

Nicolas VAYATIS

Born on August 5, 1971, in Paris

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Current activities

Full Professor (Class 1) - Department of Mathematics, ENS Cachan
Director of research unit CMLA - UMR ENS Cachan & CNRS 8536
Coordinator of master program (M2) MVA (Mathematics-Computer Vision-Learning)
Head of research group "Machine Learning and Massive Data Analysis"
Affiliated professor at Ecole Centrale Paris
Scientific advisor CEA-DAM

Past experience

Full professor (2007-) CMLA and Department of Mathematics, ENS Cachan
Invited professor (2007) School of Mathematics, Georgia Institute of Technology, Atlanta
Associate professor (2002-2007) LPMA and Department of Mathematics, Université Pierre-et-Marie Curie
Marie-Curie postdoctoral fellow (2000-2002) Department of Economics and Management, Universitat Pompeu Fabra, Barcelona
Assistant professor (1999-2000) Université Paris-10 Nanterre
Scientific assistant (1995-1996) French navy (military service)

Research topics

Machine learning algorithms/data mining techniques/statistical modeling
Predictive modeling: classification, ranking, scoring
Learning from graph data
Sequential optimization and experimental design

Education

Research habilitation - Université Pierre-et-Marie Curie - December 2006
PhD Applied Mathematics, Ecole Polytechnique - January 2000
M.S. cognitive Sciences, Ecole Polytechnique - July 1995
B.S. in engineering, Ecole Centrale Paris - June 1995

Editorial and scientific boards

Action editor *Journal of Machine Learning Research* (2007-)
Scientific board 1000mercis (digital marketing company)

Scientific advisor CEA-DAM (2010-)

Scientific board of the French Statistical Society (2010-2012)

Conference Chair ALT 2012

Area Chair NIPS 2011

Editorial board *Journal of Nonparametric Statistics* (2008-2011)

Program committee: ALT'10, "NIPS Workshop - Advances in Ranking" at NIPS'09, "ECML workshop - Learning from non-IID data: Theory, Algorithms and Practice" at ECML'09, ALT'08, COLT'08, "NIPS Workshop - Learning to Rank" at NIPS'05, COLT'04

Publications

Journal papers

1. G. Merle, J.-M. Roussel, V. Perchet, J.-J. Lesage and N. Vayatis (2014). Quantitative analysis of Dynamic Fault Trees based on the coupling of structure functions ure functions and Monte-Carlo simulation. Submitted.
2. E. Richard, S. Gaiffas, and N. Vayatis (2014). Link Prediction in Graphs with Autoregressive Features. *Journal of Machine Learning Research*. Volume 15(Feb):565-593.
3. S. Cl  men  on, M. Depecker, and N. Vayatis (2013). Ranking forests. *Journal of Machine Learning Research*. Volume 14(Jan):39-73.
4. S. Cl  men  on, S. Robbiano, and N. Vayatis (2013). Ranking data with ordinal labels: optimality and pairwise aggregation. *Machine Learning*. Volume 91(1): 67-104.
5. S. Cl  men  on, M. Depecker, and N. Vayatis (2013). An empirical comparison of learning algorithms for nonparametric scoring. *Pattern Analysis and Applications*. Vol. 16: 475-496, 2013.
6. S. Cl  men  on, M. Depecker, and N. Vayatis (2011). Adaptive partitioning schemes for bipartite ranking. *Machine Learning*. Volume 83, Issue 1, 31-69.
7. A. Kohatsu, N. Vayatis, K. Yasuda (2011). Strong consistency of Bayesian estimator under discrete observations and unknown transition density, *in Stochastic Analysis with Financial Applications: Hong Kong 2009*, A. Kohatsu-Higa, N. Privault, S.-J. Sheu eds., Birkh  user, pp. 145-168.
8. S. Cl  men  on, M. Depecker, and N. Vayatis (2010). Donn  es avec label binaire: avanc  es r  centes dans le domaine de l'apprentissage statistique d'ordonnements. *Revue d'Intelligence Artificielle*. Volume 25(3):345-368.
9. S. Cl  men  on and N. Vayatis (2010). Overlaying classifiers: a practical approach for optimal scoring. *Constructive Approximation*. Volume 32, Number 3, 619-648, DOI: 10.1007/s00365-010-9084-9
10. S. Cl  men  on and N. Vayatis (2009). Tree-based ranking methods. *IEEE Transactions on Information Theory*. Vol. 55(9):4316-4336.
11. S. Cl  men  on, G. Lugosi, and N. Vayatis (2008). Ranking and empirical risk minimization of U-statistics. *Annals of Statistics*, vol.36(2):844-874.

12. S. Cléménçon and N. Vayatis (2007). Ranking the best instances. *Journal of Machine Learning Research*, 8(Dec):2671-2699
13. S. Cléménçon, G. Lugosi, and N. Vayatis (2006). Discussion on the 2004 IMS Medallion Lecture "Local Rademacher complexities and oracle inequalities in risk minimization" by V. Koltchinskii. *Annals of Statistics*, 34(6):2672-2676.
14. A. Juditsky, A. Nazin, A. Tsybakov, and N. Vayatis (2005). Recursive aggregation of estimators via the mirror descent algorithm with averaging. *Problems of Information Transmission*, 41(4): 368-384.
15. G. Lugosi and N. Vayatis (2004). On the Bayes-risk consistency of regularized boosting methods (with discussion). *Annals of Statistics*, 32(1):30-55.
16. G. Lugosi and N. Vayatis (2004). Rejoinder "Three Papers on Boosting". *Annals of Statistics*, 32(1):124-127.
17. G. Blanchard, G. Lugosi and N. Vayatis (2003). On the rates of convergence of regularized boosting methods. *Journal of Machine Learning Research*, 4:861-894.
18. N. Vayatis (2003). Exact rates in Vapnik-Chervonenkis Bounds. *Annales de l'Institut Henri Poincaré - Probabilités et Statistiques*, 39(1):95-119.
19. R. Azencott, N. Vayatis (2001). Refined Exponential Rates in Vapnik-Chervonenkis Inequalities. *Comptes Rendus de l'Académie des Sciences, Série I - Mathématiques*, 332(6):563-568.

Conference papers

1. J. Costes, J.-M. Ghidaglia, P. Muguerra, K. L. Nielsen, X. Riou, J.-P. Saut and N. Vayatis (2014). On the Simulation of Offshore Oil Facilities at the System Level. Proceedings of the 10th International Modelica Conference
2. K. Scaman, A. Kalogeratos, N. Vayatis (2014). Dynamic Treatment Allocation for Epidemic Control in Arbitrary Networks. Proceedings of WSDM 2014 Diffusion in Networks and Cascade Analytics (DiffNet) Workshop, February, NYC.
3. E. Contal, and N. Vayatis (2014). Gaussian Process Optimization with Mutual Information. Submitted.
4. E. Contal, D. Buffoni, A. Robicquet, and N. Vayatis (2013). Parallel Gaussian Process Optimization with Upper Confidence Bound and Pure Exploration . (PDF)(Software). Proceedings of European Conference on Machine Learning, Prague.
5. F. Dias, S. Guillas, N. Vayatis, A. Sarri, T. S. Stefanakis, E. Contal and C. E. Synolakis (2013). New methods for sensitivity analysis and uncertainty quantification of tsunamis. Proceedings of the 14th Asia Congress of Fluid Mechanics, Hanoi and Halong, Vietnam.
6. S. Varet, P. Dossantos-Uzarralde, N. Vayatis, E. Bauge (2013). Pseudo-measurement simulations and shrinkage for the experimental cross-section covariances optimisation . Proceedings of the International Conference on Nuclear Data for Science and Technology, NYC.

7. P. Dossantos-Uzarralde, N. Vayatis, S. Varet (2013). Statistical selection of numerical models with deterministic parameters for cross-section uncertainty evaluations . Proceedings of the International Conference on Nuclear Data for Science and Technology, NYC.
8. E. Richard, S. Gaiffas, and N. Vayatis (2012). Link Prediction in Graphs with Autoregressive Features. Proceedings of NIPS'12.
9. T.S. Stefanakis, F. Dias, N. Vayatis, and S. Guillas (2012). Long-Wave Runup On A Plane Beach Behind A Conical Island. Proceedings of 15 WCEE, Lisboa.
10. S. Varet, P. Dossantos-Uzarralde, N. Vayatis, and E. Bauge (2012). Pseudo-measurement simulations and bootstrap for the experimental cross-section variances estimation with quality qualification. Proceedings of Wonder 2012: 3rd International Workshop on Nuclear Data Evaluation for Reactor Applications (Aix-en-Provence).
11. S. Varet, A. Garlaud, P. Dossantos-Uzarralde, N. Vayatis, and E. Bauge (2012). Kriging approach for the experimental cross-section covariances estimation. Proceedings of Wonder 2012: 3rd International Workshop on Nuclear Data Evaluation for Reactor Applications (Aix-en-Provence).
12. E. Richard, P.-A. Savalle, and Nicolas Vayatis (2012). Estimation of simultaneously sparse and low rank matrices. Proceedings of ICML 2012.
13. A. Kohatsu-Higa, N. Vayatis, and K. Yasuda (2011). Strong consistency of the Bayesian estimator for the Ornstein-Uhlenbeck process. Proceedings of the Metabief Conference. A paraître.
14. S. Cléménçon, M. Depecker, N. Vayatis (2011). Nonparametric scoring methods as a support decision tool for medical diagnosis. Proceedings of the Workshop on Knowledge Discovery in Health Care and Medicine at ECML-KDD'2011.
15. E. Richard, N. Baskiotis, T. Evgeniou, and N. Vayatis (2010). Link Discovery using Graph Feature Tracking. Proceedings of NIPS'2010 -Advances in Neural Information Processing Systems 23, Vancouver, Canada.
16. G. Merle, J.M. Roussel, J.J. Lesage, and N. Vayatis (2010). Analytical Calculation of Failure Probabilities in Dynamic Fault Trees including Spare Gates, Proceedings of the European Safety & Reliability Conference 2010 (ESREL 2010), pp. 794-801.
17. N. Baskiotis, S. Cléménçon, M. Depecker, N. Vayatis (2010). TreeRank : a R package for bipartite ranking Proceedings of SMDTA'2010 - Stochastic Modeling Techniques and Data Analysis International Conference.
18. J. Defretin, S. Herbin, G. Le Besnerais, and N. Vayatis (2010). Adaptive Planification in Active 3D Object Recognition for Many Classes of Objects RSS-2010 Workshop - Robotics: Science and Systems 2010, Saragosse, Espagne.
19. S. Cléménçon, M. Depecker, and N. Vayatis (2009). Bagging ranking trees. Proceedings of IEEE-ICMLA'09, pp.658-663.
20. S. Cléménçon, M. Depecker and N. Vayatis (2009). AUC optimization and the two-sample problem. Proceedings of NIPS'09, Vancouver, Canada.

21. S. Cl  men  on and N. Vayatis (2009). Adaptive estimation of the optimal ROC curve and a bipartite ranking algorithm. Proceedings of ALT'09, Lecture Notes in Computer Science, pp. 232-246, Springer.
22. O. Ambrym-Maillard and N. Vayatis (2009). Complexity versus agreement for many views. Proceedings of ALT'09.
23. S. Cl  men  on and N. Vayatis (2009). On partitioning rules for bipartite ranking. *Journal of Machine Learning Research - Proceedings of AISTATS'09*, vol.5:89-96.
24. A. Kohatsu, N. Vayatis, and K. Yasuda (2009). Strong consistency of Bayesian estimator under discrete observations and unknown transition density. Proceedings of the Workshop on Stochastic Analysis & Finance, Hong-Kong.
25. S. Cl  men  on and N. Vayatis (2009). Nonparametric estimation of the Precision-Recall curve. Proceedings of ICML'09 Montreal, Canada.
26. S. Cl  men  on and N. Vayatis (2008). Empirical performance maximization for linear rank statistics. Proceedings of Neural Information Processing Systems NIPS'2008, Vancouver, Canada.
27. S. Cl  men  on and N. Vayatis (2008). Overlaying classifiers: a practical approach for optimal ranking. Proceedings of Neural Information Processing Systems NIPS'2008, Vancouver, Canada.
28. P. Bertail, S. Cl  men  on and N. Vayatis (2008). On bootstrapping the ROC curve. Proceedings of Neural Information Processing Systems NIPS'2008, Vancouver, Canada.
29. S. Cl  men  on and N. Vayatis (2008). Approximation of the optimal ROC Curve and a tree-based ranking algorithm. Proceedings of ALT'08 in Lecture Notes in Artificial Intelligence 5254, Springer.
30. A. Juditsky, A. Nazin, A. Tsybakov, and N. Vayatis (2007). *Gap-free Bounds for Stochastic Multiarmed Bandit*. Proceedings of IFAC'07 Seoul, Korea.
31. S. Cl  men  on, G. Lugosi, and N. Vayatis (2005). *From Ranking to Classification: a Statistical View*. Proceedings of the 29th Annual Conference of the German Classification Society (GfKl 2005), University of Magdeburg.
32. S. Cl  men  on, G. Lugosi, and N. Vayatis (2005). *Ranking and scoring using empirical risk minimization*. Proceedings of COLT 2005, in LNCS Computational Learning Theory, vol. 3559, pp.1-15, Springer.
33. A. Juditsky, A. Nazin, A. Tsybakov and N. Vayatis (2005). *Generalization Error Bounds for Aggregation by Mirror Descent With Averaging*. Proceedings of Neural Information Processing Systems NIPS'2005, Vancouver, Canada.
34. S. Cl  men  on, G. Lugosi and N. Vayatis (2005). *From Ranking to Classification: A Statistical View*. Proceedings of the German Classification Society Meeting GfKL'2005, University of Magdeburg, Germany.
35. G. Lugosi and N. Vayatis (2002). *A consistent strategy for boosting algorithms*. Proceedings of COLT'2002, University of Sidney, Australia.

36. N. Vayatis (2000). *The Role of Critical Sets in Vapnik-Chervonenkis Theory*. Proceedings of COLT'2000, Stanford University, USA.
37. R. Azencott and N. Vayatis (1999). *Distribution-Dependent Vapnik-Chervonenkis Bounds*, Proceedings of EuroCOLT'1999 in Computational Learning Theory, Lecture Notes in Computer Science 1572, Springer.

Book chapter

1. A. Kohatsu-Higa, N. Vayatis, and K. Yasuda (2014). Strong consistency of the bayesian estimator for the Ornstein-Uhlenbeck process. Book Chapter in *Y. Kabanov, M. Rutkowski, T. Zariphopoulou (eds.), Inspired by Finance - The Musiela Festschrift: 411-437*.

Book edition

1. N.H. Bshouty, G. Stoltz, N. Vayatis, T. Zeugmann Eds. (2012). Algorithmic Learning Theory: Proceedings of the 23rd International Conference, ALT 2012, Lecture Notes in Computer Science / Lecture Notes in Artificial Intelligence, LNAI7568.

Patent

1. S. Cl  men  on, N. Vayatis (2012). Method for providing with a score an object, and decision-support system. Ref. US20120059790/WO 2012032118 A2/WO 2012032118 A3.

Funded projects

Governmental funding

Investments for the future "Big Data" - SODATECH (2013-2016) "Social Data Technologies"
 Budget ENS Cachan: 453k-  
 CNRS PEPS-CRAFT (2009-2011) "Critical Risks Analysis by Fault Trees"
 Budget ENS Cachan: 39k-  .
 FUI-CSDL (2009-2012) "Complex Systems Design Lab"
 Budget ENS Cachan: 175k-  .

Regional funding

IdFINNOV-SMARTCHECK (2013-2014) - Budget ENS Cachan: 112k-  
 DIGITEO-BEMOL (2009-2011) - Budget ENS Cachan: 75k-  .

PhD fellowships

CIFRE (2013-2016) "RTB with machine learning techniques"
 CIFRE (2013-2016) "Optimized architectures for gear boxes"
 CIFRE (2011-2014) "Statistical analysis of sloshing in LNG tanks and risk assessment"
 CIFRE (2010-2013) "Statistical learning methods for stock selection"
 CIFRE (2009-2012) "Multi-class and sublinear classification algorithms"
 CIFRE (2009-2012) "Recommender systems for collaborative filtering"
 DGA (2008-2011) "Active vision for object recognition"
 CIFRE (2007-2010) "Statistical learning and recommendation of stocks"