

Ibrahim M. Alabdulmohsin

CONTACT INFORMATION

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Google Research, Brain Team, Zürich

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EDUCATION

King Abdullah University of Science & Technology, THUWAL, SAUDI ARABIA
Ph.D., COMPUTER SCIENCE (**GPA: 4.0/4.0**) SEPT'12 – APRIL'17

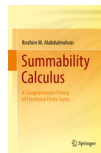
- COURSEWORK– Information Science, Data Mining, Compressed Sensing, Stochastic Methods in Engineering.
- THESIS– “Learning via Query Synthesis”, successfully defended on April 9, 2017.
DEFENSE COMMITTEE: Dr. Xiangliang Zhang (Associate Professor), Dr. Xin Gao (Associate Professor), Dr. David Keyes (Director of the Extreme Computing Research Center, KAUST), and Dr. Wei Wang (Professor of Computer Science, UCLA)

Stanford University, PALO ALTO, CA
M.S., ELECTRICAL ENGINEERING (**GPA: 4.15/4.0**) SEPT'09 – JUNE'11

- COURSEWORK– Computer Networks (Switching, Routing, Performance Engineering, and Wireless LANs), Stochastic Modeling, Convex Optimization, Applied Number Theory & Field Theory, Algorithms & Data Structures, Linear Dynamical Systems, Machine Learning, Operations Management, Information Theory, Artificial Intelligence, Cognitive Psychology, Inference Estimation & Information Processing.

University of Nebraska, Lincoln (Highest Distinction) LINCOLN, NE
B.S., COMPUTER ENG., *Minor in Economics* (**GPA: 3.98/4.0**) AUG'00 – MAY'05

BOOKS



I. Alabdulmohsin,
“*Summability Calculus: A Comprehensive Theory of Fractional Finite Sums*”
Springer International Publishing, 2018.
DOI: <https://doi.org/10.1007/978-3-319-74648-7>

PUBLICATION

- [1] J Schrouff, N Harris, O Koyejo, I Alabdulmohsin, E Schnider, K Opsahl-Ong, A Brown, S Roy, D Mincu, C Chen, A Dieng. “[Maintaining fairness across distribution shift: do we have viable solutions for real-world applications?](#)” arXiv:2202.01034 (2022). *Under review.*
- [2] A Soen, I Alabdulmohsin, S Koyejo, Y Mansour, N Moorosi, R Nock, K Sun and L Xie. Fair Wrapping for Black-box Predictions. arXiv:2201.12947 (2022). *Under review.*
- [3] I. Alabdulmohsin, H. Maennel, and D. Keyers “[The Impact of Reinitialization on Generalization in Convolutional Neural Networks.](#)” arXiv:2109.00267 (2021). *Under review.*
- [4] I. Alabdulmohsin. “[A Generalization of Classical Formulas in Numerical Integration and Series Convergence Acceleration.](#)” arXiv:2106.07621 (2021). *Under review.*

- [5] I. Alabdulmohsin and M. Lucic. “A Near-Optimal Algorithm for Debiasing Trained Machine Learning Models.”
in *Neural Information Processing Systems (NeurIPS)* (2021).
- [6] I. Alabdulmohsin, L. Markeeva, D. Keysers, & I. Tolstikhin. “A Generalized Lottery Ticket Hypothesis.”
in Workshop on Sparsity in Neural Networks: Advancing Understanding and Practice (SNN) (2021).
- [7] H. Maennel*, I. Alabdulmohsin*, I. Tolstikhin, R. Baldock, O. Bousquet, S. Gelly, & D. Keysers, “What Do Neural Networks Learn When Trained With Random Labels?”
in *Neural Information Processing Systems (NeurIPS)*, 2020 (Spotlight).
- [8] I. Alabdulmohsin, “Towards a Unified Theory of Learning and Information”
Entropy 22(4), 2020 (Editor’s Choice).
- [9] I. Alabdulmohsin, “Fractional Parts and their Relations to the Values of the Riemann Zeta Function”
Arabian Journal of Mathematics, pp. 1–8, 2018.
- [10] I. Alabdulmohsin “Axiomatic Derivation of AdaBoost and the Multiplicative Weight Update Procedure”
in the *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD)*, Dublin, Ireland, September, 2018.
- [11] I. Alabdulmohsin “Information-Theoretic Guarantees for Empirical Risk Minimization with Applications to Model Selection and Large-Scale Optimization”
in the *the thirty-fifth International Conference on Machine Learning (ICML)*, Stockholm, Sweden, July, 2018.
- [12] I. Alabdulmohsin “An Information-Theoretic Route from Generalization in Expectation to Generalization in Probability”
in the *the 20th International Conference on Artificial Intelligence and Statistics (AISTATS)*, Fort Lauderdale, Florida, April, 2017.
- [13] I. Alabdulmohsin, Y. Han, Y. Shen, X. Zhang “Content-Agnostic Malware Detection in Heterogeneous Malicious Distribution Graph”
in the *the 25th ACM International Conference on Information and Knowledge Management (CIKM)*, Indianapolis, October, 2016.
- [14] I. Alabdulmohsin, M. Cisse, X. Zhang, “Is Attribute-Based Zero-Shot Learning an Ill-Posed Strategy?”
in the *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery (ECML-PKDD)*, Riva del Garda, Italy, September, 2016.
- [15] I. Alabdulmohsin, M. Cisse, X. Gao, X. Zhang, “Large Margin Classification with Indefinite Similarities”
Machine Learning Journal (MLJ), **103** (2), pp. 215–237, 2016.
- [16] I. Alabdulmohsin, “Algorithmic Stability and Uniform Generalization”
in *Neural Information Processing Systems (NIPS)*, Montréal, Canada, December, 2015.
- [17] I. Alabdulmohsin, X. Gao, X. Zhang, “Efficient Active Learning of Halfspaces via Query Synthesis”

in *Association for the Advancement of Artificial Intelligence (AAAI)*, Austin, Texas, January, 2015.

- [18] I. Alabdulmohsin, X. Gao, X. Zhang, “Adding Robustness to Support Vector Machines Against Adversarial Reverse Engineering”
in *ACM International Conference on Information and Knowledge Management (CIKM)*, Shanghai, November, 2014.
- [19] I. Alabdulmohsin, X. Gao, X. Zhang, “Support Vector Machines with Indefinite Kernels”
in *Asian Conference on Machine Learning (ACML)*, Vietnam, November, 2014.
- [20] I. Alabdulmohsin, “Interference in Wireless Ad Hoc Networks with Smart Antennas”
in *International Wireless Communications and Mobile Computing Conference (IWCMC)*, Cyprus, August, 2014.
- [21] I. Alabdulmohsin, A. Hyadi, L. Afify, B. Shihada, “End-to-End Delay Analysis in Wireless Sensor Networks with Service Vacation”
in *IEEE Wireless Communications and Networking Conference (WCNC)*, Turkey, May, 2014.
- [22] I. Alabdulmohsin, “Techniques and Algorithms for Access Control List Optimization”
Journal of Computers and Electrical Engineering, **35** (4), pp. 556-566, 2008.

PATENTS

- [23] I. Alabdulmohsin, “Quasi-Clique Prototype-Based Hybrid Clustering”
U.S. Patent Application No. 16/340,601, Granted on 15 June, 2021.
- [24] I. Alabdulmohsin, H. Maennel, and D. Keysers, “Layerwise Reinitialization Improves Generalization in Deep Neural Networks.” (Pending)
U.S. Patent Application, Filed on Feb 1, 2021.
- [25] I. Alabdulmohsin and M. Idris, “Model Predictive Control using Semidefinite Programming” (Pending)
U.S. Patent Application, Filed on June 20, 2019.
- [26] S. Dursun, W. Alsaeed, B. Koppuravuri, and I. Alabdulmohsin, “Optimizing Queuing Systems via Model Predictive Control” (Pending)
U.S. Patent Application, Filed on Sept 27, 2019.

PROFESSIONAL SERVICES

- Peer reviewer for the *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, *IEEE Communications Letters*, and *IEEE Transactions on Neural Networks*.
- Program Committee member of *ICLR*, *AAAI*, *NeurIPS*, *ICML*, and *IJCAI* since 2017.
- Co-chair of the AI track of the 2019 Arab-American Frontiers Symposium, which is organized by the American Academies of Science, Engineering, and Medicine.
- Member of the 2020 S20 Task Force (Digital Revolution).

DISTINCTIONS

- The “Outstanding Reviewer Award” at NIPS (2016).
- The “KAUST Provost Award” (2012).
- The Saudi Arabian Oil Company – Operation Services Business Line Recognition Award for “distinguished academic achievements” (senior VP), (2012).

- *Recognition Award* for “significant contributions to the success of the Communications Engineering Department, Information Technology, Saudi Aramco”, (2009).
- The Saudi Arabian Oil Company – *Information Technology Admin Area Recognition Award* (VP) for developing innovative solutions that enhance network performance and simplify its management, (2007).
- The *Superior Scholarship Award* from the University of Nebraska, Lincoln (2005).
- *Finalist* - Windows Embedded Student Challenge contest: reached the final round with 29 other teams in a Microsoft senior project contest that included over 270 participating teams from all over the world (2005).
- The Prince Muhammed Ben Fahd *Best Student Award* in the Eastern Region–Saudi Arabia (ranked 1st) (1993).

INVITED TALKS

- “The Future of AI.” *Biban Al-Sharqiyah*, Al-Khubar, March 2019.
- “Learning & Information.” Keynote at *Arab-American Frontiers Symposium*, Nov 2018.
- “The Business Need for Data Scientists.” *King Fahd University of Petroleum & Minerals (KFUPM)*, April 2018.
- “A Unified Theory of Learning and Information.” *King Abdullah University of Science & Technology (KAUST)*, March 2018.
- “Applications of Machine Learning for the Oil & Gas Industry.” *King Abdulaziz City for Science & Technology (KACST)*, Feb 2018.

TEACHING EXPERIENCE

- Teaching Assistant (TA) for Data Analytics (CS 220) at KAUST: Falls 2014 – 2016.

PROFESSIONAL EXPERIENCE

Google Research, Brain Team, Zürich, Switzerland

Research Scientist

November’19 – Present

Currently a member of the Google Brain team in Zürich. My research focus has been in two domains: (1) understanding deep learning, and (2) developing new methods for improving the societal impact of AI. I have been a member of the Brain Solaris research group that aims to develop new insights into how deep neural networks work. In addition, I have worked on research projects related to fairness and misinformation.

Corporate Applications Department, Saudi Aramco, Dhahran, Saudi Arabia

Leader, Advanced Analytics Team

December’17 – November ’19

Founded and led the Advanced Analytics team that was responsible for developing big data & advanced analytics applications, managing data analytics infrastructures, conducting research collaboration projects with the academia, evaluating new technologies, and developing long-term strategies and roadmaps. I have led several major projects, based on machine learning, text mining, mathematical optimization, and queuing theory, which optimized operations and produced significant returns to the company. In addition, I was the technical lead of the Enterprise Analytics program, whose scope was to accelerate the adoption of Artificial Intelligence at the company, develop the workforce, and devise long-term visions and strategies.

IT Architecture Planning Group, Saudi Aramco, Dhahran, Saudi Arabia

IT Strategy & Architecture Development

May'17 – Nov'17

Developed the corporate strategies and long-term visions for Big Data & Analytics and IoT. In addition, I developed an IT news aggregator that combines multiples feeds from news websites and social media. The website identifies the most trending IT-related news stories worldwide and automatically categorizes them using machine learning into a predefined list of categories, such as mobility, IoT, security, and AI. In addition, it augments news stories with relevant contents, such as YouTube videos, Twitter hashtags and tweets, as well as Facebook share counts. The website is optimized for speed using CDN and is configured using Bootstrap to deliver fluid and responsive layout.

Network Management Group, Saudi Aramco, Dhahran, Saudi Arabia

Performance Engineering & Capacity Planning

July'11 – Aug'12

Handled various tasks on performance management and capacity planning for enterprise communications services such as the Data Center, the Internet, Extranet, and Wireless LAN infrastructures. I also developed a tool, called **Zoom4Perf**, that simplifies the task of conducting network performance measurement and analysis. The application has been very successful and was in constant use by network engineers in Saudi Aramco for troubleshooting and SLA compliance assessment.

WAN Engineering Group, Saudi Aramco, Dhahran, Saudi Arabia

Network Security and Data Center Design

July'05 – July'09

- Key member of a project management team for an 18-month IT security project that aimed at installing security devices such as firewalls, intrusion prevention systems, and proxy servers to secure hundreds of critical facilities across the company.
- Developed a tool for firewall policy optimization, which simplified firewall policy configurations considerably and improve performance.
- Project manager for a 1-year CCTV surveillance camera systems project that aimed at installing full-coverage cameras at high-elevation poles and included design and installation of a new dedicated network for the surveillance camera systems. The project also covered major civil, electrical, and structural works such as foundation constructions, trench excavations, cable pulling, and pole erections.
- Handled the data networking tasks for a SAP Accelerator project. The project aimed at accelerating key SAP transactions from hours down to a few minutes only and involved the design and connectivity of 50+ new servers at the Data Center.
- Handled many network engineering tasks such as design, installation, configuration, data network studies, design reviews, upgrades, and troubleshooting that ranged from providing basic network connectivity to enhancing availability and security.

INDUSTRY CERTIFICATIONS

CCNA, Network+, JNCIA-FWV, JNCIS-FWV, ACSP, ACSS, ACSE, ITILv3