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Combining strategies efficiently: high-quality decisions from conflicting advice

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Master of Science in Logic

September 2004 - December 2006

Supervisor: prof. Peter D. Grünwald

Thesis: *Discovering the Truth by Conducting Experiments*

Cum Laude

Universiteit van Amsterdam

Amsterdam, The Netherlands

Honors & Awards

My propaedeutic (UvA, 2001) and bachelor's (UvA, 2003) degrees in both Computer Science and Artificial Intelligence, my Maîtrise (Université de Nice-Sophia Antipolis, France, 2004) in Computer Science and my Master's degree in Logic (UvA, 2006) were all obtained cum laude.

In 2010, the Netherlands Organisation for Scientific Research (NWO) honored my project proposal *Game-Theoretically Optimal Online Learning: From Conflicting Advice to High-Quality Decisions* with a RUBICON grant, funding two years of post-doctoral research with prof. Vladimir Vovk at the Computer Learning Research Centre at Royal Holloway, University of London.

Publications**Journal**

- H. Buhrman, P. T. S. van der Gulik, S. M. Kelk, W. M. Koolen, and L. Stougie. Some mathematical refinements concerning error minimization in the genetic code. *IEEE/ACM Transactions on Computational Biology and Bioinformatics (TCBB)*, 2010. Accepted.
- E. G. Daylight, W. M. Koolen, and P. M. Vitányi. Time-bounded incompressibility of compressible strings and sequences. *Information Processing Letters (IPL)*, 109(18):1055 – 1059, Aug. 2009.

Conference

- W. M. Koolen and S. de Rooij. Switching investments. In M. Hutter, F. Stephan, V. Vovk, and T. Zeugman, editors, *Proceedings of*

- the 21st International Conference on Algorithmic Learning Theory (ALT 2010)*, LNAI 6331, pages 239–254. Springer, Heidelberg, Oct. 2010.
- W. M. Koolen, M. K. Warmuth, and J. Kivinen. Hedging structured concepts. In *Proceedings of the 23rd Annual Conference on Learning Theory (COLT 2010)*, pages 93–105, June 2010.
 - M. Ziegler and W. M. Koolen. Kolmogorov complexity theory over the reals. *Electronic Notes in Theoretical Computer Science (ENTCS)*, 221:153–169, Dec. 2008.
 - W. M. Koolen and S. de Rooij. Combining expert advice efficiently. In R. Servedio and T. Zang, editors, *Proceedings of the 21st Annual Conference on Learning Theory (COLT 2008)*, pages 275–286, June 2008.

Technical Report

- W. M. Koolen and T. van Erven. Switching between hidden Markov models using Fixed Share. *Computing Research Repository (CoRR)*, abs/1008.4532, Feb. 2010.
- H. Buhrman, P. T. S. van der Gulik, S. M. Kelk, W. M. Koolen, and L. Stougie. Some mathematical refinements concerning error minimization in the genetic code. *arXiv*, abs/0909.1442, Sept. 2009.
- W. M. Koolen and T. van Erven. Freezing and sleeping: Tracking experts that learn by evolving past posteriors. *Computing Research Repository (CoRR)*, abs/1008.4654, Feb. 2009.
- E. G. Daylight, W. M. Koolen, and P. M. B. Vitányi. On time-bounded incompressibility of compressible strings and sequences. *Computing Research Repository (CoRR)*, abs/0809.2965, Sept. 2008.
- M. Ziegler and W. M. Koolen. Kolmogorov complexity theory over the reals. *Computing Research Repository (CoRR)*, abs/0802.2027, Feb. 2008.
- W. M. Koolen and S. de Rooij. Combining expert advice efficiently. *Computing Research Repository (CoRR)*, abs/0802.2015, Feb. 2008.
- W. M. Koolen. Temporary unavailability logic and general modification logic. *ILLC Prepublication Series*, Jan. 2008.

Extended Abstracts (Local Dissemination)

- W. M. Koolen and T. van Erven. Freezing and sleeping: Tracking experts that learn by evolving past posteriors. In *Proceedings of the 18th Annual Belgian-Dutch Conference on Machine Learning (Bene-Learn 2009)*, pages 91–92, May 2009.
- W. M. Koolen and S. de Rooij. Combining expert advice efficiently. In A. Nijholt, M. Pantic, M. Poel, and H. Hondorp, editors, *Proceedings of the twentieth Belgian-Dutch Conference on Artificial Intelligence (BNAIC 2008)*, pages 323–324, Oct. 2008.

Master's Thesis

- W. M. Koolen. Discovering the truth by conducting experiments. Master's thesis, Institute of Logic, Language and Computation, Universiteit van Amsterdam, Dec. 2006.

Teaching

Kolmogorov Complexity FNWI, Universiteit van Amsterdam
Spring 2007, Spring 2008

This graduate level course was taught yearly by prof. Paul Vitányi at the Universiteit van Amsterdam. I assisted Paul by teaching the homework/lab session and grading the homework and exams, and tutored Edgar G. Daylight during the term project that he undertook, which resulting in the second journal publication above.

Teaching Assistant FNWI, Universiteit van Amsterdam
September 2001 - December 2002

I assisted the following undergraduate level courses:

- Logisch Programmeren (Introduction to Prolog for A.I. students),
- Kennis en Interactie and
- Informatie en Informatieverwerking.

Employment History

Software developer AMSTEL Instituut, Universiteit van Amsterdam
January 2002 - March 2007

I designed and implemented the SIM-PL software package, an educational tool for the design and simulation of digital components and digital circuits. SIM-PL simulates the whole spectrum from simple gates to super-scalar processors, and gives a timing-accurate insight into the internal workings of these circuits.

SIM-PL is currently used in the courses *Digitale Technieken* and *Computer Architectuur* at the Universiteit van Amsterdam.

<http://www.science.uva.nl/amstel/SIM-PL/>

Other interests

- Hiking, trekking, climbing, survival. Former Scouting member.
- Fantasy role-playing, Dungeons and Dragons.
- Bach, Mozart and symphonic metal.
- Medieval castles.
- Cooking.
- Programming.