

OLIVIER CHAPELLE

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RESEARCH INTERESTS

Machine learning: kernel methods, semi-supervised learning, large scale learning; optimization; information retrieval; computer vision.

EDUCATION

- **University Paris 6**, France (1999-2002)
PhD in Machine Learning. Advisor: P. Gallinari
- **Ecole Normale Supérieure**, Cachan, France (1998-1999)
Master Degree (DEA) in Applied Mathematics — ranked first.
- **Ecole Normale Supérieure**, Lyon, France (1996-1998)
Bachelor Degree (License - Maitrise) in Computer Science.

PROFESSIONAL EXPERIENCE

- **Yahoo! Research**, Machine learning group (Oct. 2006 - present)
Senior Research Scientist
Main projects are on machine learning applied to web search ranking and display advertising.
- **Max Planck Institute**, Tübingen, Empirical inference group. (Sep. 2002 - Oct. 2006)
Research Scientist
Design of semi-supervised learning algorithms and kernel methods.
- **Biowulf Technologies** (Apr. 2001 - Apr. 2002)
Consultant
Provided expertise in the field of machine learning for bioinformatic applications.
- **AT&T Research Labs** (Summers 1998, 2000, 2001)
Intern (Supervisor: V. Vapnik)
Worked on practical and theoretical aspects of Support Vector Machines. Applied SVMs to image classification problems.
- **INRIA Rhône-Alpes** (Summer 1997)
Intern (Supervisors: P. Gros and C. Schmid)
Worked in a computer vision team on a statistical approach to extract the interest points of an image

TEACHING EXPERIENCE & TUTORIALS

- **Yahoo!** Machine Learning class (Aug. 2009)
Tutorial on Optimization for machine learning.
- **Yahoo!** Machine Learning class (Aug. 2007)
Tutorial on Semi-Supervised learning.
- **Machine Learning Summer School** Berder & Canberra (2005 & 2006)
Practical session on semi-supervised learning.
- **Ecole Centrale Paris**, Teaching Assistant (Winter 2001)
Supervised machine learning oriented projects.

- **University Paris 6**, Teaching Assistant (Fall 2000)
Computer science department – Undergraduate level.

PROFESSIONAL ACTIVITIES

- **Editorial board**
Machine Learning Journal – Action editor. (2006 – 2009)
Trans. on Pattern Analysis and Machine Intelligence – Associate editor. (2008 – 2010)
- **Workshop organization**
Learning to rank challenge, ICML 2010
Beyond Search: Computational Intelligence for the Web, NIPS 2008
Beyond Binary Relevance: Preferences, Diversity, and Set-Level Judgments, SIGIR 2008
Machine Learning for Web Search, NIPS 2007 Large Scale Kernel Machines, NIPS 2006
Learning with Partially Classified Training Data, ICML 2005
- **Senior Program Committee**
ECML 2006, 2007
NIPS 2007, 2010
KDD 2010,
ICML 2011, 2012
CIKM 2012
- **Reviewer**
Journals: Journal of Machine Learning Research, Machine Learning Journal, Neural Computation, IEEE Trans. Neural Networks, IEEE Trans. Pattern Analysis and Machine Intelligence, IEEE Trans. Systems, Man and Cybernetics – Part B, IEEE Trans. Knowledge and Data Engineering, Journal of Artificial Intelligence Research, Neurocomputing, International Journal of Computer Vision, Pattern Recognition Letters.
Conferences: NIPS, ICML, ECML, COLT, CVPR, AISTATS, DAGM.
NSF panel, 2011
- **Scientific Board**
KXEN
- **European Projects**
PASCAL, Pattern Analysis, Statistical Modeling and Computational Learning – Site manager
CLASS, Cognitive-Level Annotation using Latent Statistical Structure
- **Co-supervised PhD students**
Jan Eichhorn, MPI Tübingen, 2006
Christian Walder, MPI Tübingen, 2006
Peter Gehler, MPI Tübingen, Expected graduation 2008.

INVITED TALKS

- Max Planck Institute for Intelligent Systems, Tübingen (Dec 2011)
- Microsoft Research, Redmond (Oct 2009)
- eBay, San Jose (Sep2009)
- International Symposium of Mathematical Programming, Chicago (Aug 2009)
- SIGIR Workshop – Learning to Rank for Information Retrieval (Jul 2009)
- Department of Computer Sciences, UC Berkeley (Apr 2008)
- Institute for Pure and Applied Mathematics, UCLA (Oct 2007)
- Max Planck Institute for Biological Cybernetics, Tübingen (Oct 2007)
- Centre for Computational Statistics and Machine Learning, UCL, London (Oct 2007)

- Yahoo! Research, Burbank (Dec 2005)
- NIPS Workshop – Open Problems in Gaussian Processes for Machine Learning (Dec 2005)
- Department of Computer Sciences, UC Berkeley (Dec 2003)
- NIPS Workshop – Variable and Feature Selection (Dec 2001)
- Dagstuhl Seminar Inference – Principles and Model Selection (Jul 2001)
- Center for for Biological and Computational Learning, MIT (Nov 1999)
- Department of Mathematics, University Paris-Sud (Oct 1999)

PUBLICATIONS

Edited Books

- L. Bottou, **O. Chapelle**, D. DeCoste, and J. Weston, editors. *Large Scale Kernel Machines*. MIT Press, Cambridge, MA., 2007.
- **O. Chapelle**, Y. Chang, and T.-Y. Liu, editors. *Proceedings of the Yahoo! Learning to Rank Challenge*, volume 14 of *JMLR Workshop and Conference Proceedings*, 2011.
- **O. Chapelle**, B. Schölkopf, and A. Zien, editors. *Semi-Supervised Learning*. MIT Press, Cambridge, MA., 2006.

Book chapters

- T. N. Lal, **O. Chapelle**, and B. Schölkopf. Combining a filter method with SVMs. In I. Guyon, S. Gunn, M. Nikravesh, and L. A. Zadeh, editors, *Feature extraction: Foundations and Applications*, Studies in Fuzziness and Soft Computing ; 207, pages 439–445. Springer, 2006.
- T. N. Lal, **O. Chapelle**, J. Weston, and A. Elisseeff. Embedded methods. In I. Guyon, S. Gunn, M. Nikravesh, and L. A. Zadeh, editors, *Feature Extraction: Foundations and Applications*, Studies in Fuzziness and Soft Computing ; 207, pages 137–165. Springer, 2006.
- G. C. Cawley, N. L.C. Talbot, and **O. Chapelle**. Estimating predictive variances with kernel ridge regression. In J. Quinonero Candela, I. Dagan, B. Magnini, and F. DALch Buc, editors, *Machine learning challenges: evaluating predictive uncertainty, visual object classification, and recognising textual entailment*, Lecture Notes in Computer Science ; 3944, pages 56–77. Springer, 2006.

Journals

- **O. Chapelle**, T. Joachims, F. Radlinski, and Y. Yue. Large scale validation and analysis of interleaved search evaluation. *Transactions on Information Systems*, 2012. to appear.
- **O. Chapelle** and Y. Chang. Yahoo! learning to rank challenge overview. *JMLR Workshop and Conference Proceedings*, 14:1–24, 2011.
- **O. Chapelle**, S. Ji, C. Liao, E. Velipasaoglu, L. Lai, and S.-L. Wu. Intent-based diversification of web search results: Metrics and algorithms. *Information Retrieval Journal*, 14(6):572–592, 2011.
- **O. Chapelle**, P. Shivaswamy, S. Vadrevu, K. Weinberger, Y. Zhang, and B. Tseng. Boosted multi-task learning. *Machine Learning Journal*, 85(1-2):149–173, 2011.
- J. Abernethy, **O. Chapelle**, and C. Castillo. Graph regularization methods for web spam detection. *Machine Learning Journal*, 81(2):207–225, 2010.
- B. Bai, J. Weston, D. Grangier, R. Collobert, K. Sadamasa, Y. Qi, **O. Chapelle**, and K. Weinberger. Learning to rank with (a lot of) word features. *Information Retrieval Journal*, 13(3):291–314, 2010.

- **O. Chapelle** and S. S. Keerthi. Efficient algorithms for ranking with SVMs. *Information Retrieval Journal*, 13(3):201–215, 2010.
- **O. Chapelle** and M. Wu. Gradient descent optimization of smoothed information retrieval metrics. *Information Retrieval Journal*, 13(3):216–235, 2010.
- **O. Chapelle**, V. Sindhwani, and S. S. Keerthi. Optimization techniques for semi-supervised Support Vector Machines. *Journal of Machine Learning Research*, 9:203–233, 2008.
- **O. Chapelle**. Training a Support Vector Machine in the primal. *Neural Computation*, 19(5):1155–1178, 03 2007. An updated version appeared in the *Large Scale Kernel Machines* book.
- C. Walder, B. Schölkopf, and **O. Chapelle**. Implicit surface modelling with a globally regularised basis of compact support. *Computer Graphics Forum*, 25(3):635–644, 09 2006.
- S. Keerthi, **O. Chapelle**, and D. Decoste. Building Support Vector Machines with reduced classifier complexity. *Journal of Machine Learning Research*, 7:1493–1515, 07 2006.
- H. Fröhlich, **O. Chapelle**, and B. Schölkopf. Feature selection for Support Vector Machines using genetic algorithms. *International Journal on Artificial Intelligence Tools*, 13(4):791–800, 2004.
- J. Weston, F. Perez-Cruz, O. Bousquet, **O. Chapelle**, A. Elisseeff, and B. Schölkopf. Feature selection and transduction for prediction of molecular bioactivity for drug design. *Bioinformatics*, 19(6):764–771, 04 2003.
- **O. Chapelle**, V. Vapnik, O. Bousquet, and S. Mukherjee. Choosing multiple parameters for Support Vector Machines. *Machine Learning*, 46(1):131–159, 2002.
- **O. Chapelle**, V. Vapnik, and Y. Bengio. Model selection for small sample regression. *Machine Learning*, 48(1-3):9–23, 2002.
- V. Vapnik and **O. Chapelle**. Bounds on error expectation for Support Vector Machines. *Neural Computation*, 12(9):2013–2036, 2000.
- **O. Chapelle**, P. Haffner, and V. N. Vapnik. Support Vector Machines for histogram-based image classification. *IEEE Transactions on Neural Networks*, 10(5):1055–1064, Sept 1999.

Conferences

- **O. Chapelle** and L. Li. An empirical evaluation of thompson sampling. *Advances in Neural Information Processing Systems 24*, 2012.
- B. Cambazoglu, H. Zaragoza, **O. Chapelle**, J. Chen, C. Liao, Z. Zheng, and J. Degenhardt. Early exit optimizations for additive machine learned ranking systems. In *WSDM '10: Proceedings of the Third ACM International Conference on Web Search and Data Mining*, 2010.
- **O. Chapelle**, P. Shivaswamy, S. Vadrevu, K. Weinberger, Y. Zhang, and B. Tseng. Multi-task learning for boosting with application to web search ranking. In *KDD '10: Proceedings of the 16th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 2010.
- B. Long, **O. Chapelle**, Y. Zhang, Y. Chang, Z. Zheng, and B. Tseng. Active learning for ranking through expected loss optimization. In *SIGIR '10: Proceedings of the 33rd annual international ACM SIGIR conference on Research and development in information retrieval*, 2010.
- Y. Yue, Y. Gao, **O. Chapelle**, Y. Zhang, and T. Joachims. Learning more powerful test statistics for click-based retrieval evaluation. In *SIGIR '10: Proceedings of the 33rd annual international ACM SIGIR conference on Research and development in information retrieval*, 2010.

- **O. Chapelle**, D. Metzler, Y. Zhang, and P. Grinspan. Expected reciprocal rank for graded relevance. In *CIKM '09: Proceedings of the 18th ACM Conference on Information and Knowledge Management*, 2009.
- **O. Chapelle** and Y. Zhang. A dynamic bayesian network click model for web search ranking. In *Proceedings of the 18th International World Wide Web Conference (WWW)*, 2009.
- C. B. Do, Q. Le, C. H. Teo, **O. Chapelle**, and A. Smola. Tighter bounds for structured estimation. In *Advances in Neural Information Processing Systems 21*. MIT Press, 2009.
- S. Ji, K. Zhou, C. Liao, Z. Zheng, G.-R. Xue, **O. Chapelle**, G. Sun, and H. Zha. Global ranking by exploiting user clicks. In *SIGIR '09: Proceedings of the 32nd annual international ACM SIGIR conference on Research and development in information retrieval*. ACM, 2009.
- K. Weinberger and **O. Chapelle**. Large margin taxonomy embedding with an application to document categorization. In *Advances in Neural Information Processing Systems 21*. MIT Press, 2009.
- **O. Chapelle** and S. S. Keerthi. Multi-class feature selection with support vector machines. In *Proceedings of the American Statistical Association*, 2008.
- **O. Chapelle** and A. Rakotomamonjy. Second order optimization of kernel parameters. In *NIPS Workshop on Automatic Selection of Optimal Kernels*, 2008.
- B. Carterette, P.N. Bennett, and **O. Chapelle**. A test collection of preference judgments. In *SIGIR 2008 Workshops: Beyond Binary Relevance: Preferences, Diversity, and Set-Level Judgments*, 2008.
- Z. Zheng, H. Zha, T. Zhang, **O. Chapelle**, K. Chen, and G. Sun. A general boosting method and its application to learning ranking functions for web search. In J.C. Platt, D. Koller, Y. Singer, and S. Roweis, editors, *Advances in Neural Information Processing Systems 20*. MIT Press, 2008.
- C. Walder and **O. Chapelle**. Learning with transformation invariant kernels. In J.C. Platt, D. Koller, Y. Singer, and S. Roweis, editors, *Advances in Neural Information Processing Systems 20*. MIT Press, 2008.
- F. Sinz, **O. Chapelle**, A. Agarwal, and B. Schölkopf. An analysis of inference with the universum. In J.C. Platt, D. Koller, Y. Singer, and S. Roweis, editors, *Advances in Neural Information Processing Systems 20*. MIT Press, 2008.
- **O. Chapelle**, Q. Le, and A. Smola. Large margin optimization of ranking measures. NIPS workshop on Machine Learning for Web Search, 2007.
- **O. Chapelle**, V. Sindhwani, and S. S. Keerthi. Branch and bound for semi-supervised Support Vector Machines. In *Advances in Neural Information Processing Systems 19*, pages 217–224, 2007.
- P. Gehler and **O. Chapelle**. Deterministic annealing for multiple-instance learning. In *Proceedings of the Eleventh International Conference on Artificial Intelligence and Statistics*, 2007.
- S. Keerthi, V. Sindhwani, and **O. Chapelle**. An efficient method for gradient-based adaptation of hyperparameters in SVM models. In B. Schölkopf, J. Platt, and T. Hoffman, editors, *Advances in Neural Information Processing Systems 19*, pages 673–680. MIT Press, 2007.
- C. Walder, B. Schölkopf, and **O. Chapelle**. Implicit surfaces with globally regularised and compactly supported basis functions. In *Advances in Neural Information Processing Systems 19*, Cambridge, MA, 2007. MIT Press.
- **O. Chapelle**, M. Chi, and A. Zien. A continuation method for semi-supervised SVMs. In *Proceedings of the 23rd International Conference on Machine Learning*, pages 185–192. ACM Press, 2006.
- V. Sindhwani, S. Keerthi, and **O. Chapelle**. Deterministic annealing for semi-supervised kernel machines. In *Proceedings of the 23rd International conference on machine learning*, pages 841 – 848, 2006.

- **O. Chapelle.** Active learning for parzen window classifier. In *Proceedings of the Tenth International Workshop on Artificial Intelligence and Statistics*, pages 49–56, 2005.
- **O. Chapelle** and Z. Harchaoui. A machine learning approach to conjoint analysis. In Y. Weiss Saul, L.K. and L. Bottou, editors, *Advances in Neural Information Processing Systems 17*, pages 257–264, Cambridge, MA, USA, 2005. MIT Press.
- **O. Chapelle** and A. Zien. Semi-supervised classification by low density separation. In *Proceedings of the Tenth International Workshop on Artificial Intelligence and Statistics*, pages 57–64, 2005.
- A. Kowalczyk and **O. Chapelle.** An analysis of the anti-learning phenomenon for the class symmetric polyhedron. In *Algorithmic Learning Theory: 16th International Conference*, pages 78–92, 10 2005.
- C. Walder, **O. Chapelle**, and B. Schölkopf. Implicit surface modelling as an eigenvalue problem. In S. Wrobel De Raedt, L., editor, *Proceedings of the 22nd International Conference on Machine Learning*, pages 937 – 944, 2005.
- O. Bousquet, **O. Chapelle**, and M. Hein. Measure based regularization. In L. Saul Thrun, S. and B. Schölkopf, editors, *Advances in Neural Information Processing Systems 16*. MIT Press, December 2004.
- **O. Chapelle**, B. Schölkopf, and J. Weston. Semi-supervised learning through principal directions estimation. In *ICML Workshop, The Continuum from Labeled to Unlabeled Data in Machine Learning & Data Mining*, 2003.
- **O. Chapelle**, J. Weston, and B. Schölkopf. Cluster kernels for semi-supervised learning. In S. Becker, S. Thrun, and K. Obermayer, editors, *Advances in Neural Information Processing Systems 15*, pages 585–592. MIT Press, 2003.
- H. Fröhlich, **O. Chapelle**, and B. Schölkopf. Feature selection for support vector machines by means of genetic algorithms. In *15th IEEE International Conference on Tools with AI*, pages 142–148, 2003.
- J. Weston, **O. Chapelle**, A. Elisseeff, B. Schölkopf, and V. Vapnik. Kernel dependency estimation. In S. Becker, S. Thrun, and K. Obermayer, editors, *Advances in Neural Information Processing Systems 15*, pages 873–880. MIT Press, 2003.
- **O. Chapelle** and B. Schölkopf. Incorporating invariances in nonlinear SVMs. In T. Dietterich, S. Becker, and Z. Ghahramani, editors, *Advances in Neural Information Processing Systems 14*, volume 14, pages 609–616. MIT Press, 2002.
- **O. Chapelle**, J. Weston, L. Bottou, and V. Vapnik. Vicinal risk minimization. In *Advances in Neural Information Processing Systems 13*, 2001.
- J. Weston, S. Mukherjee, **O. Chapelle**, M. Pontil, T. Poggio, and V. Vapnik. Feature selection for Support Vector Machines. In *Advances in Neural Information Processing Systems 13*, 2001.
- **O. Chapelle** and V. Vapnik. Model selection for Support Vector Machines. In *Advances in Neural Information Processing Systems 12*, 2000.
- **O. Chapelle**, V. Vapnik, and J. Weston. Transductive inference for estimating values of functions. In *Advances in Neural Information Processing Systems 12*, 2000.

Miscellaneous

- J. Eichhorn and **O. Chapelle.** Object categorization with SVM: kernels for local features. Technical Report 137, Max Planck Institute for Biological Cybernetics, 2004.
- **O. Chapelle.** *Support Vector Machines: Induction Principle, Adaptive Tuning and Prior Knowledge*. PhD thesis, LIP6, 2002.
- J. Weston, **O. Chapelle**, and I. Guyon. Data cleaning with Support Vector Machines. Technical report, Biowulf Technologies, 2001.

- **O. Chapelle.** Support Vector Machines for image classification. Master's thesis, Ecole Normale Supérieure de Lyon, 1998.

PATENTS

- **O. Chapelle** and S. Keerthi Selvaraj, *Efficient Algorithm For Pairwise Preference Learning*, Filed 07/2009
- S. Ji, A. Dong, C. Liao, Y. Chang, Z. Zheng, **O. Chapelle**, G. Sun and H. Zha, *System and Method for Improving Global and Topical Ranking by Exploiting User Clicks*, Filed 07/2009
- **O. Chapelle** and Y. Zhang, *Click Model For Search Rankings*, Filed 11/2008
- **O. Chapelle** and K. Weinberger, *Hierarchical Recognition Through Semantic Embedding*, Filed 04/2008
- **O. Chapelle** and S. Keerthi Selvaraj, *System and Method for Training a Multi-class Support Vector Machine to Select a Common Subset of Features for Classifying Objects*, US Patent 7,836,000
- **O. Chapelle**, *Determining a relevance function based on a query error derived using a structured output learning technique*, US Patent 8,005,774
- **O. Chapelle**, *Gradient based optimization of a ranking measure*, US Patent 7,895,198
- P. Bartlett, A. Elisseeff, B. Schoelkopf and **O. Chapelle**, *Kernels and methods for selecting kernels for use in learning machines*, US Patent 7,788,193
- A. Kowalczyk, A. Smola, C. Soon Ong and **O. Chapelle**, *Data mining unlearnable data sets*, WIPO 2006/007633
- A. Ben Hur, A. Elisseeff, **O. Chapelle** and J. Weston, *Selection of features predictive of biological conditions using protein mass spectrographic data*, US Patent 7,676,442
- J. Weston, A. Elisseeff, B. Schölkopf, **O. Chapelle** and F. Perez-Cruz, *Methods for feature selection in a learning machine*, WIPO 2002/095534