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Ibrahim Alabdulmohsin

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I am a senior research scientist at Google Deepmind, focusing on deep learning and ethical AI. 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

Professional Skills & Competencies

Research & Development	1 book, +30 research papers, 7 patents (1 granted and 6 filed).
Communication	English (fluent), Arabic (native), German (elementary).
Technical	Artificial intelligence, data science, 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. +4 years leading cross-team research collaboration projects on deep learning, computer vision, and ethical AI at Google Deepmind.

Selected Voluntary Contributions

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

Professional Experience

RESEARCH & DEVELOPMENT **NOV 2019 — Present**
Google Deepmind *Zürich, Switzerland*
- Led / co-led several projects on deep learning and ethical AI; e.g. multimodal systems, pretraining with random labels, debiasing neural networks, data scaling laws, optimizing ViTs, and calibration/robustness.
- Member of the grand vision and ML fairness in healthcare moonshots.
- Member of the Google Scholarship Review Team and mentor of AI residents & student researchers.

ENTERPRISE 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 crafting strategic roadmaps.
- Technical lead at the Digital Transformation Program, accelerating the integration and adoption of AI across the company.
- Spearheaded the roll-out of the "Data Science" specialization program and the launch of a hosted M.S. in Analytics.
- Led the design & implementation of ML applications in sectors such as downstream, supply chain, sales & marketing, IT & HR.

PERFORMANCE & OPTIMIZATION **JUN 2011 — AUG 2012**
Saudi Aramco, Comm. Eng. Department *Dhahran, Saudi Arabia*
- Performance management and capacity planning for enterprise communications services such as the Data Center, the Internet, Extranet, and Wireless LAN infrastructures.
- Won the Operation Services Business Line recognition award (2012) for "distinguished achievements."
- Developed analytical tools for automated performance measurement and SLA compliance assessment.

DATA NETWORKING **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, Vinh Q. Tran, and Mostafa Dehghani. "Fractal Patterns May Unravel the Intelligence in Next-Token Prediction." arXiv:2402.01825 (2024).
- Xi Chen, Xiao Wang, Lucas Beyer, Alexander Kolesnikov, Jialin Wu, Paul Voigtlaender, Basil Mustafa, Sebastian Goodman, Ibrahim Alabdulmohsin, Piotr Padlewski, Daniel Salz, Xi Xiong, Daniel Vlasic, Filip Pavetic, Keran Rong, Tianli Yu, Daniel Keysers, Xiaohua Zhai, Radu Soricut: "PaLI-3 Vision Language Models: Smaller, Faster, Stronger." ArXiv:2310.09199, 2023.

Publications

- Ibrahim Alabdulmohsin, Xiao Wang, Andreas Peter Steiner, Priya Goyal, Alexander D'Amour, Xiaohua Zhai: "*CLIP the Bias: How Useful is Balancing Data in Multimodal Learning?* ", **ICLR**, 2024.
- Xi Chen, Josip Djolonga, Piotr Padlewski, Basil Mustafa, Soravit Changpinyo, Jialin Wu, Carlos Riquelme Ruiz, Sebastian Goodman, Xiao Wang, Yi Tay, Siamak Shakeri, Mostafa Dehghani, Daniel Salz, Mario Lucic, Michael Tschannen, Arsha Nagrani, Hexiang Hu, Mandar Joshi, Bo Pang, Ceslee Montgomery, Paulina Pietrzyk, Marvin Ritter, AJ Piergiovanni, Matthias Minderer, Filip Pavetic, Austin Waters, Gang Li, Ibrahim Alabdulmohsin, Lucas Beyer, Julien Amelot, Kenton Lee, Andreas Peter Steiner, Yang Li, Daniel Keysers, Anurag Arnab, Yuanzhong Xu, Keran Rong, Alexander Kolesnikov, Mojtaba Seyedhosseini, Anelia Angelova, Xiaohua Zhai, Neil Houlsby, Radu Soricut: "*PaLI-X: On Scaling up a Multilingual Vision and Language Model* ", **CVPR**, 2024.
- Ibrahim Alabdulmohsin, Xiaohua Zhai, Alexander Kolesnikov, Lucas Beyer: "*Getting ViT in Shape: Scaling Laws for Compute-Optimal Model Design* ", **NeurIPS**, 2023.
- Mostafa Dehghani, Basil Mustafa, Josip Djolonga, Jonathan Heek, Matthias Minderer, Mathilde Caron, Andreas Steiner, Joan Puigcerver, Robert Geirhos, Ibrahim Alabdulmohsin, Avital Oliver, Piotr Padlewski, Alexey Gritsenko, Mario Lucic, Neil Houlsby: "*Patch n' Pack: NaViT, a Vision Transformer for any Aspect Ratio and Resolution* ", **NeurIPS**, 2023.
- Dehghani, M., Djolonga, J., Mustafa, B., Padlewski, P., Heek, J., Gilmer, J., Steiner, A., Caron, M., Geirhos, R., Alabdulmohsin, I., et al. "*Scaling Vision Transformers to 22 Billion Parameters.*" **ICML**, 2023.
- 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.*", **CVPR**, 2023.
- 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.*", **AISTATS**, 2023.
- 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.
- Amr Khalifa*, Michael C. Mozer, Hanie Sedghi, Behnam Neyshabur, Ibrahim Alabdulmohsin*: "*Layer-Stack Temperature Scaling.*" arXiv:2211.10193, 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.*", arXiv: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.

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- 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.
- Ibrahim Alabdulmohsin: "*Techniques and algorithms for access control list optimization .*", **Computers & Electrical Engineering Journal**, 2009.