

Vladimir Pavlovic

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Google Scholar <https://scholar.google.com/citations?user=8MQT8skAAAAJ&hl=en>

Education

Ph.D. Ph.D. in Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, 1999
 Dissertation: *Dynamic Bayesian Networks for Information Fusion in Advanced Human-Computer Interaction*
 Advisor: Thomas S. Huang

M.S. M.S. in Electrical Engineering, University of Illinois at Chicago, 1993
 Thesis: *Stochastic Noise Process Enhancement of Hopfield Neural Networks*
 Advisor: Dan Schonfeld

Diploma Diploma in Electrical Engineering, University of Novi Sad, Yugoslavia, 1991
 Thesis: *Automatic Speech Recognition*

Professional Experience

09/2018-present Principal Scientist & Laboratory Head
 Special Projects
 Samsung AI Center
 Cambridge, UK

07/2016-present Full Professor
 Dept. of Computer Science
 Rutgers University

07/2008-06/2016 Associate Professor
 Dept. of Computer Science
 Rutgers University

08/2002-06/2008 Assistant Professor
 Dept. of Computer Science
 Rutgers University

07/2001-08/2002 Research Assistant Professor
 Bioinformatics Program
 Boston University

01/1999-06/2001 Member of Research Staff / Research Scientist
 Cambridge Research Laboratory
 Compaq Computer Corporation

- 08/1994-12/1998 Research Assistant
Beckman Institute for Advanced Science and Technology
University of Illinois at Urbana-Champaign
- 08/1993-08/1997 Research Specialist / Assistant
Department of Psychology
University of Illinois at Urbana-Champaign
- 08/1991-08/1993 Teaching Assistant
Department of Electrical Engineering and Computer Science
University of Illinois at Chicago

Professional Expertise

Reasoning under uncertainty.
Modeling and analysis of sequences.
Statistical machine learning.
Computer vision.
Multimodal data analysis.
Structured data analysis.
Domain adaptation & transfer learning.
Bioinformatics.

Complete Vita <http://seqamlab.com/wp-content/uploads/pdf/vita.pdf>

Overview of Recent Projects & Activities

- Summary** I work in the broad area of probabilistic machine learning, with focus on multimodal and structured data. Structured data is any data that does not follow traditional iid assumptions, for example sequences, data on uniform grids (images, video), or data on graphs (protein networks, etc.). Traditional machine learning approaches cannot effectively model and do not scale to structured data domains. Mutlimodal data is characterized by data that simultaneously occurs (or has views) in different domains; for example, any social communication signal is often simultaneously conveyed through visually and aurally observed cues, which can be complementary, exclusive, or contradicting. Image data is frequently accompanied by textual descriptions or other types of auxiliary information, such as labels, etc. Traditional learning approaches cannot typically deal with this multiality of representations. I work on developing efficient models and algorithms, including **deep Bayesian models (Variational Autoencoders)**, **cross-domain and cross-modal adaptation & translation models**, and **fast meta-learning frameworks**, to solve these problems.
- Deep Representation Learning & Domain Transfer** Data, such as images, videos, or text, are inherently high-dimensional, a result of interactions of many complex factors such as lighting, illumination, geometry, context, etc. Identifying those factors and their intricate interplay is the key not only to explaining the sources of variability in the data but also to efficiently representing the same data for subsequent analysis, classification, or even re-synthesis. Representation Learning aims to tackle this fundamental but complex problem. We recently developed efficient deep Bayesian formalisms for the task of *unsupervised non-linear disentanglement* Kim, Wang, Sahu, and Pavlovic, 2019a; 2019b and learning how to effectively *transfer* knowledge across domains Gholami, Sahu, Kim, and Pavlovic, 2019; Gholami, Rudovic, Bousmalis, and Pavlovic, n.d.; Kim, Sahu, Gholami, and Pavlovic, 2019.
- Distributed Probabilistic Learning** In this project, we aimed to address the key question of how to learn a set of machine learning models, possibly distributed on a network of devices or sensors where each model can see only its own data, so as to guarantee that the collection of models integrates all data knowledge across the network after efficient exchange of messages among those models. We developed an effective and practical solution using the consensus learning for probabilistic models on graphs Yoon and Pavlovic, 2012, including some of the first methods that allow one to improve distributed learning computational performance Song, Yoon, and Pavlovic, 2016 and generalize it to a full Bayesian setting Babagholami, Yoon, and Pavlovic, 2016.
- Dynamic Human Affect & Social Signal Processing** Understanding non-verbal signals in human communication, particularly human affect, is the key to building the next generations of human-computer interfaces, including interactive robot assistants, chatbots, etc. We have developed a set of state-of-the-art machine learning models and techniques to estimate dynamic human affect from video. These techniques aim to estimate emotions and their dynamic characteristics, such as intensity, as they vary over time, valence or arousal, as well as the action unit codes of non-verbal behavior Kim and Pavlovic, 2010; Walecki, Rudovic, Pavlovic, and Pantic, 2016; 2017a; 2017b. Coupled with meta-learning methods, those models can be used to rapidly personalize and, hence, improve the accuracy of social signal models Lee, Rudovic, Pavlovic, and Pantic, 2019.
- Deep Learning for Crowd Analytics** Predicting and understanding the behavior of human crowds in complex environments is a key requirement for crowd and disaster management, architectural design, and urban planning. We are working on a project to develop a new, state-of-the-art deep learning framework to instantly predict the long-term flow of crowds in arbitrarily large, realistic environments. In this context, we have developed a combination of physics-

based and deep data-driven models that can be used to predict crowd behavior, assess the generalization of performance of crowd models, as well as efficiently compress representations to enable scale-free model generalization Sohn et al., 2019; Qiao, Zhou, Yoon, Kapadia, and Pavlovic, 2019; Qiao, Yoon, Kapadia, and Pavlovic, 2018; Liu et al., 2017; Yoon, Kapadia, Sahu, and Pavlovic, 2016.

3D Face Modeling, Tracking, and 3D Avatars

Modeling the geometry and estimating the motion of the human face is a challenging problem in computer vision, with many applications in biometrics, HCI, telepresence, and games. We developed a real-time, state-of-the-art RGBD tracker that leverages statistics of very dense, deformable 3D face shapes to constrain the pose and expression tracking process H. X. Pham and Pavlovic, 2014; Chen, Pham, Pavlovic, Cai, and Shi, 2014; H. X. Pham, Pavlovic, Cai, and Cham, 2016; Sheng, Cai, Cham, Pavlovic, and Ngan, 2019. This model was also used for a different but highly related task of denoising and refining depth images Chen et al., 2014; Chen et al., 2017. More recently, we used this family of 3D models to create realistic speech-driven 3D avatars, which can turn emotional speech into dynamic 3D avatar face expressions H. Pham and Pavlovic, 2017; H. X. Pham, Wang, and Pavlovic, n.d.

Computational Biology

Analysis of large-scale sequential data has been a critical task in modern machine learning, driven by many scientific and technological applications such as the analysis of biological sequences. We have developed a new framework for solving large-scale sequence matching, comparison, classification, and pattern extraction problems in linear time. This framework includes highly scalable sequence kernel models P. Kuksa, Huang, and Pavlovic, 2008a; 2008b; 2008c; P. P. Kuksa, Khan, and Pavlovic, 2012, with applications to challenging problems of DNA barcoding P. Kuksa and Pavlovic, 2007a; P. Kuksa and Pavlovic, 2007b; 2009 and proteomic analysis and motif extraction P. Kuksa et al., 2008a; 2008b; 2008d; P. P. Kuksa, Huang, and Pavlovic, 2009; P. P. Kuksa and Pavlovic, 2012. More recently, we coupled sequence kernel approaches with modern deep learning frameworks Laradji, Schmidt, Pavlovic, and Kim, 2019, resulting in strong models that benefit from explicit feature learning and scalable computation on structured data.

Computational Nutrition & Digital Gastronomy

The domains of human behavior and wellness, including nutrition, are some of the new and unexplored spaces where AI and Machine Learning can make essential and lasting contributions. Our recent engagement in the fields of Digital Gastronomy and AI for Nutrition aims to develop fundamental computational approaches that can help address challenging problems, such as the seamless means for tracking food intake, accurately estimating the amount of food consumed in each meal or its effects on mental wellness, assisting with the process of food preparation using cooking robotic companions, as well as the means to gamify nutritional wellness and gastronomy through automated creation of meal reflections. Some the examples of those applications are a deep learning-based system for retrieval of meal ingredients and amounts from images of prepared food items Li, Guerrero, and Pavlovic, 2019 or the deep translation model for synthesis of food images from recipes Han, Guerrero, and Pavlovic, 2019; 2020.

Publications

- Ph.D. Thesis Pavlovic, V. (1999). *Dynamic Bayesian Networks for Information Fusion with Application to Human-Computer Interfaces* (Doctoral dissertation, University of Illinois at Urbana-Champaign).
- Referred Journal Papers Zhao, L., Han, F., Peng, X., Zhang, X., Kapadia, M., Pavlovic, V., & Metaxas, D. N. (2019). “[Cartoonish sketch-based face editing in videos using identity deformation transfer](#)”. *Computers & Graphics*, 79, 58–68.
- Sheng, L., Cai, J., Cham, T., Pavlovic, V., & Ngan, K. N. (2019). “[Visibility Constrained Generative Model for Depth-Based 3D Facial Pose Tracking](#)”. *IEEE Trans. Pattern Anal. Mach. Intell.* 41(8), 1994–2007.
- Kim, J., & Pavlovic, V. (2017). “[Discovering Characteristic Landmarks on Ancient Coins Using Convolutional Networks](#)”. *SPIE Journal of Electronic Imaging*. Accepted for publication. 50% contribution.
- Chen, C., Pham, H. X., Pavlovic, V., Cai, J., Shi, G., & Gao, Y. (2017). “[Using 3D Face Priors for Depth Recovery](#)”. *J. Visual Commun. Image Represent.*
- Walecki, R., Rudovic, O., Pavlovic, V., & Pantic, M. (2017). “[A Copula Ordinal Regression Framework for Joint Estimation of Facial Action Unit Intensity](#)”. *IEEE Trans. Affective Computing*. 25% contribution.
- Mehrizi, R., Xu, X., Zhang, S. T., Pavlovic, V., Metaxas, D., & Li, K. (2017). “Using a Marker-Less Method for Estimating L5/S1 Moments during Symmetrical Lifting Applied Ergonomics”. *Applied Ergonomics*, 541–550.
- Walecki, R., Rudovic, O., Pavlovic, V., & Pantic, M. (2016). “[Variable-state Latent Conditional Random Field Models for Facial Expression Analysis](#)”. *Image and Vision Computing*. 25% contribution.
- Shariat, S., & Pavlovic, V. (2014). “[Robust Time-Series Retrieval Using Probabilistic Adaptive Segmental Alignment](#)”. *Knowledge and Information Systems*. accepted. 50% contribution.
- Rudovic, O., Pavlovic, V., & Pantic, M. (2015). “[Context-Sensitive Dynamic Ordinal Regression for Intensity Estimation of Facial Action Units](#)”. *IEEE Trans. Pattern Anal. Mach. Intell.* 37(5), 944–958. 33% contribution.
- Nicolaou, M. A., Pavlovic, V., & Pantic, M. (2014). “[Dynamic Probabilistic CCA for Analysis of Affective Behavior and Fusion of Continuous Annotations](#)”. *IEEE Trans. Pattern Anal. Mach. Intell.* 36(7), 1299–1311. 33% contribution.
- Kim, M., & Pavlovic, V. (2011a). “[Central Subspace Dimensionality Reduction Using Covariance Operators](#)”. *IEEE Trans. Pattern Anal. Mach. Intell.* 33(4), 657–670. 50% contribution.
- Kim, M., & Pavlovic, V. (2011b). “[Sequence classification via large margin hidden Markov models](#)”. *Data Min. Knowl. Discov.* 23(2), 322–344. 50% contribution.
- Mitrofanova, A., Pavlovic, V., & Mishra, B. (2011). “[Prediction of Protein Functions with Gene Ontology and Interspecies Protein Homology Data](#)”. *IEEE/ACM Trans. Comput. Biology Bioinform.* 8(3), 775–784. 33% contribution.
- Makadia, A., Pavlovic, V., & Kumar, S. (2010). “[Baselines for Image Annotation](#)”. *International Journal of Computer Vision*, 90(1), 88–105. 33% contribution.
- Kim, M., & Pavlovic, V. (2009). “[Discriminative Learning for Dynamic State Prediction](#)”. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 31(10), 1847–1861.

- Kuksa, P. P., Huang, P.-H., & Pavlovic, V. (2009). “Efficient use of unlabeled data for protein sequence classification: a comparative study”. *BMC Bioinformatics*, 10(S-14).
- Kuksa, P., & Pavlovic, V. (2009). “Efficient alignment-free DNA barcode analytics”. *BMC Bioinformatics*, 10(S-14).
- Jing, Y., Pavlovic, V., & Rehg, J. M. (2008). “Boosted Bayesian network classifiers”. *Machine Learning Journal*, 73(2). 33% contribution.
- Huang, P.-H., & Pavlovic, V. (2008). “Protein homology detection with biologically inspired features and interpretable statistical models”. *Int. J. Data Min. Bioinformatics*, 2(2), 157–175. 50% contribution.
- Carroll, S., & Pavlovic, V. (2006). “Protein Classification Using Probabilistic Chain Graphs and the Gene Ontology Structure”. *Bioinformatics*, 22(15), 1871–8. 50% contribution.
- Pavlovic, V., Schonfeld, D., & Friedman, G. (2005). “Stochastic noise process enhancement of Hopfield neural networks”. *IEEE Trans. Circuits and Systems II*, 52(4), 213–217. 50% contribution.
- Garg, A., Pavlovic, V., & Rehg, J. M. (2003). “Boosted learning in dynamic Bayesian networks for multimodal speaker detection”. *Proc. of the IEEE*, 91(9), 1355–1369. 33% contribution.
- Zhang, L., Pavlovic, V., Cantor, C., & Kasif, S. (2003). “Human-mouse gene identification by comparative evidence integration and evolutionary analysis”. *Genome Research*, 13(6A), 1190–202. 50% contribution.
- Su, Y., Murali, T. M., Pavlovic, V., Schaffer, M., & Kasif, S. (2003). “RankGene: Identification of diagnostic genes based on expression data”. *Bioinformatics*, 19(12), 1578–9. 20% contribution.
- Walker, M., Pavlovic, V., & Kasif, S. (2002). “A comparative genomic method for computational identification of prokaryotic translation initiation sites”. *Nucleic Acids Research*, 30(14), 3181–91. 33% contribution.
- Pavlovic, V., Garg, A., & Kasif, S. (2002). “A Bayesian framework for combining gene predictions.” *Bioinformatics*, 18(1), 19–27. 33% contribution.
- Sharma, R., Pavlovic, V., Huang, T., Lo, Z., Chu, S., Zhao, Y., . . . Schulten, K. (2000). “Speech/gesture interface to a visual computing environment for molecular biologists”. *IEEE Computer Graphics and Applications*, 20(2), 29–37. 20% contribution.
- Pavlovic, V., Moulin, P., & Ramchandran, K. (1999). “Integrated framework for adaptive subband image coding”. *IEEE Transactions on Signal Processing*, 47(4), 1024–1038. 33% contribution.
- Sharma, R., Pavlovic, V., & Huang, T. S. (1998). “Towards multimodal human-computer interface”. *Proc. of the IEEE*, 86(5), 853–869. 33% contribution.
- Pavlovic, V., Sharma, R., & Huang, T. (1997). “Visual interpretation of hand gestures for human-computer interaction: A review”. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 19(7), 677–695. 33% contribution.
- Pham, H. X., Wang, Y., & Pavlovic, V. (n.d.). *Generative Adversarial Talking Head: Bringing Portraits to Life with a Weakly Supervised Neural Network*. Under review.
- Gholami, B., Rudovic, O., Bousmalis, K., & Pavlovic, V. (n.d.). *Unsupervised Multi-Target Domain Adaptation: An Information Theoretic Approach*. under review.

Journal & Conference Papers
Under Review

- Books / Book Chapters
- Rudovic, O., Nicolaou, M., & Pavlovic, V. (2017). Social Signal Processing. In A. Vinciarelli, J. Burgoon, N. Magnenat-Thalmann, & M. Pantic (Eds.), (Chap. Machine Learning Methods for Social Signal Processing). 33% contribution. Cambridge University Press.
- Moon, K., & Pavlovic, V. (2007). “Graphical Models for Human Motion Modeling”. In R. K. D. Metaxas & B. Rosenhahn (Eds.), *Human Motion - Understanding, Modeling, Capture and Animation*. 50% contribution.
- Huang, R., Pavlovic, V., & Metaxas, D. N. (2007). “A Graphical Model Framework for Image Segmentation”. In A. Kandel, H. Bunke, & M. Last (Eds.), *Applied Graph Theory in Computer Vision and Pattern Recognition* (Chap. 2, Vol. 52, pp. 43–64). Studies in Computational Intelligence. Springer.
- Sharma, R., Huang, T. S., & Pavlovic, V. (1996). Human Interaction with Complex Systems. In C. A. Ntuen & E. H. Park (Eds.), (Chap. A multimodal framework for interacting with complex virtual environments, pp. 53–71). Kluwer Academic Publishers.
- Working Papers
- Kim, M., Wang, Y., Sahu, P., & Pavlovic, V. (2019). “Relevance Factor VAE: Learning and Identifying Disentangled Factors”. *CoRR*, [abs/1902.01568](#).
- Kim, M., Sahu, P., Gholami, B., & Pavlovic, V. (2019). “Unsupervised Visual Domain Adaptation: A Deep Max-Margin Gaussian Process Approach”. *CoRR*, [abs/1902.08727](#).
- Sheng, L., Cai, J., Cham, T., Pavlovic, V., & Ngan, K. N. (2019). “Visibility Constrained Generative Model for Depth-based 3D Facial Pose Tracking”. *CoRR*, [abs/1905.02114](#).
- Laradji, I. H., Schmidt, M., Pavlovic, V., & Kim, M. (2019). “Efficient Deep Gaussian Process Models for Variable-Sized Input”. *CoRR*, [abs/1905.06982](#).
- Han, F., Guerrero, R., & Pavlovic, V. (2019). “The Art of Food: Meal Image Synthesis from Ingredients”. *CoRR*, [abs/1905.13149](#). eprint: 1905.13149v1
- Conference Papers
- Han, F., Guerrero, R., & Pavlovic, V. (2020). “CookGAN: Meal Image Synthesis from Ingredients”. In *Winter Conference on Applications of Computer Vision (WACV '20)*, Aspen, Colorado.
- Sohn, S. S., Moon, S., Zhou, H., Yoon, S., Pavlovic, V., & Kapadia, M. (2019). “Deep Crowd-Flow Prediction in Built Environments”. In *Neural Information Processing Systems NeurIPS, Workshop on Artificial Intelligence for Humanitarian Assistance and Disaster Response*, Montreal, Canada.
- Kim, M., Wang, Y., Sahu, P., & Pavlovic, V. (2019). “Bayes-Factor-VAE: Hierarchical Bayesian Deep Auto-Encoder Models for Factor Disentanglement”. In *IEEE International Conference on Computer Vision, ICCV*, Seoul, Korea.
- Gholami, B., Sahu, P., Kim, M., & Pavlovic, V. (2019). “Task-Discriminative Domain Alignment for Unsupervised Domain Adaptation”. In *IEEE International Conference on Computer Vision, ICCV, 6th Workshop on Transferring and Adapting Source Knowledge in Computer Vision*, Seoul, Korea.
- Li, J., Guerrero, R., & Pavlovic, V. (2019a). “Deep Cooking: Predicting Relative Food Ingredient Amounts from Images”. In *5th International Workshop on Multimedia Assisted Dietary Management (MADiMa '19)*.
- Li, J., Guerrero, R., & Pavlovic, V. (2019b). “Deep Cooking: Predicting Food Ingredient Amounts from Images”. In *Int'l Joint Conference on Artificial Intelligence IJCNN, Workshop on AI and Food*, Macao, China.

- Lee, M., Rudovic, O., Pavlovic, V., & Pantic, M. (2019). “Fast Adaptation of Personalized Deep Learning for Facial Action Unit Detection”. In *Int’l Joint Conference on Artificial Intelligence IJCNN, Workshop on Affective Computing*, Macao, China.
- Qiao, G., Zhou, H., Yoon, S., Kapadia, M., & Pavlovic, V. (2019). “Scenario Generalization of Data-driven Imitation Models in Crowd Simulation”. In *ACM SIGGRAPH Conference on Motion, Interaction and Games (MIG)*.
- Kim, M., Sahu, P., Gholami, B., & Pavlovic, V. (2019). “Unsupervised visual domain adaptation: A deep max-margin Gaussian process approach”. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (pp. 4380–4390).
- Laradji, I. H., Schmidt, M., Pavlovic, V., & Kim, M. (2019). “Efficient Deep Gaussian Process Models for Variable-Sized Input”. In *Int’l Joint Conference on Neural Networks IJCNN*.
- Han, F., Guerrero, R., & Pavlovic, V. (2019). “VirtualCook: Cross-modal Synthesis of Food Images from Ingredients”. In *Int’l Joint Conference on Artificial Intelligence IJCNN, Workshop on AI and Food*, Macao, China.
- Qiao, G., Yoon, S., Kapadia, M., & Pavlovic, V. (2018). “The Role of Data-Driven Priors in Multi-Agent Crowd Trajectory Estimation”. In *AAAI* (pp. 4710–4717). AAAI Press.
- Pham, H. X., Wang, Y., & Pavlovic, V. (2018). “End-to-end Learning for 3D Facial Animation from Speech”. In *ICMI* (pp. 361–365).
- Kim, M., & Pavlovic, V. (2018). “Variational Inference for Gaussian Process Models for Survival Analysis”. In *UAI* (pp. 435–445). AUAI Press.
- Walecki, R., Rudovic, O., Pavlovic, V., & Pantic, M. (2017). “Deep Structured Learning for Facial Expression Intensity Estimation”. In *IEEE Int’l Conf. Computer Vision and Pattern Recognition*. 25% contribution.
- Babagholami, B., & Pavlovic, V. (2017). “Probabilistic Temporal Subspace Clustering”. In *IEEE Int’l Conf. Computer Vision and Pattern Recognition*. 50% contribution.
- Sheng, L., Cai, J., Cham, T.-J., Pavlovic, V., & Ngan, K. N. (2017). “A Generative Model for Depth-based Robust 3D Facial Pose Tracking”. In *IEEE Int’l Conf. Computer Vision and Pattern Recognition*. 25% contribution.
- Pham, H., & Pavlovic, V. (2017). “Speech-driven 3D Facial Animation with Implicit Emotional Awareness: A Deep Learning Approach”. In *IEEE Int’l Conf. Computer Vision and Pattern Recognition - Workshop on Deep Affective Learning and Context Modeling*.
- Gholami, B., Rudovic, O., & Pavlovic, V. (2017). “PUnDA: Probabilistic Unsupervised Domain Adaptation for Knowledge Transfer Across Visual Categories”. In *Int’l Conf. Computer Vision*. 33% contribution.
- Tran, C. D., Rudovic, O., & Pavlovic, V. (2017). “Unsupervised domain adaptation with copula models”. In *IEEE Int’l Conf. Machine Learning for Signal Processing (MLSP)*. 33% contribution.
- Liu, W., Hu, K., Yoon, S., Pavlovic, V., Faloutsos, P., & Kapadia, M. (2017). “Characterizing the Relationship between Environment Layout and Crowd Movement using Machine Learning”. In *Motion in Games (MiG)*.
- Yoon, S., & Pavlovic, V. (2016). “Decentralized Probabilistic Learning For Sensor Networks”. In *IEEE Global Conference on Signal and Information Processing*. 50% contribution.

- Pham, H. X., & Pavlovic, V. (2016). “Robust Real-Time 3D Face Tracking from RGBD Videos under Extreme Pose, Depth, and Expression Variations”. In *Proc. Intl. Conf. on 3D Vision (3DV)*. 50% contribution.
- Pham, H. X., Pavlovic, V., Cai, J., & Cham, T.-J. (2016). “Robust Real-time Performance-driven 3D Face Tracking”. In *Proc. Intl. Conf. Pattern Recognition (ICPR)*. 25% contribution.
- Kim, J., & Pavlovic, V. (2016a). “A Shape Preserving Approach for Salient Object Detection Using Convolutional Neural Networks”. In *Proc. Intl. Conf. Pattern Recognition (ICPR)*. 50% contribution.
- Kim, J., & Pavlovic, V. (2016b). “Discovering Characteristic Landmarks on Ancient Coins Using Convolutional Networks”. In *Proc. Intl. Conf. Pattern Recognition (ICPR)*. 50% contribution.
- Kim, J., & Pavlovic, V. (2016c). “A Shape-based Approach for Saliency Object Detection using Deep Learning”. In *Proc. European Conf. Computer Vision*. 50% contribution.
- Walecki, R., Rudovic, O., Pantic, M., Pavlovic, V., & Cohn, J. F. (2016). “A Framework for Joint Estimation and Guided Annotation of Facial Action Unit Intensity”. In *Proc. of IEEE Int’l Conf. Computer Vision and Pattern Recognition (CVPR’W 2016)*. 25% contribution.
- Walecki, R., Rudovic, O., Pavlovic, V., & Pantic, M. (2016). “Copula Ordinal Regression for Joint Intensity Estimation of Facial Action Units”. In *Proc. of IEEE Int’l Conf. Computer Vision and Pattern Recognition (CVPR’W 2016)*. 25% contribution, Las Vegas, NV.
- Yoon, S., Kapadia, M., Sahu, P., & Pavlovic, V. (2016). “Filling in the Blanks: Reconstructing Microscopic Crowd Motion from Multiple Disparate Noisy Sensors”. In *2016 IEEE Winter Applications of Computer Vision Workshops, WACV 2016 Workshops* (pp. 1–9). 25% contribution.
- Babagholami, B., Yoon, S., & Pavlovic, V. (2016). “D-MFVI: Distributed Mean Field Variational Inference using Bregman ADMM”. In *Proceedings of the Thirtieth AAAI Conference on Artificial Intelligence* (pp. 1582–158). 33% contribution. Phoenix, Arizona, USA. arXiv: 1507.00824
- Song, C., Yoon, S., & Pavlovic, V. (2016). “Fast ADMM Algorithm for Distributed Optimization with Adaptive Penalty”. In *Proceedings of the Thirtieth AAAI Conference on Artificial Intelligence* (pp. 753–759). 33% contribution. Phoenix, Arizona, USA. arXiv: 1506.08928
- Walecki, R., Rudovic, O., Pavlovic, V., & Pantic, M. (2015). “Variable-state Latent Conditional Random Fields for Facial Expression Recognition and Action Unit Detection”. In *Proc. of IEEE International Conference on Automatic Face and Gesture Recognition* (pp. 1–8). 25% contribution; oral.
- Yi, S., & Pavlovic, V. (2015). “Multi-Cue Structure Preserving MRF for Unconstrained Video Segmentation”. In *Intl Conference on Computer Vision*. 50% contribution. arXiv: 1506.09124
- Dalal, C., Pavlovic, V., & Kopp, R. (2015). “Sea-Level Estimation using the Riemannian Manifold and a Non-stationary Covariance Function”. In *Proc. Climate Informatics 2015*. 33% contribution.
- Chen, C., Pham, H. X., Pavlovic, V., Cai, J., & Shi, G. (2014). “Depth Recovery with Face Priors”. In *Computer Vision - ACCV 2014 - 12th Asian Conference on Computer Vision, Singapore, Singapore, November 1-5, 2014, Revised Selected Papers, Part IV* (pp. 336–351). 20% contribution.

- Yang, S., Rudovic, O., Pavlovic, V., & Pantic, M. (2014). “**Personalized Modeling of Facial Action Unit Intensity**”. In *Advances in Visual Computing - 10th International Symposium, ISVC 2014, Las Vegas, NV, USA, December 8-10, 2014, Proceedings, Part II* (pp. 269–281). 25% contribution.
- Yoon, S., & Pavlovic, V. (2014). “**Sentiment Flow for Video Interestingness Prediction**”. In *Proceedings of the 1st ACM International Workshop on Human Centered Event Understanding from Multimedia* (pp. 29–34). HuEvent '14. 50% contribution.
- Kim, J., & Pavlovic, V. (2014a). “**Ancient Coin Recognition Based on Spatial Coding**”. In *22nd International Conference on Pattern Recognition, ICPR 2014, Stockholm, Sweden, August 24-28, 2014* (pp. 321–326). 50% contribution.
- Pham, H. X., & Pavlovic, V. (2014). “**Hybrid On-Line 3D Face and Facial Actions Tracking in RGBD Video Sequences**”. In *22nd International Conference on Pattern Recognition, ICPR 2014, Stockholm, Sweden, August 24-28, 2014* (pp. 4194–4199). 50% contribution.
- Kim, J., & Pavlovic, V. (2014b). “**Improving Ancient Roman Coin Recognition with Alignment and Spatial Encoding**”. In *Computer Vision - ECCV 2014 Workshops - Zurich, Switzerland, September 6-7 and 12, 2014, Proceedings, Part I* (pp. 149–164). 50% contribution.
- Yi, S., Mirowski, P. W., Ho, T. K., & Pavlovic, V. (2014). “**Pose Invariant Activity Classification for Multi-floor Indoor Localization**”. In *22nd International Conference on Pattern Recognition, ICPR 2014, Stockholm, Sweden, August 24-28, 2014* (pp. 3505–3510). 25% contribution.
- Rudovic, O., Pavlovic, V., & Pantic, M. (2013a). “**Automatic Pain Intensity Estimation with Heteroscedastic Conditional Ordinal Random Fields**”. In *Advances in Visual Computing - 9th International Symposium, ISVC 2013, Rethymnon, Crete, Greece, July 29-31, 2013. Proceedings, Part II* (pp. 234–243). 33% contribution.
- Hu, J., Zhang, H., Miliou, A., Tsimplidis, T., Thornton, H., & Pavlovic, V. (2013). “**Categorization of Underwater Habitats Using Dynamic Video Textures**”. In *Computer Vision Workshops (ICCVW), 2013 IEEE International Conference on* (pp. 838–843). 33% contribution.
- Rudovic, O., Pavlovic, V., & Pantic, M. (2013b). “**Context-Sensitive Conditional Ordinal Random Fields for Facial Action Intensity Estimation**”. In *Computer Vision Workshops (ICCVW), 2013 IEEE International Conference on* (pp. 492–499). 33% contribution.
- Shariat, S., & Pavlovic, V. (2013). “**A New Adaptive Segmental Matching Measure for Human Activity Recognition**”. In *IEEE International Conference on Computer Vision, ICCV 2013, Sydney, Australia, December 1-8, 2013* (pp. 3583–3590). 50% contribution.
- Yi, S., & Pavlovic, V. (2013). “**Spatio-temporal Context Modeling for BoW-Based Video Classification**”. In *Computer Vision Workshops (ICCVW), 2013 IEEE International Conference on* (pp. 779–786). 50% contribution.
- Kim, J., Yoon, S., & Pavlovic, V. (2013). “**Relative spatial features for image memorability**”. In *ACM Multimedia Conference, MM '13, Barcelona, Spain, October 21-25, 2013* (pp. 761–764). 33% contribution.
- Hendahewa, C., & Pavlovic, V. (2012). “**Analysis of Causality in Stock Market Data**”. In *11th International Conference on Machine Learning and Applications, ICMLA, Boca Raton, FL, USA, December 12-15, 2012. Volume 1* (pp. 288–293). 50% contribution.

- Kim, J., & Pavlovic, V. (2012). “Attribute rating for classification of visual objects”. In *Proceedings of the 21st International Conference on Pattern Recognition, ICPR 2012, Tsukuba, Japan, November 11-15, 2012* (pp. 1611–1614). 50% contribution.
- Kuksa, P. P., Khan, I., & Pavlovic, V. (2012). “Generalized Similarity Kernels for Efficient Sequence Classification”. In *Proceedings of the Twelfth SIAM International Conference on Data Mining, Anaheim, California, USA, April 26-28, 2012*. (pp. 873–882). 33% contribution.
- Kuksa, P. P., & Pavlovic, V. (2012). “Efficient evaluation of large sequence kernels”. In *The 18th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, KDD '12, Beijing, China, August 12-16, 2012* (pp. 759–767). 50% contribution.
- Nicolaou, M. A., Pavlovic, V., & Pantic, M. (2012). “Dynamic Probabilistic CCA for Analysis of Affective Behaviour”. In *Computer Vision - ECCV 2012 - 12th European Conference on Computer Vision, Florence, Italy, October 7-13, 2012, Proceedings, Part VII* (pp. 98–111). 33% contribution.
- Rudovic, O., Pavlovic, V., & Pantic, M. (2012a). “Multi-output Laplacian dynamic ordinal regression for facial expression recognition and intensity estimation”. In *2012 IEEE Conference on Computer Vision and Pattern Recognition, Providence, RI, USA, June 16-21, 2012* (pp. 2634–2641). 33% contribution.
- Rudovic, O., Pavlovic, V., & Pantic, M. (2012b). “Kernel Conditional Ordinal Random Fields for Temporal Segmentation of Facial Action Units”. In *Computer Vision - ECCV 2012. Workshops and Demonstrations - Florence, Italy, October 7-13, 2012, Proceedings, Part II* (pp. 260–269). 33% contribution.
- Yan, W., Han, X., & Pavlovic, V. (2012). “Structured Learning for Multiple Object Tracking”. In *British Machine Vision Conference, BMVC 2012, Surrey, UK, September 3-7, 2012* (pp. 1–12). 33% contribution.
- Yi, S., & Pavlovic, V. (2012). “Sparse Granger causality graphs for human action classification”. In *Proceedings of the 21st International Conference on Pattern Recognition, ICPR 2012, Tsukuba, Japan, November 11-15, 2012* (pp. 3374–3377). 50% contribution.
- Yoon, S., & Pavlovic, V. (2012). “Distributed Probabilistic Learning for Camera Networks with Missing Data”. In *Advances in Neural Information Processing Systems 25: 26th Annual Conference on Neural Information Processing Systems 2012. Proceedings of a meeting held December 3-6, 2012, Lake Tahoe, Nevada, United States*. (pp. 2933–2941). 50% contribution.
- Shariat, S., & Pavlovic, V. (2012). “Improved sequence classification using adaptive segmental sequence alignment”. In *Proceedings of the 4th Asian Conference on Machine Learning, ACML 2012, Singapore, Singapore, November 4-6, 2012* (pp. 379–394). 50% contribution.
- Shariat, S., & Pavlovic, V. (2011). “Isotonic CCA for sequence alignment and activity recognition”. In *IEEE International Conference on Computer Vision, ICCV 2011, Barcelona, Spain, November 6-13, 2011* (pp. 2572–2578). 50% contribution.
- Cohen, A., & Pavlovic, V. (2011). “An efficient IP approach to constrained multiple face tracking and recognition”. In *IEEE International Conference on Computer Vision Workshops, ICCV 2011 Workshops, Barcelona, Spain, November 6-13, 2011* (pp. 852–859). 50% contribution.

- Huang, R., Sang, N., Pavlovic, V., & Metaxas, D. N. (2011). “A Belief Propagation algorithm for bias field estimation and image segmentation”. In *18th IEEE International Conference on Image Processing, ICIP 2011, Brussels, Belgium, September 11-14, 2011* (pp. 37–40). 25% contribution.
- Kim, M., & Pavlovic, V. (2010a). “Structured output ordinal regression for dynamic facial emotion intensity prediction”. In K. Daniilidis, P. Maragos, & N. Paragios (Eds.), *Computer Vision - ECCV 2010* (Vol. 6313, pp. 649–662). Lecture Notes in Computer Science. 50% contribution.
- Kuksa, P., & Pavlovic, V. (2010). “Spatial Representation for Efficient Sequence Classification”. In *20th International Conference on Pattern Recognition, ICPR 2010* (pp. 3320–3323). 50% contribution.
- Shariat, S., Pavlovic, V., Papatomas, T., Braun, A., & Sinha, P. (2010). “Sparse dictionary methods for EEG signal classification in face perception”. In *Machine Learning for Signal Processing (MLSP), 2010 IEEE International Workshop on* (pp. 331–336). 20% contribution.
- Kuksa, P., Qi, Y., Bai, B., Collobert, R., Weston, J., Pavlovic, V., & Ning, X. (2010). “Semi-supervised Abstraction-Augmented String Kernel for Multi-level Bio-Relation Extraction”. In *Machine Learning and Knowledge Discovery in Databases, European Conference, ECML PKDD 2010* (pp. 128–144). 15% contribution.
- Cohen, A., & Pavlovic, V. (2010). “Reinforcement Learning for Robust and Efficient Real-World Tracking”. In *Pattern Recognition (ICPR), 2010 20th International Conference on* (pp. 2989–2992). 50% contribution.
- Kim, M., & Pavlovic, V. (2010b). “Hidden Conditional Ordinal Random Fields for Sequence Classification”. In *ECML/PKDD* (Vol. 2, pp. 51–65). 50% contribution.
- Kuksa, P., & Pavlovic, V. (2009). “Fast Motif Selection for Biological Sequences”. In *IEEE Int’l Conf. on Bioinformatics and Biomedicine (BIBM)*.
- Kim, M., & Pavlovic, V. (2009). “Covariance Operator Based Dimensionality Reduction with Extension to Semi-Supervised Settings”. In *International Conference on Artificial Intelligence and Statistics (AISTATS)*. 40% acceptance, Clearwater Beach, FL.
- Huang, R., Pavlovic, V., & Metaxas, D. (2008). “A new spatio-temporal MRF framework for video-based object segmentation”. In *1st International Workshop on Machine Learning for Vision-based Motion Analysis (MLVMA’08), in conjunction with ECCV 2008*. Marseille, France.
- Kim, M., Kumar, S., Pavlovic, V., & Rowley, H. (2008). “Face Tracking and Recognition with Visual Constraints in Real-World Videos”. In *IEEE Conf. Computer Vision and Pattern Recognition*.
- Kim, M., & Pavlovic, V. (2008). “Dimensionality Reduction using Covariance Operator Inverse Regression”. In *IEEE Conf. Computer Vision and Pattern Recognition*.
- Kuksa, P., Huang, P.-H., & Pavlovic, V. (2008a). “A fast, semi-supervised learning method for protein sequence classification”. In *8th International Workshop on Data Mining in Bioinformatics (BIOKDD 2008)* (pp. 29–37). Acceptance 30% (8/25). Las Vegas, NV.
- Kuksa, P., Huang, P.-H., & Pavlovic, V. (2008b). “Fast and Accurate Multi-class Protein Fold Recognition with Spatial Sample Kernels”. In *Computational Systems Bioinformatics: Proceedings of the CSB2008 Conference* (pp. 133–143). Acceptance 22% (30/135).

- Kuksa, P., Huang, P.-H., & Pavlovic, V. (2008c). “On the role of local matching for efficient semi-supervised protein sequence classification”. In *IEEE Int’l Conf. Bioinformatics and Biomedicine (BIBM)*. Acceptance 24% (38/156).
- Kuksa, P., Huang, P.-H., & Pavlovic, V. (2008d). “Fast Protein Homology and Fold Detection with Sparse Spatial Sample Kernels”. In *Int’l Conf. Pattern Recognition*. Acceptance 15%.
- Kuksa, P., Huang, P.-H., & Pavlovic, V. (2008e). “Scalable Algorithms for String Kernels with Inexact Matching”. In *Neural Information Processing Systems (NIPS)*. Acceptance 12% (123/1022), Vancouver, Canada.
- Kuksa, P., & Pavlovic, V. (2008). “Approximate Substructure Matching for Biological Sequence Classification”. In *Machine Learning in Computational Biology Workshop*.
- Makadia, A., Pavlovic, V., & Kumar, S. (2008). “A New Baseline for Image Annotation”. In *European Conf. Computer Vision*.
- Mitrofanova, A., Pavlovic, V., & Mishra, B. (2008). “Integrative Protein Function Transfer using Factor Graphs and Heterogeneous Data Sources”. In *IEEE Int’l Conf. Bioinformatics and Biomedicine (BIBM)*.
- Moon, K., & Pavlovic, V. (2008a). “Monocular 3D Human Motion Tracking Using Dynamic Probabilistic Latent Semantic Analysis”. In *Fifth Canadian Conference on Computer and Robot Vision*, Windsor, ON.
- Moon, K., & Pavlovic, V. (2008b). “Visual inference using Gaussian process manifold kernel dimensionality reduction”. In *IEEE Int’l Workshop Machine Learning in Signal Processing*. Cancun, Mexico.
- Kim, M., & Pavlovic, V. (2007a). “Conditional State Space Models for Discriminative Motion Estimation”. In *IEEE Int’l Conf. Computer Vision*. 8 pages, 50% contribution, 24.5% acceptance rate.
- Huang, R., Pavlovic, V., & Metaxas, D. N. (2007a). “Embedded Profile Hidden Markov Models for Shape Analysis”. In *IEEE Int’l Conf. Computer Vision*. 8 pages, 33% contribution, 24.5% acceptance rate.
- Kuksa, P., & Pavlovic, V. (2007). “Fast kernel methods for SVM sequence classifiers”. In *The Workshop on Algorithms in Bioinformatics (WABI)*. 50% contribution. Oral presentation, 28% acceptance rate, Philadelphia, PA.
- Kim, M., & Pavlovic, V. (2007b). “A Recursive Method for Discriminative Mixture Learning”. In *Int’l Conf. Machine Learning (ICML)*. 50% contribution. Oral presentation, 29% acceptance rate.
- Kim, M., & Pavlovic, V. (2007c). “Discriminative Learning of Dynamical Systems for Motion Tracking”. In *IEEE Conf. Computer Vision and Pattern Recognition*. 50% contribution. Poster, 28.2% acceptance rate.
- Huang, R., Pavlovic, V., & Metaxas, D. N. (2007b). “Shape analysis using curvature-based descriptors and profile hidden Markov models”. In *IEEE Int’l Symposium on Biomedical Imaging (ISBI)* (pp. 1220–1223). 33% contribution. Poster. N/A acceptance rate.
- Huang, P.-H., & Pavlovic, V. (2006). “Sparse Logistic Classifiers for Interpretable Protein Homology Detection”. In *International Workshop on Datamining in Bioinformatics, IEEE Int’l Conf. Datamining (ICDM)* (pp. 99–103). 50% contribution. Oral presentation, 21.2% acceptance rate.

- Huang, R., Pavlovic, V., & Metaxas, D. N. (2006a). “A Profile Hidden Markov Model Framework for Modeling and Analysis of Shape”. In *IEEE Int’l Conf. Image Processing* (pp. 2121–4). 33% contribution. Poster. 46% acceptance rate.
- Kim, M., & Pavlovic, V. (2006). “Discriminative Learning of Mixture of Bayesian Network Classifiers for Sequence Classification”. In *IEEE Conf. Computer Vision and Pattern Recognition* (pp. 268–275). 50% contribution. Poster, 23.3% acceptance rate. New York, NY.
- Moon, K., & Pavlovic, V. (2006). “Impact of Dynamics on Subspace Embedding and Tracking of Sequences”. In *IEEE Conf. Computer Vision and Pattern Recognition* (pp. 198–205). 50% contribution. Poster, 23.3% acceptance rate.
- Huang, R., Pavlovic, V., & Metaxas, D. N. (2006b). “A tightly coupled region-shape framework for 3D medical image segmentation”. In *Int’l Symposium Biomedical Imaging*. 33% contribution. Poster. 60% acceptance rate.
- Jing, Y., Pavlovic, V., & Rehg, J. (2005). “Efficient discriminative learning of Bayesian network classifier via Boosted Augmented Naive Bayes”. In *International Conf. Machine Learning*. **Distinguished student paper award**. 33% contribution. Oral presentation, 27.3% acceptance rate.
- Huang, R., Pavlovic, V., & Metaxas, D. N. (2004a). “A graphical model based image segmentation method”. In *Biomedical Engineering Society Annual Conference*. 33% contribution. N/A acceptance rate, Philadelphia, PA.
- Huang, R., Pavlovic, V., & Metaxas, D. N. (2004b). “A hybrid face recognition method using Markov random fields”. In *Int’l Conf. Pattern Recognition*. 33% contribution. Oral presentation, 18.0% acceptance rate.
- Huang, R., Pavlovic, V., & Metaxas, D. N. (2004c). “A graphical model framework for coupling MRFs and deformable models”. In *Proc. CVPR*. 33% contribution. Poster, 23.6% acceptance rate., Washington, DC.
- Pavlovic, V. (2004). “Model-based motion clustering using boosted mixture modeling”. In *Proc. CVPR*. 100% contribution. Poster, 23.6% acceptance rate, Washington, DC.
- Alon, J., Sclaroff, S., Kollios, G., & Pavlovic, V. (2003). “Discovering Clusters in Motion Time-Series Data”. In *IEEE Conf. Computer Vision and Pattern Recognition*. 25% contribution. Poster, 23.6% acceptance rate., Madison, WI.
- Choudhury, T., Rehg, J. M., Pavlovic, V., & Pentland, A. (2002). “Boosting and Structure Learning in Dynamic ”Bayesian” Networks for Audio-Visual Speaker Detection”. In *ICPR*. 30% contribution. Poster, 44.8% acceptance rate., Quebec City, Quebec.
- Garg, A., & Pavlovic, V. (2002). “Bayesian Networks as Ensemble of Classifiers”. In *ICPR*. 50% contribution. Oral presentation, 20.2% acceptance rate, Quebec City, Quebec.
- Choudhury, T., Rehg, J., Pavlovic, V., & Pentland, A. (2002). “Multimodal speaker detection using boosted dynamic Bayesian networks”. In *1.Int’l Conf. Information Fusion* (pp. 550–556). 20% contribution, N/A acceptance rate.
- Garg, A., Pavlovic, V., & Rehg, J. M. (2001). “Audio-Visual Speaker Detection using Dynamic Bayesian Networks”. In *Int’l Conference on Automatic Face and Gesture Recognition*. 33% contribution. N/A acceptance rate., Grenoble, France.
- Pavlovic, V., Rehg, J. M., & MacCormick, J. (2000). “Learning Switching Linear Models of Human Motion”. In *Neural Information Processing Systems*. 33% contribution. Poster, 30.2% acceptance rate., Denver, CO.

- Pavlovic, V., Garg, A., & Rehg, J. M. (2000). "Multimodal speaker detection using input/output hidden Markov models". In *Int'l Conf. Multimodal Interfaces*. 33% contribution. Oral presentation, N/A acceptance rate, Beijing, China.
- Pavlovic, V., & Rehg, J. M. (2000). "Impact of dynamic model learning on classification of human motion". In *IEEE Conf. Computer Vision and Pattern Recognition*. 50% contribution. Oral presentation, 14.2% acceptance rate., Hilton Head Island, SC.
- Pavlovic, V., Garg, A., Rehg, J. M., & Huang, T. S. (2000). "Multimodal speaker detection using error feedback DBNs". In *IEEE Conf. Computer Vision and Pattern Recognition*. 33% contribution. Oral presentation, 14.2% acceptance rate., Hilton Head Island, SC.
- Pavlovic, V., Frey, B., & Huang, T. S. (1999a). "Variational Learning in Mixed-State Dynamic Graphical Models". In *Proc. Uncertainty in Artificial Intelligence*. 33% contribution. Oral presentation, 51% acceptance rate., Stockholm, Sweden.
- Pavlovic, V., Rehg, J. M., Cham, T.-J., & Murphy, K. (1999). "A Dynamic Bayesian Network Approach to Figure Tracking Using Learned Dynamical Models". In *IEEE Int'l Conf. Computer Vision*. 25% contribution. Oral presentation, 31% acceptance rate.
- Pavlovic, V., Frey, B., & Huang, T. S. (1999b). "Time Series Classification Using Mixed-State Dynamic Bayesian Networks". In *IEEE Conf. Computer Vision and Pattern Recognition*. 33% contribution. Oral presentation, N/A acceptance rate., Ft. Collins, CO.
- Pavlovic, V., & Huang, T. S. (1998). "Tracking and classification of audio/visual features". In *IEEE Int'l Conf. Image Processing*. 50% contribution. Poster, N/A acceptance rate, Chicago, IL.
- Pavlovic, V., Berry, G., & Huang, T. S. (1997). "Integration of audio/visual information for intelligent human-computer interaction". In *IEEE Int'l Conf. Image Processing*. 33% contribution. Oral presentation, N/A acceptance rate, Santa Barbara, CA.
- Pavlovic, V., Ramchandran, K., & Moulin, P. (1997). "Transform image coding based on joint adaptation of filter banks, tree structures and quantizers". In *DCC*, Salt Lake City, UT.
- Pavlovic, V., Sharma, R., & Huang, T. S. (1996). "Gestural interface to a visual computing environment for molecular biologists". In *2nd International Conference on Automatic Face and Gesture Recognition*. 33% contribution. Poster, N/A acceptance rate., Killington, VT.
- Moulin, P., Ramchandran, K., & Pavlovic, V. (1996). "Transform image coding based on joint adaptation of filter banks and tree structures". In *IEEE Int'l Conf. Image Processing*. 33% contribution. Oral presentation, N/A acceptance rate., Lausanne, Switzerland.
- Sharma, R., Huang, T. S., Pavlovic, V., Schulten, K., Dalke, A., Phillips, J., . . . Chu, S. (1996). "Speech / gesture interface to a visual computing environment for molecular biologists". In *International Conference on Pattern Recognition*.
- Refereed Workshop Papers Kuksa, P., & Pavlovic, V. (2007). "Fast barcode-based species identification using string kernels". In *2nd International Barcode of Life Conference*. 1 page, 50% contribution, N/A acceptance rate., Taipei, Taiwan.
- Huang, R., Pavlovic, V., & Metaxas, D. N. (2005). "A Hybrid Framework for Image Segmentation Using Probabilistic Integration of Heterogeneous Constraints". In *Computer Vision for Biomedical Image Application: Current Techniques and Future Trends*. 33% contribution. Poster. N/A acceptance rate.

- Moon, K., & Pavlovic, V. (2005). “Robust tracking of articulated layers”. In *Vision for HCI Workshop*. 50% contribution. Oral presentation, 23% acceptance rate, San Diego, CA.
- Huang, P.-H., & Pavlovic, V. (2005). “Protein homology detection using sparse profile hidden Markov models”. In *Int'l Conf. Intelligent Systems for Molecular Biology (ISMB)*. 50% contribution. Poster. N/A acceptance rate, Detroit, MI.
- Dandekar, N., & Pavlovic, V. (2004). “Multi-species comparative gene identification and analysis of predictive accuracy”. In *Gene Finding Workshop at Computational Genomics Conference*. 50% contribution. N/A acceptance rate, Reston, VA.
- Goldenstein, S., Vogler, C., Stolfi, J., Pavlovic, V., & Metaxas, D. N. (2004). “Outlier rejection in deformable model tracking”. In *IEEE Workshop on Articulated and Nonrigid Motion*. 20% contribution. N/A acceptance rate, Washington, DC.
- Pavlovic, V., Zhang, L., Cantor, C., & Kasif, S. (2003). “Cross-species gene identification: evolutionary analysis and architectures”. *Computational Genomics*. 30% contribution. Oral presentation, N/A acceptance rate.
- Pavlovic, V., & Garg, A. (2001). “Efficient Detection of Objects and Attributes Using Boosting”. In *IEEE Conf. Computer Vision and Pattern Recognition*. 50% contribution, Kauai, HI.
- Pavlovic, V., Schonfeld, D., & Friedman, G. (2001). “Enhancement of Hopfield neural networks using stochastic noise processes”. In *Neural Networks for Signal Processing XI, Proc. IEEE Signal Processing Society Workshop*. 50% contribution. Poster, N/A acceptance rate.
- Pavlovic, V., Rehg, J. M., & Cham, T.-J. (2000). “A dynamic Bayesian network approach to tracking using learned”. In *Int'l Workshop on Hybrid Systems: Computation and Control*. 33% contribution. Oral presentation, N/A acceptance rate, Pittsburgh, PA.
- Pavlovic, V., Garg, A., & Kasif, S. (2000). “A Bayesian Framework for Combining Gene Predictions”. In *Computational Genomics*. 33% contribution. Oral presentation, N/A acceptance rate.
- Berry, G., Pavlovic, V., & Huang, T. S. (1998). “A Multimodal Human-Computer Interface for the Control of a Virtual Environment”. In *AAAI Workshop on Intelligent Environments*. 33% contribution. N/A acceptance rate, Stanford University, CA.
- Pavlovic, V., & Huang, T. S. (1998). “Multimodal Tracking and Classification of Audio-Visual Features”. In *AAAI Workshop on Representations for Multi-modal Human-Computer Interaction*. 50% contribution. Oral presentation, N/A acceptance rate, Madison, WI.
- Pavlovic, V., Berry, G., Huang, T., Devi, L., Sethi, Y., & Sharma, R. (1998). “Integration of speech and gestures for display control”. In *2nd Advanced Display Federated Laboratory Symposium*, College Park, MD.
- Pavlovic, V., Berry, G., & Huang, T. S. (1997). “Fusion of audio/visual information for human-computer interaction”. In *Workshop on Perceptual User Interfaces*. 33% contribution. Poster, N/A acceptance rate, Banff, Alberta.
- Huang, T. S., & Pavlovic, V. (1995). “Hand gesture modeling, analysis, and synthesis”. In *Int'l Workshop on Automatic Face and Gesture Recognition*. 50% contribution. N/A acceptance rate., Zurich, Switzerland.

Invited lectures

Digital Nutrition & Wellness in the Age of AI, keynote at Int'l Conference on AI, Chengdu,

China, Nov. 23, 2019.

Multimodal Structured Representation Learning: The Food for Thought, keynote at Workshop on Multi-output Learning, Macau, China, Aug. 12, 2019.

Context-Based Modeling: Human Affect, Crowds, and Beyond, Penn Institute for Computational Science Symposium (Emergence in Artificial Intelligence and the Brain), Philadelphia, PA, Oct. 6, 2017.

Health, Wellness, and AI: Personalizable Assistants for Diet and Lifestyle Coaching, keynote at Premier AI Conference in Shanghai, China, July 14, 2017.

Social Signal Processing in the Age of Data Science, keynote speaker at the opening of NTU SCSE Center for Data Science and AI Research (DSAIR), April 28, 2017.

Probabilistic Decentralized Learning and Generalizations, School of Computer Science and Engineering, NTU, Singapore, Aug. 11, 2016.

Distributed Consensus Markov Models for Analysis of Spatio-Temporal Processes, Dept. of Computing, Imperial College London, June 26, 2015.

Distributed Consensus Markov Models for Analysis of Spatio-Temporal Processes, Nanyang Technological University, Singapore, Nov. 6, 2014.

Scalable sequence analytics, Dept. of Computing, Imperial College London, Nov. 26, 2013

Statistical learning & computer vision: affective computing, action modeling and tracking at SEQAM Lab, Computer Vision Center, Universita Autonoma de Barcelona (UAB), Oct. 4, 2013.

Dynamic Ordinal Regression for Facial Expression Recognition and Intensity Estimation, Nanyang Technological University, Singapore, Nov. 6, 2012.

Conditional Ordinal Random Fields - Ratings vs. Classes, Stevens Institute of Technology, Hoboken, NJ, March 20, 2012.

Large-scale sequence analytics, Johns Hopkins University, Baltimore, MD, April 19, 2011.

Efficient alignment-free barcode analytics, Third International Conference on Barcoding of Life (CBOL), Mexico City, Mexico, Nov. 11, 2009.

Tutorial: Dynamic Bayesian networks: probabilistic modeling of sequential data from time-series to proteins, Universiti of Teknologi, Skudai, Malaysia, Aug. 6-9, 2009.

Sparse spatial sample kernels - An efficient way of measuring remote sequence similarity, PICASso Seminar Series, Princeton, University, Nov. 3, 2008.

Embedded Profile Markov Models for Shape Analysis, RUCCS Seminar Series, Rutgers University, May 17, 2007.

Discriminative learning methods for state space models, Toyota Technological Institute and University of Chicago, April 21, 2007.

Discriminative learning methods for state space models, ECE Dept., Northwest University, April 20, 2007.

Discriminative Mixtures for Time-Series Modeling, College of Computing, Georgia Institute of Technology, Atlanta, GA, Oct. 2006.

Discriminative Learning Using Boosted Generative Model, Google Inc., New York, NY, June 26, 2006.

A Graphical Model Framework for Coupling MRFs and Deformable Models for Image Segmentation, Dept. of Computer Science, Boston University, Boston, MA, Oct. 1, 2004.

Mathematical models for comparative genomics, BioMaPS Seminar, Rutgers University, May 12, 2004.

Mathematical models for comparative genomics-successes and challenges, Microsoft Research, Machine Learning and Applied Statistics Group, Redmond, WA, Nov. 21, 2003.

Sequence modeling in bioinformatics, Bioinformatics Program, Boston University, Boston, MA, Oct. 2002.

Probabilistic sequence models in comparative genomics Nanyang Technological Institute, Singapore, Sept. 2002.

Professional activities

- Conference & Workshop Chairmanship
- Area Chair, British Machine Vision Conference, 2019.
 - Area Chair, IEEE Int'l Conf. Computer Vision and Pattern Recognition, 2019.
 - Area Chair. IEEE Intl Conference on Face and Gestures, Washington, DC, May 30 –June 3, 2017.
 - Workshops Chair. ACM Multimedia, Barcelona, Spain, Sept. 2013.
 - Area Chair. IEEE Intl Conference on Face and Gestures, Beijing, PRC, April 22-26, 2013.
 - Special Sessions and Panels Chair. IEEE Intl Conference on Face and Gestures, Beijing, PRC, April 22-26, 2013.
 - Program Committee Vice Chair, IEEE Int'l Conf. Bioinformatics & Biomedicine (BIBM), Philadelphia, PA, 2008.
 - Special Sessions and Panels Chair. IEEE Int'l Conference on Face and Gestures, Amsterdam, The Netherlands, Sept. 11-13, 2008.
 - Area Chair, IEEE Int'l Conference Computer Vision, Rio de Janeiro, Brasil, Oct. 14-20, 2007.
 - IEEE Workshop on Vision for Human-Computer Interaction (V4HCI), <http://rtv4hci.rutgers.edu>, in conjunction with IEEE Conf. Computer Vision and Pattern Recognition (CVPR), San Diego, CA, June 21, 2005.
 - IEEE Workshop on Computer Vision Methods for Bioinformatics, <http://www.ittc.ku.edu/biocvpr>, in conjunction with IEEE Conf. Computer Vision and Pattern Recognition (CVPR), San Diego, CA, June 25, 2005.
 - CVPR Workshop on Real-Time Computer Vision for Human-Computer Interaction, Baltimore, MD, 2004
 - ICML Workshop on Machine Learning for Bioinformatics, Washington DC, Aug. 2003
- Program Committees
- Neural Information Processing Systems (NIPS): 2009, 2012, 2013, 2014, 2015, 2016, 2017.
 - Int'l Conf. Pattern Recognition (ICPR): 2004, 2006, 2008, 2010, 2012, 2014, 2016.
 - IEEE Conf. Computer Vision and Pattern Recognition (CVPR): 2006, 2007, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017.
 - Int'l Conf. Computer Vision (ICCV): 2009, 2011, 2013, 2015, 2017.
 - Int'l Conf. Machine Learning (ICML): 2003, 2004, 2008, 2010, 2011.
 - European Conf. Machine Learning (ECML-PKDD): 2011, 2014, 2015.

Asian Conf. on Computer Vision (ACCV): 2006, 2009, 2010, 2012.
European Conf. Computer Vision (ECCV): 2006, 2008, 2010, 2012, 2014, 2016.
Int'l Conf. on Face and Gesture (FG): 2008, 2011, 2013, 2015, 2017.
Int'l Conf. on Affective Computing and Intelligent Interaction (ACII): 2015.
ACM Multimedia, Augsburg, Germany, 2007.
IEEE Int'l Conference on Image Processing, 2010.

Int'l Conf. on Behavior, Economic and Social Computing (BESC): 2014.
IEEE International Conference on Advanced Video and Signal-Based Surveillance (AVSS), Beijing, China, 2012.
IEEE Int'l Conf. Machine Learning and Applications (ICMLA), Miami, FL, 2009.
IEEE Int'l Workshop on Human-Computer Interaction (HCI2009), Kyoto, Japan, 2009.
IEEE Int'l Workshop on CVPR for Human Communicative Behavior Analysis, Miami, FL, 2009.
SIG-09: First International Workshop on Stochastic Image Grammars, Miami, FL, 2009.
IEEE Int'l Conf. on Multimedia and Expo (ICME), New York, NY, 2009.
First IEEE Workshop on CVPR for Human Communicative Behavior Analysis (CVPR4HB), Anchorage, Alaska, June 28th, 2008.
Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP), Bhubaneswar, India, 2008.
Int'l Workshop on Advances in Pattern Recognition, Bath, UK, 2007.
ICCV'05 Workshop on Machine Analysis of Social Interaction.
Int'l Conf. on Advances in Pattern Recognition, Bath, UK, 2005.
Int'l Conf. IEEE Engineering in Medicine and Biology Society (EMBC), San Francisco, CA, 2004.
Int'l Conf. on Multimodal Interfaces (ICMI), College Park, PA, 2004.
Workshop on Perceptual User Interfaces (PUI), Florida, 2001.
IEEE Workshop on Human Modeling Analysis, and Synthesis, Hilton Head Island, SC, 2000.
IEEE Workshop on Undergraduate Education and Image Computation, Hilton Head Island, SC, 2000.

Editorial duties Associate Editor, IEEE Transactions on Emerging Topics in Computational Intelligence, Dec. 2017 - present.
Associate Editor-in-Chief, IPSJ Transactions on Computer Vision and Applications (CVA), June 2012 - present.
Associate Editor, Image and Vision Computing Journal, Oct. 2008 - present.
Associate Editor, IEEE Transactions on Circuits and Systems for Video Technology, Jan. 2014 - Jan, 2016.
Associate Editor, IEEE Transactions Pattern Analysis and Machine Intelligence, July 2008 - May 2013.
M. Kolsch, V. Pavlovic, B. Kisacanin and T. S. Huang, Guest editors, Special section on Vision for Human-Computer Interaction, Computer Vision and Image Understanding journal, 2005.

X-W. Chen, S. Kim, V. Pavlovic, D. Casasent, Guest editors, Special Issue on Advanced Image-Signal Processing Techniques for Bioinformatics, EURASIP Journal, 2005.

J. M. Rehg, V. Pavlovic, T. S. Huang, W. T. Freeman, Guest editors, Special section on graphical models in computer vision, IEEE Trans. On Pattern Analysis and Machine Intelligence, 25(7), July 2003.

Journal article refereeing

BMC Bioinformatics
Computer Vision and Image Understanding
Data Mining and Knowledge Discovery
EURASIP Journal on Advances in Signal Processing
IEEE Transactions on Graphics
IEEE Transactions on Pattern Analysis and Machine Intelligence
IEEE Trans. Systems, Man and Cybernetics - Part B.
IEEE Trans. Systems, Man and Cybernetics - Part C.
Journal of Mathematical Imaging and Vision
Journal of Visual Languages and Computing
IEEE Transactions on Neural Networks
IEEE Transactions on Signal Processing
IEEE Transactions on Image Processing
IEEE Transactions on Circuits and Systems for Video Technology
Machine Vision and Application Journal
Pattern Recognition

University service

University Senator. Instruction, Curricula and Advising Committee. 9/2011 - 9/2014.

Member. School of Arts and Sciences Advisory Committee for Appointments and Promotions. 9/2012 - 9/2014 and 9/2015 - 8/2018.

Member. Executive Council, Dept. Computer Science, 1/2017 - 8/2018.

Chair and Co-chair. Ph.D. Admissions Committee, c9/2014 - 8/2017.

Chair. AI/ML Hiring Committee, Dept. Computer Science, 2016 and 2018.

Member. Advisor Council, Rutgers Center for Cognitive Science (RuCCS), 2017 - present.

Member. Executive Council, Rutgers Center for Cognitive Science (RuCCS), 2016 - present.

Funding

EAGER: Development of Model-based Active Chair for Proactive Injury Prevention. PI Kang Li, Co-PI V. Pavlovic, NSF IIS-1555408, 10/1/15 - 9/30/18. \$300,000.00.

MRI: Development of a Near-Real-Time High-Accuracy Musculoskeletal System Measurement and Analysis Instrument (SKELETALMI). PI D.N. Metaxas, Co-PI V. Pavlovic, NSF CNS-1229628, 9/1/12 - 8/31/17, \$2,794,820.00.

Phase I: I/UCRC: Center for Dynamic Data Analytics (CDDA) PI D.N. Metaxas, Co-PI V. Pavlovic, NSF IIP-1069258, 3/3/11-3/2/14. \$391,100.00.

Planning Grant: I/UCRC for Dynamic Data Analytics PI D.N. Metaxas, Co-PI V. Pavlovic,, NSF IIP-0934379, 8/15/09-8/14/10, \$10,000.

RI: Small: Novel structured regression approaches to high-dimensional motion analysis. PI V. Pavlovic, NSF IIS 0916812, 9/1/09 - 8/31/12. \$370,292.

3-D Perception of Faces and Scenes. Rutgers Academic Excellence Fund. PI T. Paphomas, Co-PI V. Pavlovic. 7/1/09 - 6/30/10. \$25,000.

Planning Grant: I/UCRC for Dynamic Data Analytics. NSF IIP 0934379. PI Metaxas, Co-PI Pavlovic. \$10,000.

Nonlinear methods for parametric grouping and modeling of motion, PI V. Pavlovic, NSF IIS-0413105, 1/1/05 - 12/31/09, \$260,002. REU: \$18,000 (2008), \$21,250 (2009).

Deception Detection from Visual and Multimodal Input, Co-PI, HSARPA Award. Larry Willis, program manager; Jennifer King, Naval Research Lab (technical contact), \$3,502,341.64.

Estimating and Recognizing 3D Articulated Motion via Uncalibrated Cameras, PI S. Sclaroff, Boston University, Co-PI Vladimir Pavlovic, NSF DIIS Award 0208876, 7/29/01-7/29/04, Rutgers subcontract \$135,011.

ITR - DDDAS - Advances in recognition and interpretation of human motion: An Integrated Approach to ASL Recognition, PI D.N. Metaxas, Co-PI A. Elgammal, V. Pavlovic, NSF DCNS Award 0428231, 9/15/04 - 9/15/07, \$849,817.

Gargoyle Strategic Investments L.L.C, "Computational finance: volatility surface dynamics." Sept. 1, 2008. \$20,000.

Grant for *International HCI Workshop*, in conjunction with European Computer Vision Conference, May 2006, Graz, Austria, awarded by Delphi Corp., \$1500.

Grant for *Vision for HCI Workshop*, in conjunction with IEEE Computer Vision and Pattern Recognition Conference, June 2005, San Diego, CA, awarded by Delphi Corp., \$1500.

Grant for *IEEE Workshop on Computer Vision Methods for Bioinformatics*, in conjunction with IEEE Conf. Computer Vision and Pattern Recognition, June 2005, San Diego, CA, awarded by Microsoft Corp. \$3500.

Students

Rui Huang (graduated, w/ D.N. Metaxas, Ph.D. 9/22/2008.)

Pai-Hsi Huang (graduated, Ph.D. 6/11/2008.)

Kooksang Moon (graduated, Ph.D. 12/19/2008.)

Minyoung Kim (graduated, Ph.D. 4/11/2008.)

Pavel Kuksa (graduated, Ph.D. 2/14/2011.)

Shahriar Shariat (graduated, Ph.D., 7/2/2013.)

Ognjen Rudovic (graduated, Ph.D., May 2014, co-advisor, Imperial College, London, UK.)

Mihalis Nicolaou (graduated, Ph.D., Sept. 2014, co-advisor, Imperial College, London, UK.)

Sejong Yoon (graduated, Ph.D., 8/26/2016.)

Jongpil Kim (graduated, Ph.D., 12/21/2016.)

Hai Xuan Pham (graduated, Ph.D, 10/1/2017.)

Behnam Babagholami (current.)

Fangda Han (current.)

Mihee Lee (current.)

Yuting Wang (current.)

Pritish Sahu (current.)

Jiatong Li (current.)

Xiaoye Han (graduated, MS essay, 12/10/2012.)

Nikhil Dandekar (graduated, MS thesis, 7/28/2005.)

Steven Carroll (graduated, MS thesis, 1/14/2006.)

Teaching

CS536, Machine Learning, Spring 2008, Spring 2011, Spring 2013, Spring 2015, Spring 2017, Spring 2018.

CS535, Pattern Recognition, Fall 2008, Fall 2010, Fall 2012, Fall 2014, Fall 2016, Fall 2017.

CS534, Computer Vision, Spring 2003, Spring 2006, Spring 2007.

CS530, Principles of AI, Spring 2004, Fall 2004, Fall 2009, Fall 2011.

CS500, Graphical models in pattern recognition, Spring 2003. Computational Sequence Modeling, Spring 2010. Differential Geometry of Information Manifolds, Fall 2011.

CS440, Introduction to AI, Fall 2003, Fall 2005.

CS206, Discrete structures II, Spring 2005, Spring 2009, Fall 2009, Spring 2012, Fall 2015, Spring 2016, Fall 2017.

CS110, Introduction to Computers and Applications, Spring 2010.

PS521, IMPS: Integrative Methods in Perceptual Science, Spring 2009.

Patents

Method for visual tracking using switching linear dynamic systems models, Vladimir Pavlovic and James Matthew Rehg, USPTO No. 6999601, No. 6683968, issued Jan 27, 2004, Feb 14, 2006.

Method for learning switching linear dynamic system models from data, Vladimir Pavlovic and James M. Rehg, USPTO No. 6591146, issued Jul 8, 2003.

Method for motion classification using switching linear dynamic system models, Vladimir Pavlovic and James Matthew Rehg, USPTO No. 6694044, issued Feb 17, 2004.

Method and apparatus for combining gene predictions using Bayesian networks, Vladimir Pavlovic, Simon Kasif, and Ashutosh Garg, USPTO No. 6807491, issued Oct 19, 2004.

Method for motion synthesis and interpolation using switching linear dynamic system models, Vladimir Pavlovic and James Matthew Rehg, USPTO No. 6993462, issued Jan 31, 2006.