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Ibrahim Alabdulmohsin

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Last Updated: August, 2022

I am a research scientist at Google Brain, developing tools for understanding deep learning and improving its societal impact, particularly relating to fairness. Previously, I founded and led the Advanced Analytics team at Saudi Aramco, managed the company's Enterprise Analytics program, and was a technical lead at its digital transformation program.

Education

Doctor of Philosophy - PhD, Computer Science , *KAUST*, GPA: 4.0 / 4.0
Thesis title: "Learning via Query Synthesis." Committee: X. Zhang, X. Gao, D. Keyes (KAUST), and W. Wang (UCLA). 2012 — 2017

Master of Science, Electrical Engineering, *Stanford University*, GPA: 4.15 / 4.0
Emphasis on networked systems, artificial intelligence, and operations management. 2009 — 2011

Bachelor of Science, Computer Engineering, *University of Nebraska, Lincoln*, GPA: 3.98 / 4.0
Highest Distinction; Superior Scholarship Award; Minor in Economics. 2000 — 2005

Skills

Research & Development	Authored 1 book, +25 research papers, 1 granted patent and 3 pending patents.
Communication	English (fluent), Arabic (native), German (elementary, A1).
Technical	Data science, artificial intelligence, modeling & optimization, digital transformation, networked systems (certified by Cisco, Juniper and Alcatel-Lucent).
Leadership	+2 years managing corporate-wide enterprise analytics program, leading the data science team, and serving as a technical lead at the digital transformation program at Saudi Aramco.

Selected Activities

Program committee member at NeurIPS, ICML, ICLR, AAAI, and IJCAI. 2017 — Present
Reviewer for TMLR, IEEE PAMI, IEEE TNNLS, and IEEE Communications Letters. 2019 — Present
Member of the S20 Task Force (Digital Revolution). 2020
Chair of AI track of the 2019 Arab-American Frontiers Symposium. 2019

Professional Experience

RESEARCH & DEVELOPMENT SCIENTIST **NOV 2019 — Present**
Google, Brain Team *Zürich, Switzerland*

- Led / co-led several projects to improve understanding of deep learning and improve ML fairness; e.g. pretraining with random labels, debiasing neural networks, debiasing multiclass datasets, data scaling laws, reinitialization and calibration.
- Key member of a moonshot team for machine learning fairness in healthcare.
- Member of the Google Scholarship Review Team and mentor of AI residents.

LEAD, ADVANCED ANALYTICS **NOV 2017 — OCT 2019**
Saudi Aramco, Corporate Applications Dept *Dhahran, Saudi Arabia*

- Founded and led the Advanced Analytics team that was responsible for developing AI solutions, managing analytics infrastructures, conducting research collaboration with academia, evaluating technologies, and developing roadmaps.
- Technical lead at the Digital Transformation Program, with a mission to accelerate the adoption of artificial intelligence at the company.
- Led the design & implementation of several ML applications in sectors such as downstream, supply chain, sales & marketing, IT, cybersecurity and HR.

NETWORK PERFORMANCE ENGINEER **JUN 2011 — AUG 2012**
Saudi Aramco, Comm. Eng. Department *Dhahran, Saudi Arabia*

- Won the Operation Services Business Line recognition award (2012) for "distinguished achievements."
- Performance management and capacity planning for enterprise communications services such as the Data Center, the Internet, Extranet, and Wireless LAN infrastructures.
- Developed an analytics tool for automated performance analysis and SLA compliance assessment.

DATA NETWORK ENGINEER **JUL 2005 — AUG 2009**
Saudi Aramco, Comm. Eng. Department *Dhahran, Saudi Arabia*

- Won the Information Technology Admin Area recognition award (2007) for "developing innovative solutions" and the Communications Eng Dept recognition award (2009) for "significant contributions to department's success."
- Key member of an 18-month IT network security project for securing critical facilities.
- Project manager for a 1-year CCTV surveillance camera systems project (involving civil and communications work).
- Design, installation, configuration, reviews, upgrades, and troubleshooting of data networks.

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Books

Ibrahim Alabdulmohsin, *Summability Calculus: A Comprehensive Theory of Fractional Finite Sums*, Springer, 2018.

Recent Preprints

- Ibrahim Alabdulmohsin, Nicole Chiou, Alexander D'Amour, Arthur Gretton, Sanmi Koyejo, Matt J. Kusner, Stephen R. Pfohl, Olawale Salaudeen, Jessica Schrouff, Katherine Tsai: "*Adapting to Latent Subgroup Shifts via Concepts and Proxies.*", arXiv:2212.11254, 2022.
- Lucas Beyer, Pavel Izmailov, Alexander Kolesnikov, Mathilde Caron, Simon Kornblith, Xiaohua Zhai, Matthias Minderer, Michael Tschannen, Ibrahim Alabdulmohsin, Filip Pavetic: "*FlexiViT: One Model for All Patch Sizes.*", arXiv:2212.08013, 2022.
- Amr Khalifa*, Michael C. Mozer, Hanie Sedghi, Behnam Neyshabur, Ibrahim Alabdulmohsin*: "*Layer-Stack Temperature Scaling.*" arXiv:2211.10193, 2022.

Publications

- Ibrahim Alabdulmohsin, Behnam Neyshabur, Xiaohua Zhai: "*Revisiting Neural Scaling Laws in Language and Vision.*", **NeurIPS**, 2022.
- Ibrahim Alabdulmohsin, Jessica Schrouff, Oluwasanmi Koyejo: "*A Reduction to Binary Approach for Debiasing Multiclass Datasets.*", **NeurIPS**, 2022.
- Jessica Schrouff, Natalie Harris, Oluwasanmi Koyejo, Ibrahim Alabdulmohsin, Eva Schnider, Krista Opsahl-Ong, Alexander Brown, Subhrajit Roy, Diana Mincu, Christina Chen, Awa Dieng, Yuan Liu, Vivek Natarajan, Alan Karthikesalingam, Katherine A. Heller, Silvia Chiappa, Alexander D'Amour: "*Maintaining fairness across distribution shift: do we have viable solutions for real-world applications?*", **NeurIPS**, 2022.
- Alexander Soen, Ibrahim Alabdulmohsin, Sanmi Koyejo, Yishay Mansour, Nyalleng Moorosi, Richard Nock, Ke Sun, Lexing Xie: "*Fair Wrapping for Black-box Predictions.*", **NeurIPS**, 2022.
- Ibrahim Alabdulmohsin, Mario Lucic: "*A Near-Optimal Algorithm for Debiasing Trained Machine Learning Models.*", **NeurIPS**, 2021.
- Ibrahim Alabdulmohsin, Larisa Markeeva, Daniel Keysers, Ilya O. Tolstikhin: "*A Generalized Lottery Ticket Hypothesis.*", **SNN**, 2021.
- Ibrahim Alabdulmohsin, Hartmut Maennel, Daniel Keysers: "*The Impact of Reinitialization on Generalization in Convolutional Neural Networks.*", CoRR abs/2109.00267, 2021.
- Ibrahim Alabdulmohsin: "*A Generalization of Classical Formulas in Numerical Integration and Series Convergence Acceleration.*", CoRR abs/2106.07621, 2021.
- Hartmut Maennel*, Ibrahim Alabdulmohsin*, Ilya O. Tolstikhin, Robert J. N. Baldock, Olivier Bousquet, Sylvain Gelly, Daniel Keysers: "*What Do Neural Networks Learn When Trained With Random Labels?*", **NeurIPS**, 2020.
- Ibrahim Alabdulmohsin: "*Towards a Unified Theory of Learning and Information.*", **Entropy** 22(4), 2020.
- Ibrahim Alabdulmohsin: "*Information Theoretic Guarantees for Empirical Risk Minimization with Applications to Model Selection and Large-Scale Optimization.*", **ICML**, 2018.
- Ibrahim Alabdulmohsin: "*Axiomatic Characterization of AdaBoost and the Multiplicative Weight Update Procedure.*", **ECML/PKDD**, 2018.
- Ibrahim Alabdulmohsin: "*An Information-Theoretic Route from Generalization in Expectation to Generalization in Probability.*, **AISTATS**, 2017.
- Ibrahim Alabdulmohsin, Moustapha Cisse, Xin Gao, Xiangliang Zhang: "*Large margin classification with indefinite similarities*", **Machine Learning Journal** 103(2), 2016.
- Ibrahim Alabdulmohsin, Yufei Han, Yun Shen, Xiangliang Zhang: "*Content-Agnostic Malware Detection in Heterogeneous Malicious Distribution Graph*", **CIKM**, 2016.
- Ibrahim Alabdulmohsin, Moustapha Cissé, Xiangliang Zhang: "*Is Attribute-Based Zero-Shot Learning an Ill-Posed Strategy?*", **ECML/PKDD**, 2016.
- Ibrahim Alabdulmohsin, Xin Gao, Xiangliang Zhang: "*Efficient Active Learning of Halfspaces via Query Synthesis*", **AAAI**, 2015.
- Ibrahim Alabdulmohsin: "*Algorithmic Stability and Uniform Generalization.*", **NeurIPS**, 2015.
- Ibrahim Alabdulmohsin, Xin Gao, Xiangliang Zhang: "*Support vector machines with indefinite kernels.*", **ACML**, 2014.
- Ibrahim Alabdulmohsin, Xin Gao, Xiangliang Zhang: "*Adding Robustness to Support Vector Machines Against Adversarial Reverse Engineering.*", **CIKM**, 2014.
- Ibrahim Alabdulmohsin, Amal Hyadi, Laila H. Afify, Basem Shihada: "*End-to-end delay analysis in wireless sensor networks with service vacation.*", **WCNC**, 2014.