

Curriculum Vitae for Oleg Sysoev

PERSONAL DATA

- **Name:** Oleg Sysoev
- **Date of birth:** 8 october 1981
- **Sex:** Male
- **Languages:** Swedish(fluent), English(fluent), Russian(native)
- **Contact**
Division of Statistics and Machine Learning,
Dept of Computer and Information Science
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- **Present employment:** University lecturer in Statistics, Linköping University, employed since 06/2011
- **Previous periods of employment:**
2010–2011 Assistant professor in Statistics, Linköping University
2005–2010 PhD student (doktorand) in Statistics, Linköping University
2004–2005 Senior Customer Support Engineer at the Moscow Branch of the NetCracker Technology Corp. registered in the US. Company profile: NetCracker is a leading provider of Operations Support Systems Solution (OSS) for service providers, cable operators, enterprises and government agencies.

EDUCATION

- **Academic degrees:**
PhD in Statistics from Linköping University, defended in April, 2010.
MSc in Applied Mathematics from Moscow Institute of Physics and Technology (state university), 2004
- **Completed pedagogical education:**
2016: Course ‘Supervision of Doctoral students’ (4 ECTS)
2009: Course ‘University pedagogy, step 2’ (6 ECTS)
2008: Course ‘University pedagogy, step 1’ (6 ECTS)

SCIENTIFIC ACHIEVEMENTS

- **Brief account of own research profile:**

My research interests are monotonic regression and interpolation, data mining and machine learning methods (primarily decision trees, kernel smoothing, neural networks), data mining and machine learning in public health, bootstrap methods, computational statistics,

optimization.

Part of my research is focused on developing statistical and optimizational approaches in the area of large-scale Monotonic Regression (MR). MR is a nonparametric method where it is assumed that the target should be a monotonic, i.e. increasing or decreasing, function of the features. Papers that were published in this direction address various MR algorithms and consider such issues such as scalability and complexity, prediction quality and uncertainty.

Another on-going project is development of data mining and machine learning methods for public health. In this project, we work on development of various models for public health data, such as decision trees (model-based decision trees), random forests, subspace clustering algorithms, bootstrap uncertainty estimation.

• List of publications

Journal publications:

- Burdakov O., Sysoev O.: *A Dual Active-Set Algorithm for Regularized Monotonic Regression*. Journal of Optimization Theory and Applications (2017) vol. 172, pp 929-949
- Kalish, M.L, Dunn J.C., Burdakov O. and Sysoev O.: *A statistical test of the equality of latent orders* Journal of mathematical psychology (Print)(2016), vol 70, pp 1-11.
- Sysoev, O., Grimvall, A., and Burdakov, O.: *Bootstrap confidence intervals for large-scale multivariate monotonic regression problems*. Statistics-Simulation and Computation (2015), pp 1-16.
- Sysoev, O., Grimvall, A., and Burdakov, O.: *Bootstrap estimation of the variance of the error term in monotonic regression models*. Journal of Statistical Computation and Simulation **83.4** (2013): pp 627-640.
- Sysoev, O., Burdakov, O., Grimvall, A.: *A Segmentation-Based Algorithm for Large-Scale Monotonic Regression Problems*. Computational Statistics and Data Analysis 55 (2011), pp. 2463-2476
- Burdakov, A. Grimvall and O. Sysoev. *Data preordering in generalized PAV algorithm for monotonic regression*. Journal of Computational Mathematics. (2006) 24, No. 6, pp. 771-790.
- Burdakov O. , Sysoev O. ,Grimvall A. and Hussian M. *An $O(n^2)$ algorithm for isotonic regression*. In: G. Di Pillo and M. Roma (Eds) Large-Scale Nonlinear Optimization. Series: Nonconvex Optimization and Its Applications, Springer-Verlag, (2006) 83, pp. 25-33.
- Hussian M. ,Grimvall A. ,Burdakov O. and Sysoev O. *Monotonic regression for the detection of temporal trends in environmental quality data*. MATCH Commun. Math. Comput. Chem. (2005) 54, pp. 535-550.

Conference publications:

1. Sysoev, O. Estimating binary monotonic regression models and their uncertainty by incorporating kernel smoothers. Complex Data Modeling and Computationally Intensive Statistical Methods for Estimation and Prediction conference (2013)
2. O. Burdakov, A. Grimvall and O. Sysoev. Generalized PAV algorithm with block re-

finement for partially ordered monotonic regression. In: A. Feelders and R. Potharst (Eds.) Proceedings of the Workshop on Learning Monotone Models from Data at the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (2009), pp. 23-37.

3. O. Burdakov, O. Sysoev, A. Grimvall and M. Hussian (2004). An algorithm for isotonic regression problems. In: The Proceedings of the 4th European Congress of Computational Methods in Applied Science and Engineering 'ECCOMAS 2004'.

4. M. Hussian, A. Grimvall, O. Burdakov and O. Sysoev (2004). Monotonic regression for trend assessment of environmental quality data. In: The Proceedings of the 4th European Congress of Computational Methods in Applied Science and Engineering 'ECCOMAS 2004'

Manuscripts Unpublished and under Preparation:

- Sysoev, O., and Burdakov O. "A smoothed monotonic regression via L2 regularization.", submitted to Machine Learning journal (2017)
- Sysoev O. "Accelerating bootstrap for adaptive program optimization problems", in progress

SUPERVISION EXPERIENCE

- Co-supervisor for Måns Magnusson (ongoing, PhD level, main supervisor: Mattias Villani)
- Supervisor for 3 students, master level thesis.
- Supervisor for 6 students, bachelor level thesis.

PEDAGOGICAL EXPERIENCE

• Recent teaching

- Machine learning, 6 ECTS (master, PhD)
- Computational Statistics, 6 ECTS (master)
- Visualization, 6 ECTS (master)
- Advanced Academic Studies, 3 ECTS (master)
- Grundläggande SAS programmering, 7.5 ECTS (bachelor)

• Previous teaching

- Data Mining and Statistical learning, 15 ECTS (master, PhD)
- Data Mining, 7.5 ECTS (bachelor)
- Linear Statistical Models 15 ECTS (master)
- Visuell Dataanalys, 7.5 ECTS (bachelor)
- Statistik A, 7.5 ECTS (bachelor)
- Statistiska metoder 7.5 ECTS (bachelor)
- Sambandsmodeller 15 ECTS (bachelor)
- Regression Methods 7.5 ECTS (bachelor)

ADMINISTRATIVE WORK

- **Administration of the master program**
from 2011: Program director of the master's program "Statistics and Data Mining"
- **Membership of university boards or councils**
2015-2017 Member of the department board
2009-2010: Member in the doctoral students' council (doktorandrådet)
2011: A supplementary member in the faculty board

OTHER

- **Special education:**
2010: SAS software with programming.