennes, France. His research interests include virtual reality, haptic interaction, 3D user interfaces, and brain-computer interfaces. He regularly serves as expert in Virtual Reality and BCI for public bodies such as European Commission (EC), European Research Council (ERC), or French National Research Agency (ANR). He is currently Associate Editor of "IEEE Transactions on Visualization and Computer Graphics", "Frontiers in Virtual Reality" and "Presence" journals. He was notably Program Chair of IEEE Virtual Reality Conference (2015-2016) and General Chair of IEEE Symposium on Mixed and Augmented Reality (2017). He is author or co-author of more than 200 scientific publications. Anatole Lécuyer obtained the Inria-French Academy of Sciences Young Researcher Prize in 2013, and the IEEE VGTC Technical Achievement Award in Virtual/Augmented Reality in 2019.

KEYNOTE TALK

Wednesday, October 6, 2021 at 1:30pm

Direct estimation of appearance models for image segmentation

Pedro Felzenszwalb
Brown University
USA

Abstract: Image segmentation algorithms often depend on appearance models that characterize the distribution of pixel values in different image regions. We describe a novel approach for estimating appearance models directly from an image, without explicit consideration of the pixels that make up each region. Our approach is based on algebraic expressions that relate local image statistics to the appearance models of spatially coherent regions. The approach leads to two different algorithms for estimating appearance models. We present experimental results that demonstrate the proposed methods work well in practice and lead to effective image segmentation algorithms.



Speaker Bio-Sketch: Pedro Felipe Felzenszwalb received the BS degree in computer science from Cornell University in 1999. He received the MS and PhD degrees in computer science from MIT in 2001 and 2003. His main research interests are in computer vision, geometric algorithms and artificial intelligence. He was a professor of Computer Science at the University of Chicago from 2004 to 2011. He joined Brown University in 2011, where he is currently a Professor of Engineering and Computer Science. His work has been supported by the National Science Foundation, including a CAREER award received in 2008. He received the Longuet-Higgins Prize for a fundamental contribution to computer vision in 2010 and 2018. He is also the recipient of an IEEE Technical Achievement Award and the 2013 ACM Grace Murray Hopper Award.

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