Marco Zuliani, Ph.D.
Director at

+1 805–280–8170
marco.zuliani@gmail.com
@inailuZocraM
LinkedIn
http://www.marcozuliani.com

Last updated: October 9, 2020

Objective

To apply my technical knowledge, my creative abilities, and my leadership skills to achieve scientific and technological excellence with a tangible social impact.

Skills

Leadership: Experienced in building highly effective, lean and impactful organizations that utilize computer vision, natural language processing and machine learning to build magical user experiences. Proven track record in imagining and creating technologies shipping on hundreds of millions of devices in full respect of user privacy. Focused on improving fairness and reducing bias.

Technology Domains: Computer vision with emphasis on people and scene analysis. Text recognition and natural language processing. Deep learning. Tools and infrastructure for ML, fast inference on dedicated HW for embedded platforms. Data collection, annotation, robustness analysis. Bridging the gap between user experience and core technologies.

Programming: C, C++, Objective C, Python, Matlab. Extensive experience in coding for embedded platforms.

Other: Excellent oral presentation skills. Visa status: Permanent Resident (Green Card).

Work Experience

Apple Cupertino, USA
Director, System Intelligence and Machine Learning *Oct 2019 – Present*

- I lead the System Intelligence and Machine Learnig group. We enable experiences that require perception and reasoning, with empahsis on natural language procesing and computer vision.

Computer Vision Research Manager *Jul 2013 – Oct 2019*

- As a member of Camera & Photos, I led a few team performing R&D in the field of computer vision and machine learning, to build core technologies to understand the content of videos and images in a privacy preserving manner.

Algorithm Engineer *May 2011 – Jun 2013*

- As a member of the Interactive Media Group, I designed, developed and integrated algorithms for the cameras of mobile devices. Say cheeeeeese!

Santa Barbara City College Santa Barbara, USA
Adjunct Professor *January 2011 – May 2011*

- I taught CS 143, a computer science course about Discrete Math. I designed the course from the ground up, including the exercises. The topics I covered included: fundaments of mathematical logic, mathematical proofs, set theory, fundaments of number theory, cryptography, algorithm complexity, graph theory, shortest path problems, etc.

Mayachitra, Inc. Santa Barbara, USA
Research Staff Member *October 2006 – May 2011*

- I develped software tools and libraries for image registration, video registration/stabilization and mosaicking, geo-referencing, panorama creation.
- I was the principal researcher, architect and developer of:
  - AIPR and AIPR Lite, software for image registration and panorama creation.
  - VideoReg, a video registration and stabilization software.

Mitsubishi Electric ITE-VIL Guildford, UK
Internship *Winter 2005*

- I worked on problems related to motion segmentation.

FriulROBOT S.r.l. Udine, Italy
Internship *Summer 2000*

- I designed and implemented a calibration algorithm for a robotic arm used to acquire high precision 3D measurements.

Education

University of California, Santa Barbara Santa Barbara, USA
Ph.D. in Electrical Engineering *October 2006*

- Ph.D. in Electrical Engineering with emphasis in computer vision.
- Thesis title: *"Computational Methods for Automatic Image Registration."*. Advisor: prof. B.S. Manjunath
- I was a teaching assistant for a variety of upper division and graduate classes (including computer vision, image processing, digital control, digital signal processing, etc.). My tasks included preparing lab projects, homeworks, midterm and finals, leading office hours and discussion sessions. I also gave a short graduate course on image registration and related topics.

University of California, Santa Barbara Santa Barbara, USA
M.S. in Electrical Engineering *June 2003*

- Major Area: Signal Processing
- Minor Area: Controls
- Relevant graduate courses: Stochastic Processes, Advanced Digital Signal Processing, Digital Image Processing, Patter Recognition, Neural Networks, Matrix Analysis, Linear Systems I, Nonlinear Optimization, Optimal Estimation, Kalman Filtering, Finite Difference Methods for Partial Differential Equations, Level Set Methods and Their Applications.
- GPA 3.9

University of California, Santa Barbara Santa Barbara, USA
Exchange Student *Sep 2000, June 2001*

- Exchange student within the Education Abroad Program (EAP).

University of Padova Padova, Italy
Laurea in Computer Engineering *June 2001*

- Major: Systems and Controls
- Thesis title: *"A Vision Based System to Recover the Trajectory of a Human Head"* Advisors: prof. R. Frezza and prof. B.S. Manjunath
- Equivalent GPA 3.7

Patents

- Image Blending Operations – 20130329071
- Motion–Based Image Stitching – 20130329072
- Projection–Based Image Registration – 20130329070
- Method and apparatus for finding and using video portions that are relevant to adjacent still images – 10706892
- Real–time selection of DNN style transfer networks from DNN sets – 10664963
- Compiling models for dedicatd hardware – 20200082274
- Automated selection of keeper images from a burst photo captured set – 10523894
- System and method for person reidentification – 10318721
- Reconstruction of missing regions of images – 10249029
- Method And Apparatus For Finding And Using Video Portions That Are Relevant To Adjacent Still Images – 20190096441
- Style transfer–based image content correction – 10198839
- Artistic style transfer for videos – 10147459
- Systems and Methods of Memory Allocation for Neural Networks – 20180088996
- Fast template–based tracking – 9773192
- Methods and systems for determining a direction of a sweep motion – 9749524
- Camera pair calibration using non-standard calibration objects – 9686539
- Efficient machine-readable object detection and tracking – 9542585
- Method for dynamically calibrating rotation offset in a camera system – 9092853

Publications

- C. Kenney, B. Manjunath, M. Zuliani, G. Hewer, and A. Van Nevel. A condition number for point matching with application to registration and post-registration error estimation. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 25(11):1437–1454, November 2003

- M. Zuliani, C. Kenney, and B.S. Manjunath. A mathematical comparison of point detectors. In *Proc. of the 2nd IEEE Workshop on Image and Video Registration*, 2004
- M. Zuliani, S. Bhagavathy, C. S. Kenney, and B. S. Manjunath. Affine-invariant curve matching. In *IEEE International Conference on Image Processing*, October 2004
- M. Zuliani, C. S. Kenney, S. Bhagavathy, and B. S. Manjunath. Drums and curve descriptors. In *British Machine Vision Conference*, September 2004
- C. Kenney, M. Zuliani, and B.S. Manjunath. An axiomatic approach to corner detection. In *Proc. of IEEE Conference on Computer Vision and Pattern Recognition*, pages 191–197, San Diego, California, June 2005
- M. Zuliani, C. S. Kenney, and B. S. Manjunath. The MultiRANSAC algorithm and its application to detect planar homographies. In *IEEE International Conference on Image Processing*, September 2005
- M. Zuliani. *Computational Methods for Automatic Image Registration*. PhD thesis, Department of Engineering and Computer Engineering, University of California, Santa Barbara, October 2006
- M. Zuliani, L. Bertelli, C. S. Kenney, S. Chandrasekarnan, and B. S. Manjunath. Drums, curve descriptors and affine invariant region matching. *Image and Vision Computing Journal*, 2007. In press. Preprint available online http://dx.doi.org/10.1016/j.imavis.2006.12.001
- L. Bertelli, M. Zuliani, and B.S. Manjunath. Pairwise similarities across images for multiple view rigid/non-rigid segmentation and registration. In *Proceedings of the International Conference on Computer Vision (ICCV07)*, Oct 2007
- Marco Zuliani, Luca Bertelli, and B. S. Manjunath. An automatic method to learn and transfer the photometric appearance of partially overlapping images. In *Proc. IEEE International Conference on Image Processing*, October 2008
- C. Kenney, M. Zuliani, B. S. Manjunath, and K. Solanki. Condition theory for image registration and post–registration error estimation. In J. LeMoigne, N. Netanyahu, and R. Eastman, editors, *Image Registration for Remote Sensing*. Cambridge University Press, 2011

Invited Talks & Lectures

- M. Zuliani, C. S. Kenney, S. Bhagavathy, B. S. Manjunath, "Drums, Curve Descriptors and Image Correspondences," Mitsubishi Electric ITE-VIL, Guildford, UK, Sep. 2004. (Host: Dr. M. Bober)

- M. Zuliani, C. S. Kenney, D. Fedorov, S. Bhagavathy, B. S. Manjunath, "Robust Techniques for Image Registration," at:
  - Signal Processing Institute at EPFL, Switzerland, Jun. 2005 (Host: prof. T. Ebrahimi)
  - Laboratorio di Visione Computazionale e Navigazione Autonoma at University of Padova, Italy, Jun. 2005 (Host: prof. R. Frezza)
  - Vision, Image Processing & Sound Laboratory at University of Verona, Italy, Jun. 2005 (Host: prof. A. Fusiello)
- M. Zuliani, "Fundamentals of Image Registration"
  A set of lectures for the graduate Image Processing course at the University of California, Santa Barbara. (Host: prof. B. S. Manjunath)
- M. Zuliani, "RANSAC: Estimating Parameters in Presence of Outliers"
  Center for Control, Dynamical Systems, and Computation, University of California, Santa Barbara, Feb. 2009. (Host: prof. F. Bullo)

Reviewer Activity

- Conferences: CVPR, ICCV, ICIP, Siggraph, SPCOM.
- Journals: PERS – Photogrammetric Engineering & Remote Sensing, IEEE Transactions on Multimedia, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Image Processing, International Journal of Image and Graphics, Image and Vision Computing Journal, Journal of Mathematical Imaging and Vision, Pattern Recognition.

References

Avaialble upon request.