Minimum Description Length Model Selection

de Rooij, S.

Publication date
2008

Minimum Description Length Model Selection

Problems and Extensions

ILLC Dissertation Series DS-2008-07

Institute for Logic, Language and Computation

For further information about ILLC-publications, please contact

Institute for Logic, Language and Computation
Universiteit van Amsterdam
Plantage Muidergracht 24
1018 TV Amsterdam
phone: +31-20-525 6051
fax: +31-20-525 5206
e-mail: illc@science.uva.nl
homepage: http://www.illc.uva.nl/

Minimum Description Length Model Selection

Problems and Extensions

Academisch Proefschrift

ter verkrijging van de graad van doctor aan de
Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof.dr. D. C. van den Boom
ten overstaan van een door het college voor
promoties ingestelde commissie, in het openbaar
te verdedigen in de Agnietenkapel
op woensdag 10 september 2008, te 12.00 uur

door

Steven de Rooij

geboren te Amersfoort.

Promotiecommissie:

Promotor:	prof.dr.ir. P.M.B. Vitányi
Co-promotor:	dr. P.D. Grünwald
Overige leden:	prof.dr. P.W. Adriaans
	prof.dr. A.P. Dawid
	prof.dr. C.A.J. Klaassen
	prof.dr.ir. R.J.H. Scha
	dr. M.W. van Someren
	prof.dr. V. Vovk
	dr.ir. F.M.J. Willems

Faculteit der Natuurwetenschappen, Wiskunde en Informatica

The investigations were funded by the Netherlands Organization for Scientific Research (NWO), project 612.052.004 on Universal Learning, and were supported in part by the IST Programme of the European Community, under the PASCAL Network of Excellence, IST-2002-506778.

Cover inspired by Randall Munroe's xkcd webcomic (www.xkcd.org)
Printed and bound by PrintPartners Ipskamp (www.ppi.nl)
ISBN: 978-90-5776-181-2

Parts of this thesis are based on material contained in the following papers:

- *An Empirical Study of Minimum Description Length Model Selection with Infinite Parametric Complexity*
  Steven de Rooij and Peter Grünwald
  In: Journal of Mathematical Psychology, special issue on model selection. Vol. 50, pp. 180-190, 2006
  (Chapter 2)

- *Asymptotic Log-Loss of Prequential Maximum Likelihood Codes*
  Peter D. Grünwald and Steven de Rooij
  In: Proceedings of the 18th Annual Conference on Computational Learning Theory (COLT), pp. 652-667, June 2005
  (Chapter 3)

- *MDL Model Selection using the ML Plug-in Code*
  Steven de Rooij and Peter Grünwald
  In: Proceedings of the International Symposium on Information Theory (ISIT), 2005
  (Chapters 2 and 3)

- *Approximating Rate-Distortion Graphs of Individual Data: Experiments in Lossy Compression and Denoising*
  Steven de Rooij and Paul Vitányi
  Submitted to: IEEE Transactions on Computers
  (Chapter 6)

- *Catching up Faster in Bayesian Model Selection and Averaging*
  Tim van Erven, Peter D. Grünwald and Steven de Rooij
  In: Advances in Neural Information Processing Systems 20 (NIPS 2007)
  (Chapter 5)

- *Expert Automata for Efficient Tracking*
  W. Koolen and S. de Rooij
  In: Proceedings of the 21st Annual Conference on Computational Learning Theory (COLT) 2008
  (Chapter 4)