

Federico Perazzi

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Short Bio

I am a Research Scientist in the On-Device AI team, at Facebook Reality Labs. Prior to joining Facebook, I had the privilege to be part of the Creative Intelligence Lab, at Adobe Research. I spent eight memorable years as Intern, PhD and Post-Doctoral Researcher at Disney Research Zurich, in the Imaging and Video Processing Group. I obtained my PhD in 2017 from ETHZ.

My research spans Computer Vision and Machine Learning with a focus on Video Analysis, Semantic Image Understanding, and Image Enhancement.

Employment History

- 2020 - present** Facebook Reality Labs, Bay Area, California
Research Scientist
- 2018 - 2020** Adobe Research, Bay Area, California
Research Scientist
- 2017-2018** Disney Research, Zurich, Switzerland
Postdoctoral Researcher
- Oct 2012 - Feb 2013** Walt Disney Imagineering, Los Angeles, CA, United States
Advanced Development Intern
- Oct 2010 - Sep 2012** Disney Research, Zurich, Switzerland
Lab Associate
- May 2009 - Feb 2010** Carnegie Mellon University, Pittsburgh, PA, United States
Research Intern

Technologies in Production

- Photoshop** We developed a library of Adobe Photoshop filters that enable semantic face editing in just a few clicks using AI. I lead the development of the face-smoothing filter, one of the two featured filters at release - <https://www.theverge.com/2020/10/20/21517616/adobe-photoshop-ai-neural-filters-beta-launch-machine-learning>
- Rendering** We developed an ML-based denoiser of Monte-Carlo renderings. The technology has been integrated into Adobe *Dimension*, a software to create physically-based renderings of 3D asset. The denoiser reduces the time to generate a scene by an average of 8x on CPU.
- VFX** I contributed to the video upsampling technology that is being used by Disney Studios to increase the resolution of movies while retaining fine texture details. The technology is described in the publication: "*A Fully Progressive Approach to Single-Image Super-Resolution*".
- VR Media** We designed and implemented a stitching technology to create artifact-free, high-resolution panoramic videos. The technology has been used to generate 8K panoramic videos for the Disney Parks attraction *Soarin' Around The World*. and for other Disney VR productions. The technology is described in the publication: "*Panoramic Videos From Unstructured Camera Arrays*".

Education

- 2013-2017** Ph.D. in Computer Science - ETH, joint Disney Research, Switzerland
General Topic: Video Object Segmentation.
Advisors: Prof. Markus Gross, Dr. Alexander Sorkine-Hornung (Disney Research)
Awarded with an ETH Medal for outstanding thesis.
- 2010-2012** M.Sc. in Computer Science - ETH, Zurich, Switzerland
Thesis: Fisheye Camera Array Calibration
GPA: 5.45 out of 6.0
- 2008-2010** M.Sc. in Entertainment Technology - Carnegie Mellon University, Pittsburgh, United States
GPA: 3.6 out of 4.0
- 2004-2008** B.Sc. in Computer Science - Universita degli Studi di Pavia, Pavia, Italy
GPA: 100 out of 110

Selected Publications

- 2021** Content-Aware GAN Compression
Yuchen Liu, Zhixin Shu, Yijun Li, Zhe Lin, F. Perazzi, S.Y. Kung
CVPR 2021.
- Deep Denoising of Flash and No-Flash Pairs for Photography in Low-Light Environments
Z. Xia, M. Gharbi, F. Perazzi, K. Sunkavalli, A. Chakrabarti
CVPR 2021.
- 2020** Shape Adaptor: A Learnable Resizing Module.
S. Liu, Z. Lin, Y. Wang, J. Zhang, F. Perazzi, E. Johns.
ECCV 2020.
- Scene Scale Estimation from Single Image in the Wild.
Rui Zhu, X. Yang, Y. Hold-Geoffroy, F. Perazzi, J. Eisenmann, K. Sunkavalli, M. Chandraker
ECCV 2020.
- TDNet: A Temporally Distributed Network for Fast Video Segmentation
P. Hung, F. Caba, O. Wang, Z. Lin, S. Sclaroff, F. Perazzi.
CVPR 2020, Seattle, Washington.
- Basis Prediction Networks for Effective Burst Denoising with Large Kernels
Z. Xia, F. Perazzi, M. Gharbi, K. Sunkavalli, A. Chakrabarti
CVPR 2020, Seattle, Washington.
- Active Speakers in Context
J. C. Leon, F. Caba Heilbron, L. Mai, F. Perazzi, J.-Y. Lee, P. Arbelaez, B. Ghanem
CVPR 2020, Seattle, Washington.
- 2019** Scaling Object Detection by Transferring Classification Weights.
J. Kuen, F. Perazzi, Z. Lin, J. Zhang, Y-P.Tan
ICCV 2019 (oral), Seoul, South Korea.
- Synthetic to Real Translation Via Explicit Image Disentanglement.
S. Bi, K. Sunkavalli, F. Perazzi, E. Shechtman, V. Kim, R. Ramamoorthi
ICCV 2019, Seoul, South Korea.
- Web Stereo Video Supervision for Depth Prediction from Dynamic Scenes.
C. Wang, S. Lucey, F. Perazzi, O. Wang
3DV 2019, Quebec City, Canada.

- 2018** On Regularized Losses for Weakly-supervised CNN Segmentation.
M. Tang, F. Perazzi, A. Djelouah, I. B. Ayed, C. Schroers, Y. Boykov.
ECCV 2018, Munich, Germany.
- Normalized Cut Loss for Weakly-supervised CNN Segmentation.
M. Tang, A. Djelouah, F. Perazzi, Y. Boykov, C. Schroers.
CVPR 2018, Salt Lake City, UT, United States.
- A Fully Progressive Approach to Single-Image Super-Resolution.
Y. Wang, F. Perazzi, B. McWilliams, A. Sorkine-Hornung, O. Sorkine-Hornung, C. Schroers.
CVPR NTIRE Workshop 2018, Salt Lake City, UT, United States.
- 2017** Learning Video Object Segmentation from Static Images.
F. Perazzi, A. Khoreva, R. Benenson, B. Schiele, M. Gross, A. Sorkine-Hornung.
CVPR 2017, Honolulu, HI, United States.
- 2016** A Benchmark Dataset and Evaluation Methodology for Video Object Segmentation.
F. Perazzi, J. Pont-Tuset, B. McWilliams, L. Van Gool, M. Gross, A. Sorkine-Hornung.
CVPR 2016, Las Vegas, NV, United States.
- Bilateral Space Video Segmentation.
Nicolas Marki, Federico Perazzi, Oliver Wang, Alexander Sorkine-Hornung.
CVPR 2016, Las Vegas, NV, United States
- 2015** Fully Connected Object Proposal For Video Segmentation.
Federico Perazzi, Oliver Wang, Alexander Sorkine-Hornung, Markus Gross.
ICCV 2015, Santiago, Chile.
- Panoramic Video From Unstructured Camera Arrays.
F. Perazzi, A. Sorkine-Hornung, H. Zimmer, P. Kaufmann, O. Wang, S. Watson, M. Gross.
EUROGRAPHICS 2015, Computer Graphics Forum, Vol. 34, No. 2, Zurich, Switzerland.
- 2013** Non-Polynomial Galerkin Projection on Deforming Meshes.
M. Stanton, Y. Sheng, M. Wicke, F. Perazzi, A. Yuen, S. Narasimhan, A. Treuille.
SIGGRAPH 2013, ACM Transactions on Graphics Vol. 32(4), Anaheim, CA, United States.
- 2012** Saliency Filters: Contrast Based Filtering for Saliency Region Detection.
Federico Perazzi, Philipp Krähenbühl, Yael Pritch, Alexander Hornung.
CVPR 2012, Providence, RI, United States.

Conference Workshops

- 2019** The 2019 DAVIS Challenge on VOS: Unsupervised Multi-Object Segmentation.
S. Caelles, J. Pont-Tuset, F. Perazzi, A. Montes, K.-K. Maninis, L. Van Gool.
CVPR 2019, Long Beach, California.
- 2018** The 2018 DAVIS Challenge on Video Object Segmentation.
S. Caelles, A. Montes, K.-K. Maninis, Y. Chen, L. Van Gool, F. Perazzi, J. Pont-Tuset.
CVPR 2018, Salt Lake City, Utah.
- 2017** The 2017 DAVIS Challenge on Video Object Segmentation
J. Pont-Tuset, F. Perazzi, S. Caelles, P. Arbeláez, A. Sorkine-Hornung, L. Van Gool.
CVPR 2017, Honolulu, Hawaii.

Supervised Students

Patents

- 2019** Video Super-Resolution Using An Artificial Neural Network.
C. Schroers, Y. Wang, F. Perazzi, B. McWilliams, A. Sorkine-Hornung.
US Patent App. 15/886,625

Zhihao Xia, *Washington Uni. in St. Louis* Ping Hu, *Boston University*
Ozge Yalcinkaya, *Hacettepe University* Yifan Wang, *Disney Research*
Caner Harzirbas, *Apple* Anna Khoreva, *Bosh AI*
Meng Tang, *Facebook Reality Labs* Yuchen Liu, *Princeton University*

- 2018** Systems and Methods for Higher Order Dimensional Space Video Segmentation.
A. Sorkine-Hornung, F. Perazzi, O. Wang, N. Märki.
US Patent 9,911,194
- 2017** Video segmentation from an uncalibrated camera array.
H. Zimmer, A. Sorkine-Hornung, M. Botsch, F. Perazzi.
US Patent 15/176,017
- 2016** Methods and Systems of Performing Video Object Segmentation.
A. Sorkine-Hornung, F. Perazzi, O. Wang.
US Patent 15/045,102
- 2015** Visual Saliency Estimation for Images and Videos.
F. Perazzi, A. Sorkine-Hornung, P. Krähenbül, Y. Pritch.
US Patent 9,025,880
- 2014** Panoramic Video from Unstructured Camera Arrays with Globally Consistent Parallax.
F. Perazzi, A. Sorkine-Hornung, H. Zimmer, O. Wang, P. Kaufmann, S. Watson. Removal.
US Patent 14/339,253
- 2012** Robotic Texture.
P. Beardsley, J. Alonso Mora, A. Breitenmoser, F. Perazzi, A. Hornung.
US Patent 15/458,875