

Marc'Aurelio Ranzato

Facebook Inc.
770 Broadway
New York, NY 10003, USA
email: ranzatomr@gmail.com
web: <https://ranzato.github.io/>

RESEARCH INTERESTS

My primary research interests are in the area of machine learning, with applications to computer vision, natural language processing and speech recognition. In particular, I have been investigating methods to learn representations of data in a fully unsupervised, semi-supervised, and continual learning settings.

I have been working with deep learning methods, energy based models and graphical models. I have designed algorithms for various applications, such as object recognition in natural images, machine translation, summarization and acoustic modeling for speech recognition.

CURRENT APPOINTMENT

Facebook Inc., New York, NY - USA
Position: *Manager Research Scientist*
Period: September 2013 to present

EDUCATION

New York University, The Courant Institute of Mathematical Sciences, New York, NY, U.S.A.
Ph.D. degree in Computer Science, May 2009
Advisor: Prof. Yann LeCun
Thesis: Unsupervised learning of feature hierarchies
Committee: Rob Fergus, Geoffrey Hinton, Yann LeCun, Sebastian Seung, Eero Simoncelli

University of Padova, Padova, Italy
Laurea in Electronics Engineering, April 2004 110/110 cum laude
Advisor: Prof. Pietro Perona and Prof. Ruggero Frezza
Thesis: Automatic recognition of biological particles in microscopic images

Conservatory "Frescobaldi", Ferrara, Italy
Diploma of music in violin, June 1999 9/10

ACADEMIC EXPERIENCE

University of Toronto, Department of Computer Science, Toronto, ON - CANADA

Position: *Post-Doctoral Fellow*

Supervisor: Prof. Geoffrey Hinton

Period: July 2009 to June 2011

Project: "Learning gated MRF's"

California Institute of Technology, Computer Vision Laboratory, Pasadena, CA, U.S.A.

Position: *Graduate Research Assistant*

Supervisor: Prof. Pietro Perona

Period: August 2003 - March 2004, July 2004 - August 2004

Project: "Automatic Visual Recognition of Biological Particles"

WORK EXPERIENCE

Google Inc., Mountain View, CA - USA

Position: *Research Scientist*

Period: October 2011 to September 2013

Yahoo! Research, Mission College, Santa Clara, CA, U.S.A.

Position: *Summer Intern*

Host: Kilian Weinberger, Malcolm Slaney, Olivier Chapelle, Kishore Papineni

Period: Summer 2008

Project: Learning sparse and locally shift-invariant feature hierarchies of images

Microsoft Research LTD., Cambridge, U.K.

Position: *Summer Intern*

Host: Martin Szummer

Period: Summer 2007

Project: Learning semantic representations of text documents from partially labeled collections

TEACHING EXPERIENCE

Teaching Assistant, New York University

Graduate Course on Machine Learning, Fall 2007. Instructor: Prof. LeCun

Tutorials and Guest Lectures

- Graduate Course on Machine Learning for Natural Language, Spring 2018, Harvard University - Instructor: Prof. Alexander Rush

- Tutorial on Deep Learning for Vision, Text and Sequences. DeepLearn Summer School, Bilbao 2017.

- Graduate Course on Deep Learning, Spring 2017, New York University - Instructor: Prof. Yann LeCun.

- Graduate Course on Computer Vision CS 231A, Winter 2014. Stanford University - Instructor: Prof. Savarese.

- CVPR 2014 Tutorial on Deep Learning

- CVPR 2013 Tutorial on Large Scale Visual Recognition

- ICML 2013 Tutorial on Deep Learning, jointly with Y. LeCun

- UCLA IPAM Summer School 2012 on Deep Learning
- CVPR 2012 Tutorial on Deep Learning
- Graduate Course on Advanced Machine Learning, Spring 2010. University of Toronto - Instructor: Prof. Zemel.
- CIFAR Summer School, 2010.

Students Advised

- Guillaume Lample (Fall 2016 till present, Ph.D. advisor)
- Yoon Kim (summer 2017, internship at Facebook)
- Sam Wiseman (summer 2016 and summer 2017, internship at Facebook)
- Sebastien Jean (summer 2015, internship at Facebook)
- Gregoire Mesnil (summer 2014 internship at Facebook)
- Babak Shakibi (winter 2014 internship at Facebook)
- David Eigen (summer 2013 internship at Google)
- Matthew D. Zeiler (summer 2012 internship at Google)

Students Co-Advised

- Sida Wang (University of Toronto)

PROFESSIONAL ACTIVITIES

Guest Editor for the International Journal of Computer Vision Special Issue on “Deep Learning”, jointly with G.E. Hinton and Y. LeCun

Workshop Organizer

- Deep Learning Symposium
Conference: Neural Information Processing Systems (NIPS) 2015
- Tutorial on Deep Learning for Computer Vision
Conference: Computer Vision and Pattern Recognition (CVPR) 2014
- Representation Learning
Conference: International Conference of Machine Learning (ICML) 2012
Co-organizers: Aaron Courville, Hugo Larochelle, Yoshua Bengio
- Challenges in Learning Hierarchical Models: Transfer Learning and Optimization
Conference: Neural Information Processing Systems (NIPS) 2011
Co-organizers: Quoc V. Le, Ruslan Salakhutdinov, Andrew Ng, Josh Tenenbaum
- Deep Learning and Unsupervised Feature Learning
Conference: Neural Information Processing Systems (NIPS) 2010
Co-organizers: Honglak Lee, Yoshua Bengio, Geoffrey Hinton, Yann LeCun, Andrew Y. Ng

Program Chair

- International Conference on Learning Representations 2017
- International Conference on Learning Representations 2018

Area Chair

- International Conference of Machine Learning 2018

- Neural Information Processing Systems 2017
- Computer Vision and Pattern Recognition 2016
- International Conference of Computer Vision 2015
- Computer Vision and Pattern Recognition 2015
- Neural Information Processing Systems 2014
- International Conference of Machine Learning 2014
- ACM Multimedia 2014
- Neural Information Processing Systems 2013
- International Conference of Machine Learning 2013
- Neural Information Processing Systems 2012
- International Conference of Machine Learning 2012
- Conference on Uncertainty in Artificial Intelligence 2012

Reviewer

- Neural Computation
- Journal of Machine Learning
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- International Journal of Computer Vision
- International Journal of Machine Learning and Cybernetics
- Neural Information Processing Systems
- International Conference on Learning Representations
- International Conference of Machine Learning
- Artificial Intelligence and Statistics
- Computer Vision and Pattern Recognition
- European Conference of Computer Vision
- International Conference of Computer Vision
- Conference on Knowledge Discovery and Data Mining
- AAAI Conference on Artificial Intelligence
- Conference on Uncertainty in Artificial Intelligence

HONORS

- Top-100 most influential scholars in Machine Learning for the year of 2016 according to AMiner.
- NYU Dean's dissertation fellowship, 2008-2009
- "Henry M. MacCracken" Award Scholarship, 2004-2008
- "Ing. Aldo Gini" Award for Italian researchers abroad, 2004

- S. Edunov, M. Ott, M. Auli, D. Grangier and **M. Ranzato**, *Classical Structured Prediction Losses for Sequence to Sequence Learning*. North America Chapter of the Association for Computational Linguistics (NAACL) 2018
- G. Lample, A. Conneau, L. Denoyer and **M. Ranzato** *Unsupervised Machine Translation Using Monolingual Corpora Only*. International Conference on Learning Representations (ICLR) 2018
- A. Conneau, G. Lample, **M. Ranzato**, L. Denoyer and H. J  gou, *Word translation without parallel data*. International Conference on Learning Representations (ICLR) 2018
- S. Gross, **M. Ranzato** and A. Szlam, *Hard Mixtures of Experts for Large Scale Weakly Supervised Vision*. Computer Vision and Pattern Recognition (CVPR), 2017
- D. Lopez-Paz and **M. Ranzato**, *Gradient Episodic Memory for Continual Learning*. Neural Processing Information (NIPS) 2017
- G. Lample, N. Zeghidour, N. Usunier, A. Bordes, L. Denoyer and **M. Ranzato**, *Fader networks: Manipulating images by sliding attributes*. Neural Processing Information (NIPS) 2017
- S. Chintala, **M. Ranzato**, A. Szlam, Y. Tian, M. Tygert and W. Zaremba *Scale-invariant learning and convolutional networks*. Applied and Computational Harmonic Analysis 42 (1), 154-166 2017
- J. Li, A.H. Miller, S. Chopra, **M. Ranzato** and J. Weston *Learning through dialogue interactions*. International Conference on Learning Representations (ICLR) 2017
- J. Li, A.H. Miller, S. Chopra, **M. Ranzato** and J. Weston *Dialogue learning with human-in-the-loop*. International Conference on Learning Representations (ICLR) 2017
- **M. Ranzato**, S. Chopra, M. Auli and W. Zaremba, *Sequence level training with recurrent neural networks*. International Conference on Learning Representations (ICLR) 2016
- Y. Taigman, M. Yang, **M. Ranzato** and L. Wolf, *Web-scale training for face identification*. Computer Vision and Pattern Recognition (CVPR), 2015
- T. Mikolov, A. Joulin, S. Chopra, M. Mathieu and **M. Ranzato**, *Learning Longer Memory in Recurrent Neural Networks*, in International Conference on Learning Representations (ICLR), 2015
- Y. Taigman, M. Yang, **M. Ranzato** and L. Wolf, *DeepFace: Closing the Gap to Human-Level Performance in Face Verification*, in IEEE Proc. of Computer Vision and Pattern Recognition Conference (CVPR), 2014
- N. Zhang, M. Paluri, **M. Ranzato**, T. Darrell and L. Bourdev, *PANDA: Pose Aligned Networks for Deep Attribute Modeling*, in IEEE Proc. of Computer Vision and Pattern Recognition Conference (CVPR), 2014
- **M. Ranzato**, J. Susskind, V. Mnih and G.E. Hinton, *On Deep Generative Models with Applications to Recognition*, in IEEE Proc. of Computer Vision and Pattern Recognition Conference (CVPR), 2011

- M. Denil, B. Shakibi, L. Dinh, **M. Ranzato**, N. de Freitas, *Predicting Parameters in Deep Learning*, Advances in Neural Information Processing Systems (NIPS), MIT Press, 2013
- A. Frome, G. Corrado, J. Shlens, S. Bengio, J. Dean, **M. Ranzato**, T. Mikolov, *DeViSE: A Deep Visual-Semantic Embedding Model*, Advances in Neural Information Processing Systems (NIPS), MIT Press, 2013
- M.D. Zeiler, **M. Ranzato**, R. Monga, M. Mao, K. Yang, Q.V. Le, P. Nguyen, A. Senior, V. Vanhoucke, J. Dean, G.E. Hinton, *On Rectified Linear Units for Speech Processing*, International Conference on Acoustic, Speech and Signal Processing (ICASSP), 2013
- A. Senior, G. Heigold, **M. Ranzato**, K. Yang, *An Empirical Study of Learning Rates in Deep Neural Networks for Speech Recognition*, International Conference on Acoustic, Speech and Signal Processing (ICASSP), 2013
- G. Heigold, V. Vanhoucke, A. Senior, P. Nguyen, **M. Ranzato**, M. Devin, J. Dean, *Multilingual Acoustic Models using Distributed Deep Neural Networks*, International Conference on Acoustic, Speech and Signal Processing (ICASSP), 2013
- J. Dean, G. Corrado, R. Monga, K. Chen, M. Devin, Q.V. Le, M. Mao, **M. Ranzato**, A. Senior, P. Tucker, K. Yang, A.Y. Ng, *Large Scale Distributed Deep Networks*, Advances in Neural Information Processing Systems (NIPS), MIT Press, 2012
- Q.V. Le, **M. Ranzato**, R. Monga, M. Devin, G. Corrado, K. Chen, J. Dean, A.Y. Ng, *Building High-Level Features Using Large Scale Unsupervised Learning*, International Conference of Machine Learning (ICML), 2012.
- K. Swersky, **M. Ranzato**, D. Buchman, B.M. Marlin, N. de Freitas, *On Autoencoders and Score Matching for Energy Based Models*, International Conference of Machine Learning (ICML), 2011.
- **M. Ranzato**, J. Susskind, V. Mnih and G.E. Hinton, *On Deep Generative Models with Applications to Recognition*, in IEEE Proc. of Computer Vision and Pattern Recognition Conference (CVPR), 2011
- **M. Ranzato**, V. Mnih and G.E. Hinton, *Generating More Realistic Images Using Gated MRF's*, Advances in Neural Information Processing Systems (NIPS), MIT Press, 2010
- G. Dahl, **M. Ranzato**, A. Mohamed and G.E. Hinton, *Phone Recognition with the Mean-Covariance Restricted Boltzmann Machine*, Advances in Neural Information Processing Systems (NIPS), MIT Press, 2010
- **M. Ranzato** and G.E. Hinton, *Modeling Pixel Means and Covariances Using Factorized Third-Order Boltzmann Machines*, in IEEE Proc. of Computer Vision and Pattern Recognition Conference (CVPR), 2010
- **M. Ranzato**, A. Krizhevsky and G.E. Hinton, *Factored 3-Way Restricted Boltzmann Machines for Modeling Natural Images*, in Proc. of the 13-th International Workshop on Artificial Intelligence and Statistics (AISTATS), 2010
- K. Jarrett, K. Kavukcuoglu, **M. Ranzato** and Y. LeCun, *What is the Best Multi-Stage Architecture for Object Recognition?*, in IEEE Proc. of International Conference on Computer Vision (ICCV), 2009

- K. Kavukcuoglu, **M. Ranzato**, R. Fergus, Y. LeCun, *Learning Invariant Features through Topographic Filter Maps*, in IEEE Proc. of Computer Vision and Pattern Recognition Conference (CVPR), 2009
- **M. Ranzato**, M. Szummer, *Semi-supervised Learning of Compact Document representations with Deep Networks*, International Conference of Machine Learning (ICML), 2008.
- **M. Ranzato**, Y. Boureau, Y. LeCun, *Sparse Feature Learning for Deep Belief Networks*, Advances in Neural Information Processing Systems (NIPS), MIT Press, 2007
- **M. Ranzato**, Y. LeCun, *A Sparse and Locally Shift Invariant Feature Extractor Applied to Document Images*, International Conference on Document Analysis and Recognition (ICDAR), 2007.
- Y. LeCun, S. Chopra, **M. Ranzato**, F.J. Huang, *Energy-Based Models in Document Recognition and Computer Vision*, International Conference on Document Analysis and Recognition (ICDAR), 2007.
- **M. Ranzato**, F.J. Huang, Y. Boureau, Y. LeCun, *Unsupervised Learning of Invariant Feature Hierarchies with Applications to Object Recognition*, in IEEE Proc. of Computer Vision and Pattern Recognition Conference (CVPR), 2007
- **M. Ranzato**, Y. Boureau, S. Chopra, Y. LeCun, *A Unified Energy-Based Framework for Unsupervised Learning*, In Proc. of the 11-th International Workshop on Artificial Intelligence and Statistics (AISTATS), 2007
- **M. Ranzato**, C.S. Poultney, S. Chopra, Y. LeCun, *Efficient Learning of Sparse Representations with an Energy-Based Model*, Advances in Neural Information Processing Systems (NIPS), MIT Press, 2006

JOURNAL PAPERS

- **M. Ranzato**, V. Mnih, J. Susskind, G.E. Hinton, *Modeling Natural Images Using Gated MRFs*. IEEE Trans. Pattern Analysis and Machine Intelligence, 2013.
- **M. Ranzato**, P.E. Taylor, J.M. House, R.C. Flagan, Y. LeCun, P. Perona, *Automatic recognition of biological particles in microscopic images*. Pattern Recognition Letters, Vol. 28, Issue 1, 1 Jan. 2007, pp. 31-39.

OTHER PUBLICATIONS AND TECHNICAL REPORTS

- S. Wiseman, S. Chopra, **M. Ranzato**, A. Szlam, R. Sun, S. Chintala and N. Vasilache, *Training Language Models Using Target-Propagation*. arXiv:1702.04770 2017
- J. Van Amersfoort, A. Kannan, **M. Ranzato**, A. Szlam, D. Tran and S. Chintala, *Transformation-based models of video sequences*. arXiv:1701.08435 2016
- M. Tygert, A. Szlam, S. Chintala, **M. Ranzato**, Y. Tian, W. Zaremba, *Convolutional networks and learning invariant to homogeneous multiplicative scalings*. arXiv:1506.08230 2015
- **M. Ranzato**, A. Szlam, J. Bruna, M. Mathieu, R. Collobert and S. Chopra, *Video (Language) Modeling: A Baseline for Generative Models of Natural Videos*, arXiv:1412.6604 2015

- **M. Ranzato** *On Learning Where To Look*, ArXiv:1405.5488 2014
- K. Kavukcuoglu, **M. Ranzato**, Y. LeCun, *Fast Inference in Sparse Coding Algorithms with Applications to Object Recognition*, CBLT Technical Report December 2008, arXiv 1010.3467
- Y. LeCun, S. Chopra, R. Hadsell, **M. Ranzato**, F.J. Huang, *A Tutorial on Energy-Based Learning*, in Bakir et al. (eds) "Predicting Structured Outputs", MIT Press 2006

WORKSHOP AND DEMONSTRATION PAPERS

- G. Mesnil, T. Mikolov, **M. Ranzato**, Y. Bengio, *Ensemble of Generative and Discriminative Techniques for Sentiment Analysis of Movie Reviews*, workshop at the International Conference on Representation Learning (ICLR), 2015
- D. Eigen, I. Sutskever, **M. Ranzato**, *Learning Factored Representations in a Deep Mixture of Experts*, workshop at the International Conference on Representation Learning (ICLR), 2014
- O. Yadan, K. Adams, Y. Taigman, **M. Ranzato** *Multi-GPU Training of ConvNets*, workshop at the International Conference on Representation Learning (ICLR), 2014
- E. Horster, M. Slaney, **M. Ranzato**, K. Weinberger, *Unsupervised Image Ranking*, Proc. of the first ACM workshop on Large-scale multimedia retrieval and mining, Beijing, China, 2009
- K. Kavukcuoglu, **M. Ranzato**, Y. LeCun, *Fast Inference in Sparse Coding Algorithms with Applications to Object Recognition*, "Optimization for Machine Learning" workshop at Advances in Neural Information Processing Systems (NIPS), 2008
- D.R. Edgington, I. Kerkez, D.E. Cline, **M. Ranzato**, P. Perona, *Detecting, Tracking and Classifying Animals in Underwater Video*, IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), demonstration, New York, New York, 2006
- D.R. Edgington, I. Kerkez, D.E. Cline, D. Oliver, **M. Ranzato**, P. Perona, *Detecting, Tracking and Classifying Animals in Underwater Video*, IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), demonstration, San Diego, California, 2005

INVITED PRESENTATIONS

- *Deep Learning for Vision*
 - workshop on Web-Scale Vision and Social Media at CVPR 2014
 - Workshop on Scene Understanding at CVPR 2014
 - Large Scale Visual Recognition tutorial at CVPR 2014
 - Large Scale Visual Recognition tutorial at CVPR 2013
 - Bay Area Vision Meeting 2013
- *On The Quest For Good Generative Models of Natural Images*
 - CIFAR NCAP Workshop, Vancouver, Canada, December 2010
 - CBLT seminar, New York University, New York, November 2010
- *Modeling Natural Images with Higher-Order Boltzmann Machines*

- CIFAR Summer School, Toronto, Canada, August 2010
- Redwood Center for Theoretical Neuroscience, June 2010
- Computer Science Department, Stanford, June 2010
- Google Research, Mountain View, June 2010
- Department of Computer Science, University of California, San Diego, June 2010
- Department of Computer Science, University of California, Irvine, June 2010
- CIFAR NCAP Workshop, Vancouver, Canada, December 2009
- *High-Accuracy Object Recognition with a New Convolutional Net Architecture and Learning Algorithm*, Learning Workshop, Snowbird - Clearwater, April 2009
- *Unsupervised Learning of Sparse and Invariant Features Hierarchies*, Learning Workshop, Snowbird - Puerto Rico, March 2007
- *Efficient Learning of Sparse Representations with an Energy-Based Model*
 - Computational Vision Laboratory, California Institute of Technology, December 2006
 - Laboratory for Computational Vision, Center for Neuroscience - NYU, October 2006
- *Energy-Based Model for Unsupervised Learning of Sparse Overcomplete Representations*
 - Learning Workshop, Snowbird Utah, April 2006
 - CIAR NCAP Workshop, Vancouver Canada, December 2005

OTHER MEETINGS

- Workshop: *Mathematics of Knowledge and Search Engines - Workshops II: Numerical Tools and Fast Algorithms for Massive Data Mining, Search Engines and Applications*, IPAM UCLA, October 2007.
- Graduate Summer School: *Neural Computation and Adaptive Perception*, CIAR University of Toronto, August 2006.
- NESCAI - Cornell University, Ithaca, April 2006.
- Graduate Summer School: *Intelligent Extraction of Information from Graphs and High Dimensional Data*, IPAM UCLA, July 2005.

PATENTS

- **M. Ranzato**, K.Q. Weinberger, E. Hoerster, M. Slaney. System and method for improved classification. US Patent 9,639,7802017
- J. Shlens, Q.V. Le, G.S. Corrado, **M. Ranzato**. Generating labeled images. US Patent 9,256,80712016
- A.W. Senior, **M. Ranzato**. Curriculum learning for speech recognition. US Patent 9,202,464
- **M. Ranzato**. Identifying objects in images. US Patent 9,129,190

- Y. Taigman, M. Yang, **M. Ranzato**. Systems and methods for facial representation. US Patent App. 14/530,585
- P. Perona, **M. Ranzato**, R. Flagan. Automatic visual recognition of biological particles. US Patent App. 11/122,575 US Patent 9,202,464