

Dávid Pál

Curriculum Vitae

E-mail: davidko.pal@gmail.com
Web: <http://david.palenica.com/>
Cell phone: +1 (646) 206 4832
Home phone: +1 (650) 386 1616

800 High School Way, Apt. 242
Mountain View, CA 94041
USA

I am a machine learning researcher and a machine learning engineer. My expertise is contextual bandits, ads ranking, ads auctions, discrete and continuous optimization, big data, deep learning, spam filtering.

Employment

- March 2024 – present **Sr. Staff Machine Learning Engineer at Coupang, Mountain View, CA**
I am a part of search quality team. I work on machine learning models for search ranking.
- January 2021 – February 2024 **Staff Machine Learning Engineer at Instacart, New York, NY**
I worked on machine learning models for ads ranking. I built a system for training click-through rate prediction models using Tensorflow. I worked on machine learning models that allocate discount coupon to customers. I co-authored three patents.
- May 2019 – December 2020 **Principal Applied Researcher at Expedia Group, New York, NY**
I lead a team of 3 researchers building system for optimizing ad campaigns. I built two libraries for solving large scale optimization problems using Apache Spark.
- Sep 2014 – May 2019 **Senior Research Scientist at Yahoo/Oath/Verizon Media Research, New York, NY**
I designed and implemented machine learning models that filter spam and phish emails by doing large scale clustering of emails using Hadoop MapReduce and Apache Spark. I co-authored one patent. I published multiple papers at NIPS and ICML. I served as a reviewer for COLT, ALT, ICML and area chair for NIPS. I mentored 4 research interns.
- Sep 2011 – Sep 2014 **Software Engineer at Google, New York, NY**
I was a backend engineer on the Google Ad Exchange team. I designed, authored a patent for and implemented the “passback” ad auction algorithm, which processes 100 billion ad impressions per day and generates revenue of tens of billions of dollars per year. I also worked on the data pipelines for reserve price optimization. The work was done in C++ and Python.
- Jul 2007 – Sep 2007 **Research Internship at Google, New York, NY**
I designed an ad auction algorithm for AdWords that unifies GSP (generalized second price) and VCG (Vickrey-Clarke-Groves) auctions and proved mathematical theorems about it. The end result was an academic paper with description of the algorithm and its properties that Google later used.
- Jun 2004 – Dec 2004 **Programmer at Applied Software Consultants, Bratislava, Slovakia**
I was a software engineer in a small family-run company that develops software for elementary schools and high schools. I worked on a desktop application that keeps track of students, their grades, etc. The work was done in C# and PHP.

Academics

- January 2022 – May 2022 **Adjunct Professor at Tandon School of Engineering,
New York University, New York, NY**
I taught a graduate course "Statistical and Computational Foundations of Machine Learning".
- Jul 2009 – Jun 2011 **Postdoctoral Fellow at Department of Computing Science,
University of Alberta, Edmonton, AB, Canada**
Advisor: Prof. Csaba Szepesvári
I did research in machine learning and in statistics (contextual bandits, online optimization, entropy estimation).
- Jan 2005 – May 2009 **Ph.D. in Computer Science, School of Computer Science,
University of Waterloo, Waterloo, ON, Canada**
Advisor: Prof. Shai Ben-David
Ph.D. Thesis: Contributions to Unsupervised and Semi-Supervised Learning
- Sep 1999 – May 2004 **"Magister Degree" in Computer Science,
Faculty of Mathematics, Physics and Informatics,
Comenius University, Bratislava, Slovakia**
Advisor: Prof. Martin Škoviera Thesis: Steiner Colorings of Cubic Graphs

Technical Skills

- Python, Java, Scala, C++, Apache Spark, MapReduce, Tensorflow, LaTeX

Service

- Area chair of NIPS 2018, 2019
- Program Committee member of COLT 2017, COLT 2024
- Reviewer for ICML 2016–2018; NIPS 2008–2014, 2016; COLT 2007, 2008, 2016, 2019–2023; AISTATS 2017–2018; STOC 2008; AAAI 2016; IJCAI 2016; ALT 2022, 2023.
- Organizer of the Internet Problem Solving Contest, <http://ipsc.ksp.sk/>, 2000 – 2004, 2007
- Organizer of correspondence seminars in mathematics and computer science for Slovak high school students 1999 – 2004.

Awards

- co-author of a patent: "Distributed algorithm for solving the generalized knapsack problem" (Application no. 63/407,644)
- co-author of a patent: "Accounting for variable dimensions of content items when positioning content items in a user interface having slots for displaying content items" (US 20230109298 A1)
- co-author of a patent: "Message classification" (US 20180159808 A1)
- co-author of a patent: "Allocation of content inventory units" (US 20160364766 A1)

- co-author of a patent: “Passback auction” (US 20140316922 A1)
- David R. Cheriton Scholarship, 2007 – 2009
- COLT 2006 Best Student Paper Award
- 15th place in ACM ICPC 2000, Central European Region
- 14th place in ACM ICPC 1999, Central European Region
- Bronze Medal, Central European Olympiad in Informatics 1999
- Winner of Internet Problem Solving Contest 1999, High School Division
- Top 10 at Slovak National Olympiad in Informatics in 1997, 1998, 1999
- Top 10 at Slovak National Olympiad in Physics in 1999

Personal

- Dual citizenship: Slovak Republic & U.S.

References

Edo Liberty
 CEO of Pinecone
 LinkedIn:
<https://www.linkedin.com/in/edo-liberty-4380164/>

S. Muthu Muthukrishnan
 Vice President at Amazon
 LinkedIn:
<https://www.linkedin.com/in/muthu-muthukrishnan-4344819/>

Prof. Shai Ben-David
 David R. Cheriton School of Computer Science
 University of Waterloo, ON, Canada
 email: shai@cs.uwaterloo.ca
 www: <http://www.cs.uwaterloo.ca/~shai/>

Prof. Csaba Szepesvári
 Department of Computing Science
 University of Alberta, Edmonton, AB, Canada
 email: szepesva@cs.ualberta.ca
 www: <http://www.ualberta.ca/~szepesva/>

Publications

- [1] Alina Beygelzimer, Dávid Pál, Balázs Szörényi, Devanathan Thiruvengatathari, Chen-Yu Wei, and Chicheng Zhang. Bandit multiclass linear classification: Efficient algorithms for the separable case. In Kamalika Chaudhuri and Ruslan Salakhutdinov, editors, *International Conference on Machine Learning, 9–15 June 2019, Long Beach, CA, USA, 2019*.
- [2] Alexander Golovnev, Dávid Pál, and Balázs Szörényi. The information-theoretic value of unlabeled data in semi-supervised learning. In Kamalika Chaudhuri and Ruslan Salakhutdinov, editors, *International Conference on Machine Learning, 9–15 June 2019, Long Beach, CA, USA, 2019*.
- [3] Satyen Kale, Zohar Karnin, Tengyuan Liang, and Dávid Pál. Adaptive feature selection: Computationally efficient online sparse linear regression under rip. In Doina Precup and Yee Whye Teh, editors, *International Conference on Machine Learning, 6–11 August 2017, International Convention Centre, Sydney, Australia*, volume 70, pages 1780–1788, 2017.

- [4] Francesco Orabona and Dávid Pál. Scale-free online learning. *Theoretical Computer Science*, 2017. Available at <http://arxiv.org/abs/1601.01974>, DOI: <https://doi.org/10.1016/j.tcs.2017.11.021>.
- [5] Chansoo Lee, Satyen Kale, and Dávid Pál. Hardness of online sleeping combinatorial optimization problems. In D. D. Lee, M. Sugiyama, U. V. Luxburg, I. Guyon, and R. Garnett, editors, *Advances in Neural Information Processing Systems 29 (NIPS 2016)*, 2016.
- [6] Francesco Orabona and Dávid Pál. From coin-betting to parameter-free online learning. In D. D. Lee, M. Sugiyama, U. V. Luxburg, I. Guyon, and R. Garnett, editors, *Advances in Neural Information Processing Systems 29 (NIPS 2016)*, 2016.
- [7] Francesco Orabona and Dávid Pál. Open problem: Parameter-free and scale-free online algorithms. In Vitaly Feldman, Alexander Rakhlin, and Ohad Shamir, editors, *Proceedings of 29th Annual Conference on Learning Theory (COLT 2016)*, New York, NY, USA, 2016.
- [8] Francesco Orabona and Dávid Pál. Scale-free algorithms for online linear optimization. In Kamalika Chaudhuri, Claudio Gentile, and Sandra Zilles, editors, *Algorithmic Learning Theory, 26th International Conference, ALT 2015, Banff, AB, Canada, October 4-6, 2015*, pages 287–301, 2015.
- [9] Gábor Bartók, Dean Foster, Dávid Pál, Alexander Rakhlin, and Csaba Szepesvári. Partial monitoring – classification, regret bounds, and algorithms. *Mathematics of Operations Research*, 39(4):967–997, June 2014.
- [10] Yasin Abbasi Yadkori, Dávid Pál, and Csaba Szepesvári. Online-to-confidence-set conversions and application to sparse stochastic bandits. In Neil Lawrence and Mark Girolami, editors, *Proceedings of the 15th International Conference on Artificial Intelligence and Statistics (AISTATS 2012)*, La Palma, Canary Islands, Spain, pages 1–9, 2012.
- [11] Gábor Bartók, Dávid Pál, and Csaba Szepesvári. Minimax regret of finite partial-monitoring games in stochastic environments. In Sham M. Kakade and Ulrike von Luxburg, editors, *Proceedings of 24th Annual Conference on Learning Theory (COLT 2011)*, Budapest, Hungary, 2011.
- [12] Yasin Abbasi Yadkori, Dávid Pál, and Csaba Szepesvári. Improved algorithms for linear stochastic bandits. In J. Shawe-Taylor, R. S. Zemel, P. L. Bartlett, F. Pereira, and K. Q. Weinberger, editors, *Advances in Neural Information Processing Systems 24 (NIPS 2011)*, December 12-17, 2011, Granada, Spain, 2011.
- [13] Gábor Bartók, Dávid Pál, and Csaba Szepesvári. Toward a classification of partial monitoring games. In Marcus Hutter, Frank Stephan, Vladimir Vovk, and Thomas Zeugmann, editors, *ALT 2010, Canberra, Australia*, 2010.
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- [15] Tyler Lu, Dávid Pál, and Martin Pál. Contextual multi-armed bandits. In *Proceedings of the 13th International Conference on Artificial Intelligence and Statistics (AISTATS 2010)*, Chia Laguna Resort, Sardinia, Italy, volume 9, pages 485–492, 2010.
- [16] Barnabas Poczós, Dávid Pál, and Csaba Szepesvári. Estimation of Rényi entropy and mutual information based on generalized nearest-neighbor graphs. In J. D. Lafferty, C. K. I. Williams, J. Shawe-Taylor, R. S. Zemel, and A. Culotta, editors, *Advances in Neural Information Processing Systems 23 (NIPS 2010)*, December 6-11, 2010, Vancouver, Canada, 2010.

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- [20] Dávid Pál. *Contributions to Unsupervised and Semi-Supervised Learning*. PhD thesis, University of Waterloo, 2009.
- [21] Shai Ben-David, Tyler Lu, and Dávid Pál. Does unlabeled data provably help? Worst-case analysis of the sample complexity of semi-supervised learning. In Rocco Servedio and Thong Zhang, editors, *Proceedings of 21st Annual Conference on Learning Theory (COLT 2008), Helsinki, Finland*, pages 33–44, 2008.
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