Dr. Michalis Vrigkas

Postdoctoral Fellow
Computational Biomedicine Lab
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Research Interests

Computer Vision; Image and Video Processing and Analysis; Machine Learning; Pattern Recognition; Biomedical Image Analysis; Biometrics; Predictive Analytics

Education

Ph.D. in Computer Science, **March 2016**
Dept. Computer Science & Engineering, University of Ioannina, Ioannina, Greece
Thesis Topic: *Human activity recognition using conditional random fields and privileged information*
Thesis Subject: Computer Vision, Image Processing, and Machine Learning

M.Sc. in Computer Science, **September 2010**
Dept. Computer Science, University of Ioannina, Ioannina, Greece
Thesis Topic: *Image super-resolution methods*
Thesis Subject: Computer Vision and Image Processing

B.Sc. in Computer Science, **June 2008**
Dept. Computer Science, University of Ioannina, Ioannina, Greece
Thesis Topic: *Image inpainting by partial differential equations*
Thesis Subject: Computer Vision and Image Processing

Professional and Research Experience

University of Houston, Houston, TX **May 2016 - Present**
- *Postdoctoral Fellow.* Developed methods based on machine learning and predictive analytics for heart attack detection. A research project funded by the University of Houston

University of Ioannina, Greece **September 2007 - March 2016**
- *Research Associate.* Intelligent system of microscopic image analysis for the detection of pathological cells in Pap smear images (ISMIA). A research project funded by the Region of Epirus (NSRF 2007-2013)
- *Research Assistant.* Developed new methods for video-based human activity recognition
- *Research Assistant.* Developed methods for robust image super-resolution

Foundation for Research and Technology - Hellas (FORTH) **2009 - 2010**
- *Software Developer.* An open ubiquitous and adaptive chronic disease management platform for COPD and renal insufficiency (CHRONIOUS), in the framework of the E.U. research project funded by FP7-ICT-2007-1-216461
- Software Developer. Multi-level patient-specific artery and atherogenesis model for outcome prediction, decision support treatment, and virtual hand-on training (ARTreat), in the framework of the E.U. research project funded by FP7-224297 - Large-scale Integrating Project (IP)

Freelancer, IT services **2009 - 2015**

Refereed Journal Publications

[5] **M. Vrigkas**, C. Nikou and I. A. Kakadiaris, "Identifying human behaviors using synchronized audio-visual cues," *IEEE Transactions on Affective Computing*, vol. 8, no. 1, pp. 54-66, January-March 2017.

[4] **M. Vrigkas**, C. Nikou and I. A. Kakadiaris, "A review of human activity recognition methods," *Frontiers in Robotics and Artificial Intelligence*, vol 2, no. 28, pp. 1-26, November 2015.

[3] **M. Vrigkas**, C. Nikou and L. P. Kondi, "Robust maximum a posteriori image super-resolution," *Journal of Electronic Imaging*, vol. 23, no. 4, pp. 043016, July 2014.

[2] **M. Vrigkas**, V. Karavasilis, C. Nikou and I. A. Kakadiaris, "Matching mixtures of curves for human action recognition," *Computer Vision and Image Understanding*, vol. 119, pp. 27-40, February 2014.

[1] **M. Vrigkas**, C. Nikou and L. P. Kondi, "Accurate image registration for MAP image super-resolution," *Signal Processing: Image Communication*, vol. 28, no. 5, pp. 494-508, May 2013.

Refereed Conference Publications

[10] O. Magaña-Tellez, **M. Vrigkas**, C. Nikou and I. A. Kakadiaris, "SPICE: Superpixel classification for cell detection and counting," in Proc. *13th International Conference on Computer Vision Theory and Applications*, pp. 485-490, Funchal, Madeira, Portugal, January 27-29 2018.

[9] **M. Vrigkas**, E. Kazakos, C. Nikou and I. A. Kakadiaris, "Inferring human activities using robust privileged probabilistic learning," in Proc. *IEEE International Conference on Computer Vision Workshops*, pp. 2658-2665, Venice, Italy, October 22-29 2017.

[8] N. Sarafianos, **M. Vrigkas** and I. A. Kakadiaris, "Adaptive SVM+: Learning with privileged information for domain adaptation," in Proc. *IEEE International Conference on Computer Vision Workshops*, pp. 2637-2644, Venice, Italy, October 22-29 2017.

[7] **M. Vrigkas**, C. Nikou and I. A. Kakadiaris, "Active privileged learning of human activities from weakly labeled samples," in Proc. *23rd IEEE International Conference on Image Processing*, pp. 3036-3040, Phoenix, AZ, September 25-28 2016.

[6] **M. Vrigkas**, C. Nikou and I. A. Kakadiaris, "Exploiting privileged information for facial expression recognition," in Proc. *9th IAPR International Conference on Biometrics*, pp. 1-8, Halmstad, Sweden, June 13-16, 2016. (Acceptance rate 34%) **Honorable Mention Paper Award**.

[5] M. E. Plissiti, **M. Vrigkas** and C. Nikou, "Segmentation of cell clusters in Pap smear images using intensity variation between superpixels," in *Proc. 22nd International Conference on Systems, Signals and Image Processing*, pp. 184-187, London, UK, September 10-12 2015.

[4] **M. Vrigkas**, C. Nikou and I. A. Kakadiaris, "Classifying behavioral attributes using conditional random fields," in *Proc. 8th Hellenic Conference on Artificial Intelligence, ser. Lecture Notes in Computer Science*, vol. 8445, pp. 95-104, Ioannina, Greece, May 15-17 2014.

[3] **M. Vrigkas**, V. Karavasilis, C. Nikou and I. A. Kakadiaris, "Action recognition by matching clustered trajectories of motion vectors," in *Proc. 8th International Conference on Computer Vision Theory and Applications*, pp. 112-117, Barcelona, Spain, February 21-24 2013.

[2] **M. Vrigkas**, C. Nikou and L. P. Kondi, "A fully robust framework for MAP image super-resolution," in *Proc. IEEE International Conference on Image Processing*, pp. 2225-2228, Orlando, FL, September 30-October 3 2012.

[1] **M. Vrigkas**, C. Nikou and L. P. Kondi, "On the improvement of image registration for high accuracy super-resolution," in *Proc. IEEE International Conference on Acoustics, Speech and Signal Processing*, pp. 981-984, Prague, Czech Republic, May 22-27 2011.

Refereed Abstracts

[1] I. A. Kakadiaris, **M. Vrigkas**, M. Budoff, A. Yen and M. Naghavi, "Machine learning outperformed ACC/AHA Pooled Cohort Equations Risk Calculator for detection of high-risk asymptomatic individuals and recommending treatment for prevention of cardiovascular events in the Multi-Ethnic Study of Atherosclerosis (MESA)," *Circulation*, vol 136, no. Suppl 1, pp. A23075-A23075, American Heart Association, Scientific Sessions, Anaheim, CA, November 2017.

Professional and Academic Services

- Member, Institute for Electrical and Electronics Engineers (IEEE) **2011 - Present**
- Member, Information Processing and Analysis Research Group (I.P.AN.) **2008 - 2016**
- Reviewer in scientific journals
  - Applied Optics, Biomedical Signal Processing and Control, Computer Vision and Image Understanding, EURASIP Journal on Advances in Signal Processing, IEEE Journal of Biomedical and Health Informatics, IEEE Signal Processing Letters, IEEE Transactions on Image Processing, IEEE Transactions on Systems, Man and Cybernetics: Systems, IET Image Processing, Journal of Visual Communication and Image Representation, Machine Vision and Applications, Pattern Recognition Letters, Pervasive and Mobile Computing, Signal Processing: Image Communication
- Reviewer in scientific conferences
  - CVPR 2017, ICIP (2018, 2017, 2016), ICFHR 2014, EUSIPCO 2014, DSP 2013
- Reviewer/Evaluator of Research Proposals
  - General Secretariat of Research and Technology, Greece
  - Research Promotion Foundation, Cyprus

Volunteering

- Chair, IEEE Student Branch, University of Ioannina **January 2015 - April 2016**
- Vice-Chair, IEEE Student Branch, University of Ioannina **October 2012 - January 2015**

Awards

Honorable Mention Paper Award **2016**
– Conference publication [6]: one of two papers selected among 151 submitted and 52 accepted papers at IAPR/IEEE International Conference on Biometrics (ICB)

Excellence Award **2003**
– Ministry of Education of Greece

Teaching Experience

- Teaching Assistant, Dept. Computer Science & Engineering, University of Ioannina, Greece
  - Signals and Systems **Fall 2015, 2011 ‖ Spring 2015, 2014**
  - Digital Image Processing **Fall 2014, 2013**
  - Computational Mathematics **Fall 2012**
  - Design and Analysis of Algorithms **Spring 2010, 2009**
- Instructor, Computer Training Centers, Greece **October 2008 - June 2009**

Student Supervision and Mentorship

- Ph.D. Students
  - Christos Smailis, *Action recognition from still images*, University of Houston, September 2017 - Present (Co-supervision with Prof. Ioannis A. Kakadiaris)
- Graduate (M.Sc.) Students
  - Ermioni Mastora, *Robust incremental hidden conditional random fields for action recognition*, University of Ioannina, February 2017 (Co-supervision with Prof. Christophoros Nikou)
  - Konstantinos Kalogeropoulos, *Estimation of the background scene in video sequences*, University of Ioannina, October 2013 (Co-supervision with Prof. Christophoros Nikou)
- Internship Students
  - Nekruz Vatanshoev, *Deep learning methods for time series event prediction*, University of Houston, June 2017 - November 2017
  - Ahmed Gul, *Cardiovascular risk prediction*, University of Houston, October 2016 - November 2016

Technical Skills

- Excellent algorithmic design and programming skills
- Software development tools: C, C++, Python, Java, FORTRAN, SQL, MySQL, PHP, OpenCV, OpenGL, Matlab, LaTeX, WordPress

Languages

- **Greek:** Mother tongue
- **English:** Fluent
- **German:** Advanced