CURRICULUM VITAE 2004

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Education:

- **1990** Student matriculation, Helsingin Suomalainen Yhteiskoulu
- **1996** Diploma Engineer (M.Sc.), Helsinki University of Technology, Department of Electrical Engineering
- **2000** Doctor of Science in Technology, Helsinki University of Technology, Department of Computer Science and Engineering

Language Skills:

Finnish, English, German, Swedish

Military Service:

1991-1992 Finnish Army, rank: second lieutenant

Employment:

- **1994-1995** Research Assistant, Helsinki University of Technology, Laboratory of Computer and Information Science
- **1995-1996** Research Assistant, Helsinki University of Technology, Neural Networks Research Centre
- **1996-2002** Research Scientist, Helsinki University of Technology, Neural Networks Research Centre
- **2002-2003** Visiting Researcher, International Computer Science Institute, Berkeley, California, USA
- **2003-2005** Research Scientist, Helsinki University of Technology, Neural Networks Research Centre
- **2005-** Bioinformatics, University of Helsinki, Department of Applied Biology

Research Background and Interests:

My general research interests are in signal processing, bioinformatics, and machine learning. I am also interested in telecommunications. Most of my background is in speech recognition where I have been working with acoustic models. I am familiar with feature extraction methods and statistical models like Gaussian mixture models and hidden Markov models. I have also interest in Bayesian methods. Besides speech recognition, another main branch of my work has been in the use and development of self-organizing maps. These belong to a certain type of artificial neural networks which can be used for the clustering and visualization of complex data.

Programming Skills:

C/C++, MATLAB, Perl.

Journal reviewing:

I have been reviewer for papers submitted to Bioinformatics, Neural Computation, International Journal of Neural Systems, Neural Processing Letters, IEEE Transactions on Systems, Man, and Cybernetics - Part B, IEEE Transactions on Knowledge and Data Engineering, and IEEE Transactions on Speech and Audio Processing.

Publications:

P. Somervuo, **Online Algorithm for the Self-Organizing Map of Symbol Strings**, *Neural Networks*, 17, 2004, pp. 1231-1239.

P. Somervuo, **Comparison of ML, MAP, and VB based acoustic models in large vocabulary speech recognition**, in *Proceedings of the 8th International Conference on Spoken Language Processing (ICSLP)*, Jeju Island, Korea, October 5-8, 2004.

P. Somervuo and A. Härmä, **Bird song recognition based on syllable pair histograms**, in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Montreal, Canada, May 17-21, 2004.

A. Härmä and P. Somervuo, **Classification of the harmonic structure in bird vocalization**, in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Montreal, Canada, May 17-21, 2004.

P. Somervuo, **Self-Organizing Map of Symbol Strings with Smooth Symbol Averaging**, in *Proceedings of the Workshop on Self-Organizing Maps (WSOM)*, Hibikino, Kitakyushu, Japan, September 11-14, 2003.

P. Somervuo and A. Härmä, **Analyzing Bird Song Syllables on the Self-Organizing Map**, in *Proceedings of the Workshop on Self-Organizing Maps (WSOM)*, Hibikino, Kitakyushu, Japan, September 11-14, 2003.

M. Oja, P. Somervuo, S. Kaski, and T. Kohonen, **Clustering of human endogenous retrovirus sequences with median self-organizing map**, in *Proceedings of the Workshop on Self-Organizing Maps (WSOM)*, Hibikino, Kitakyushu, Japan, September 11-14, 2003.

P. Somervuo, B. Chen, and Q. Zhu, **Feature Transformations and Combinations for Improving ASR Performance**, in *Proceedings of the 8th European Conference on Speech Communication and Technology (Eurospeech)* , Geneva, Switzerland, September 1-4, 2003.

P. Somervuo, **Experiments with Linear and Nonlinear Feature Transformations in HMM Based Phone Recognition**, in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)* , Hong Kong, 2003, vol. I, pp. 52-55.

P. Somervuo, **Speech Dimensionality Analysis on Hypercubical Self-Organizing Maps**, *Neural Processing Letters* 17(2), 2003, pp. 125-136.

T. Kohonen and P. Somervuo, **How to make large self-organizing maps for nonvectorial data**, *Neural Networks* 15(8-9), 2002, pp. 945-952.

P. Somervuo, **Speech Modeling Using Variational Bayesian Mixture of Gaussians**, in *Proceedings of the 7th International Conference on Spoken Language Processing (ICSLP)*, Denver, Colorado, USA, September 16-20, 2002.

P. Somervuo, **Two-level phoneme recognition based on successive use of monophone and diphone models**, in *Proceedings of the XI European Signal Processing Conference (EUSIPCO)* , Toulouse, France, September 3-6, 2002, vol. III, pp. 77-80.

P. Somervuo, **Self-Organizing Maps for Signal and Symbol Sequences**, *PhD Thesis*, Helsinki University of Technology, 2000. Published in Acta Polytechnica Scandinavica, Mathematics and Computing Series No. 107, ISBN 951-666-550-0.

P. Somervuo and T. Kohonen, **Clustering and Visualization of Large Protein Sequence Databases by Means of an Extension of the Self-Organizing Map**, in *Proceedings of Discovery Science 2000*, pp. 76-85, Kyoto, Japan, 2000.

P. Somervuo, **Competing Hidden Markov Models on the Self-Organizing Map**, in *Proceedings of the International Joint Conference on Neural Networks (IJCNN)*, vol. 3, pp. 169-174, Como, Italy, 2000.

P. Somervuo, **Speech Recognition Using Temporally Connected Kernels in Mixture Density Hidden Markov Models**, in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, vol. 6, pp. 3434-3437, Istanbul, Turkey, 2000.

P. Somervuo, **Time Topology for the Self-Organizing Map**, in *Proceedings of the International Joint Conference on Neural Networks (IJCNN)*, vol. 3, pp. 1900-1905, Washington DC, 1999.

P. Somervuo and T. Kohonen, **Self-Organizing Maps and Learning Vector Quantization for Feature Sequences**, *Neural Processing Letters*, 10(2), pp. 151-159, 1999.

P. Somervuo, **Redundant Hash Addressing of Feature Sequences Using the Self-Organizing Map**, *Neural Processing Letters*, 10(1), pp. 25-34, 1999.

T. Kohonen and P. Somervuo, **Self-Organizing Maps of Symbol Strings**, *Neurocomputing* 21, pp. 19-30, 1998.

T. Kohonen and P. Somervuo, **Self-Organizing Maps of Symbol Strings with Application to Speech Recognition**, in *Proceedings of the Workshop on Self-Organizing Maps (WSOM)*, pp. 2-7, Espoo, Finland, 1997.

M. Karjalainen, P. Boda, P. Somervuo, and T. Altosaar, **Applications for the Hearing-Impaired: Evaluation of Finnish Phoneme Recognition Methods**, in *Proceedings of the 5th European Conference on Speech Communication and Technology (Eurospeech)*, vol. 4, pp. 1811-1814, Rhodes, Greece, 1997.

M. Kurimo and P. Somervuo, **Using the Self-Organizing Map to Speed up the Probability Density Estimation for Speech Recognition with mixture density HMMs**, in *Proceedings of the International Conference on Spoken Language Processing (ICSLP)*, pp. 358-361, Philadelphia, PA, 1996.

P. Somervuo, **Speech Recognition Using Context Vectors and Multiple Feature Streams**, *Master's Thesis*, Helsinki University of Technology, 1996.