



REFERENCES

- Allen, J. B. (1994). How do humans process and recognize speech?, *IEEE Transactions on Speech and Audio Processing* **2**(4): 567–577.
- Attias, H. (1999). Independent factor analysis, *Neural Computation* **11**(4): 803–851.
- Aur, D., Connolly, C. I. and Jog, M. S. (2006). Computing information in neuronal spikes, *Neural Processing Letters* **23**: 183–199.
- Bair, W. (1999). Spike timing in the mammalian visual system, *Current Opinion in Neurobiology* **9**: 447–453.
- Beloozerova, I. N., Sirota, M. G. and Swadlow, H. A. (2003). Activity of different classes of neurons of the motor cortex during locomotion, *Journal of Neuroscience* **23**: 1087–1097.
- Blumensath, T. and Davies, M. (2006). Sparse and shift-invariant representation of music, *IEEE Transactions on Audio, Speech, and Language Processing* **14**(1): 50–57.
- Boukong, S., Toch, B., Saad, D. and Lowe, D. (2003). ICA for watermarking digital images, *Journal of Machine Learning Research* **4**: 1471–1498.
- Byrd, R. H., Lu, P., Nocedal, J. and Zhu, C. (1995). A limited memory algorithm for bound constrained optimization, *SIAM Journal on Scientific and Statistical Computing* **16**(5): 1190–1208.
- Cardoso, J. F. (1997). Infomax and maximum likelihood for blind source separation, **4**: 109–111.



- Chen, S. S., Donoho, D. L. and Saunders, M. A. (1998). Atomic decomposition by basis pursuit, *SIAM Journal on Scientific Computing* **20**: 33–61.
- Chi, Z., Rauske, P. L. and Margoliash, D. (2003). Detection of spike patterns using pattern filtering, with applications to sleep replay, *Neurocomputing* **52–54**: 19–24.
- Cho, Y. C. and Choi, S. (2005). Nonnegative features of spectro-temporal sounds for classification, *Pattern recognition letters* **26**: 1327–1336.
- Cormen, T. H., Leiserson, C. E., Rivest, R. L. and Stein, C. (2001). *Introduction to Algorithms*, 2nd edn, MIT Press and McGraw-Hill, Cambridge, Mass.
- Davis, G., Mallat, S. and Avellaneda, M. (1997). Adaptive greedy approximations, *Journal of Constructive Approximation* **13**: 57–98.
- Dayan, P. and Abbott, L. F. (2001). *Theoretical Neuroscience: computational and mathematical modeling of neural systems*, MIT Press, Cambridge, Mass., chapter 1.5 - The Neural Code.
- deCharms, R. C., Blake, D. T. and Merzenich, M. M. (1998). Optimizing sound features for cortical neurons, *Science* **280**: 1439–1444.
- DeWeese, M., Wehr, M. and Zador, A. (2003). Binary spiking in auditory cortex, *Journal of Neuroscience* **23**: 7940–7949.
- Eggemont, J. J. (1998). Is there a neural code?, *Neuroscience & Biobehavioral Reviews* **22**(2): 355–370.
- Fan, R. E., Chen, P. H. and Lin, C. J. (2005). Working set selection using second order information for training support vector machines, *Journal of Machine Learning Research* **6**: 1889–1918.
- Field, D. J. (1994). What is the goal of sensory coding?, *Neural Computation* **6**: 559–601.
- Földiák, P. (1998). *The handbook of brain theory and neural networks*, 1st mit press paperback edn, MIT Press, Cambridge, Mass., chapter Sparse coding in the primate cortex, pp. 895–898.



- Földiák, P. and Young, M. (1995). *The handbook of brain theory and neural networks*, MIT Press, Cambridge, Mass., chapter Sparse coding in the primate cortex, pp. 895–898.
- Gat, I. and Tishby, N. (2001). Spotting neural spike patterns using an adversary background model, *Neural Computation* **13**: 2681–2708.
- Girolami, M. (2001). A variational method for learning sparse and overcomplete representations, *Neural Computation* **13**: 2517–2532.
- Hermansky, H. (1990). Perceptual linear predictive(PLP) analysis of speech, *Journal of the Acoustical Society of America* **87**: 1738–1752.
- Hermansky, H. (1998). Should recognizers have ears?, *Speech Communication* **25**: 3–27.
- Hermansky, H. and Morgan, N. (1994). Rasta processing of speech, *IEEE Transactions on Speech and Audio Processing* **2**(4): 578–589.
- Hermansky, H. and Sharma, S. (1999). Temporal patterns (TRAPs) in ASR of noisy speech, *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing*, Phoenix, AZ.
- Holmberg, M., Gelbart, D., Ramacher, U. and Hemmert, W. (2005). Automatic speech recognition with neural spike trains, *Interspeech 2005 - Eurospeech, 9th European Conference on Speech Communication and Technology*.
- Huggins, A. W. F. (1975). Temporally segmented speech, *Perception and Psychophysics* **18**(2): 149–157.
- Hyvarinen, A. (1999a). Sparse code shrinkage: Denoising of nongaussian data by maximum likelihood estimation, *Neural Computation* **11**(7): 1739–1768.
- Hyvärinen, A. (1999b). Sparse code shrinkage: denoising of nonhaussion data by maximum likelihood estimation, *Neural computation* **11**: 1739–1768.
- Hyvärinen, A. and Hoyer, P. O. (2001). A two-layer sparse coding model learns simple and complex cell receptive fields and topography from natural images, *Vision Research* **41**(18): 2413–2423.



- Ikbal, S., Magimai.-Doss, M., Misra, H. and Boulard, H. (2004). Spectro-temporal activity pattern (STAP) features for noise robust ASR, *Proceedings of the INTERSPEECH-International Conference on Spoken Language Processing*, Jeju Island, Korea.
- Kass, R. E. and Ventura, V. (2001). A spike-train probability model, *Neural Computation* **13**: 1713–1720.
- Kayser, C., Petkov, C. I., Augath, M. and Logothetis, N. K. (2007). Functional imaging reveals visual modulation of specific fields in auditory cortex, *Journal of Neuroscience* **27**(8): 1824–1835.
- Klein, D. J., König, P. and Körding, K. P. (2003). Sparse spectrotemporal coding of sounds, *EURASIP Journal on Applied Signal Processing* **7**: 659–667.
- Kleinschmidt, M. (2002). Methods for capturing spectro-temporal modulations in automatic speech recognition, *Acustica* **88**: 416–422.
- Kral, A. (2000). Temporal code and speech, *Acta Otolaryngol* **120**: 529–530.
- Kreutz-Delgado, K., Murray, J. F., Rao, B. D., Engan, K., Lee, T. W. and Sejnowski, T. J. (2003). Dictionary learning algorithms for sparse representation, *Neural Computation* **15**: 349–396.
- Kwon, O. W. and Lee, T. W. (2004). Phoneme recognition using ICA-based feature extraction and transformation, *Signal Processing* **84**(6): 1005–1019.
- Laurent, G. (2002). Olfactory network dynamics and the coding of multidimensional signals, *Nature Reviews Neuroscience* **3**: 884–895.
- Lee, T. W., Lewicki, M. S., Girlami, M. and Sejnowski, T. J. (1999). Blind source separation of more sources than mixtures using overcomplete representations, *IEEE Signal Processing Letters* **6**(4): 87–90.
- Leonard, R. G. and Doddington, G. (1993). TIDIGITS, Philadelphia.
- Lewicki, M. S. (2002). Efficient coding of natural sounds, *Nature Neuroscience* **5**(4): 356–363.



- Lewicki, M. S. and Olshausen, B. A. (1999). Probabilistic framework for the adaptation and comparison of image codes, *Journal of the Optical Society of America* **16**(7): 1587–1601.
- Lewicki, M. S. and Sejnowski, T. J. (1999). Coding time-varying signals using sparse, shift-invariant representations, in M. S. Kearns, S. Solla and D. Cohn (eds), *Advances in neural information processing systems, 11*, MIT Press, Cambridge, Mass., London, pp. 730–736.
- Lewicki, M. S. and Sejnowski, T. J. (2000). Learning overcomplete representations, *Neural Computation* **12**: 337–365.
- Liao, S. P., Lin, H. T. and Lin, C. J. (2002). A note on the decomposition methods for support vector regression, *Neural Computation* **14**: 1267–1281.
- Loiselle, S., Rouat, J., Pressnitzer, D. and Thorpe, S. (2005). Exploration of rank order coding with spiking neural networks for speech recognition, *International Joint Conference on Neural Networks*, Montreal, Canada.
- Mallet, S. and Zhang, Z. (1993). Matching pursuits with time-frequency dictionaries, *IEEE Transactions on Signal Processing* **41**(12): 3397–3415.
- Massaro, D. W. (1972). Preperceptual images, processing time and perceptual units in auditory perception, *Psychological Review* **79**(2): 124–145.
- Mercier, D. and Séguier, R. (2002). Spiking neurons (stanns) in speech recognition, *3rd WSES International Conference on Neural Networks and Applications*, Interlaken.
- Moller, A. (1999). Review of the roles of temporal and place coding of frequency in speech discrimination, *Acta Otolaryngol* **119**: 424–430.
- Näger, C., Storck, J. and Deco, G. (2002). Speech recognition with spiking neurons and dynamic synapses: a model motivated by the human auditory pathway, *Neurocomputing* **44–46**: 937–942.



- Neumaier, A. MINQ - general definite and bound constrained indefinite quadratic programming [online]. 1998. Available from: <http://www.mat.univie.ac.at/~neum/software/minq/> [cited December 1, 2007].
- Nguyen, N. and Hawkins, S. (2003). Temporal integration in the perception of speech: introduction, *Journal of Phonetics* pp. 279–287.
- Olshausen, B. Sparsenet [online]. 1996. Available from: <http://redwood.berkeley.edu/bruno/sparsenet/> [cited November 26, 2007].
- Olshausen, B. A. (2002). Sparse codes and spikes, in R. P. N. Rao, B. A. Olshausen and M. S. Lewicki (eds), *Probabilistic models of the brain: perception and neural function*, MIT Press, pp. 257–272.
- Olshausen, B. A. and Field, D. J. (1996a). Emergence of simple-cell receptive-field properties by learning a sparse code for natural images, *Nature* **381**: 607–609.
- Olshausen, B. A. and Field, D. J. (1996b). Wavelet-like receptive fields emerge from a network that learns sparse codes for natural images, *Nature* **381**: 607–609.
- Olshausen, B. A. and Field, D. J. (1997). Sparse coding with an overcomplete basis set: A strategy employed by V1?, *Vision Research* **37**: 3311–3325.
- Olshausen, B. A. and Field, D. J. (2004). Sparse coding of sensory inputs, *Current Opinion in Neurobiology* **14**: 481–487.
- Oram, M. W., Wiener, M. C., Lestienne, R. and Richmond, B. J. (1999). Stochastic nature of precisely timed spike patterns in the visual system neuronal responses, *Journal of Neurophysiology* **81**: 3021–3033.
- Ostendorf, M., Digilakis, V. V. and Kimball, O. A. (1996). From HMMs to segment models: A unified view of stochastic modeling for speech recognition, *IEEE Transactions on Speech and Audio Processing* **4**: 360–378.
- Perrinet, L. (2004a). Feature detection using spikes: the greedy approach, *Journal of Physiology-Paris* **98**: 530–539.



- Perrinet, L. (2004b). Finding independent components using spikes: a natural result of Hebbian learning in a sparse spike coding scheme, *Natural Computing* **3**(2): 159–175.
- Quirago, R. Q., Reddy, L., Kreiman, G., Koch, C. and Fried, I. (2005). Invariant visual representation by single neurons in the human brain, *Nature* **435**(7045): 1102–1107.
- Rabiner, L. and Juang, B. H. (1993). *Fundamentals of Speech Recognition*, Prentice Hall, Englewood Cliffs, N.J.
- Rao, B. D., Engan, K., Cotter, S. F., Palmer, J. and Kreutz-Delgado, K. (2003). Subset selection in noise based on diversity measure minimization, *IEEE Transactions on Signal Processing* **51**(3): 760–770.
- Rebollo-Neira, L. and Lowe, D. (2002). Optimised orthogonal matching pursuit, *IEEE Signal Processing Letters* **9**(4): 137–140.
- Rieke, F., Warland, D., de Ruyter van Steveninck, R. and Bialek, W. (1996). *Spikes: Exploring the Neural Code*, MIT Press, Cambridge, Mass.
- Rolls, E. T. and Treves, A. (1990). The relative advantages of sparse versus distributed encoding for associative neuronal networks in the brain, *Network: Computation in Neural Systems* **1**: 407–421.
- Shamma, S. A. (2001). On the role of space and time in auditory processing, *Trends in Cognitive Sciences* **5**(8): 340–348.
- Shang, L., Huang, D. E., Zheng, C. H. and Sun, Z. L. (2006). Noise removal using a novel non-negative sparse coding shrinkage technique, *Neurocomputing* **69**: 874–877.
- Shannon, R. V., Zeng, F. G., Kamath, V., Wygonski, J. and Ekelid, M. (1995). Speech recognition with primarily temporal cues, *Science* **270**(5234): 303–304.
- Sigman, M., Cecchi, G. A., Gilbert, C. D. and Magnasco, M. O. (2001). On a common circle: Natural scenes and gestalt rules, *PNAS* **98**(4): 1935–1940.
- Smith, E. and Lewicki, M. S. (2005). Efficient coding of time-relative structure using spikes, *Neural Computation* **17**: 19–45.



- Sun, J., Zhou, Q., Ma, C. and Wang, W. (2001). Sparse image coding with clustering property and its application to face recognition, *Pattern recognition* **34**(9): 1883–1884.
- Theunissen, F. E. (2003). From synchrony to sparseness, *Trends in Neuroscience* **26**(2): 61–64.
- Thorpe, S., Fize, D. and Marlot, C. (1996). Speed of processing in the human visual system, *Nature* **381**(6582): 520–522.
- University of Cambridge. Hidden Markov Model Toolkit ver 3.4 [online]. 2006. Available from: <http://htk.eng.cam.ac.uk/> [cited March 17, 2008].
- Verstraeten, D., Schrauwen, B., Stroobandt, D. and Campenhout, J. V. (2005). Isolated word recognition with the liquid state machine: a case study, *Information Processing Letters* **95**: 521–528.
- Vinje, W. E. and Gallant, J. L. (2000). Sparse coding and decorrelation in primary visual cortex during natural vision, *Science* **287**: 1273–1276.
- Vinje, W. E. and Gallant, J. L. (2002). Natural stimulation of the nonclassical receptive field increases information transmission efficiency in V1, *Journal of Neuroscience* **22**(7): 2904–2915.
- Wang, K. and Shamma, S. A. (1995). Spectral shape analysis in the central auditory system, *IEEE Transactions on Speech and Audio Processing* **3**(5): 382–395.
- Wiener, M. C. and Richmond, B. J. (2003). Decoding spike trains instant by instant using order statistics and the mixture-of-Poissons model, *Journal of Neuroscience* **23**(6): 2394–2406.
- Willmore, B. and Tolhurst, D. J. (2001). Characterizing the sparseness of neural codes, *Network* **12**: 255–270.
- Wipf, D. P. and Rao, B. D. (2006). l_0 -norm minimization for basis selection, *Advances in Neural Information Processing Systems 18*, MIT Press, Cambridge, Mass., London.