

THE IDEAL ENTRY POINT

BY KHADIJA OUAJJANI



Introduction to Machine Learning (Revised 4th Edition), by Ethan Alpaydin who was a Visiting Fulbright Scholar to the Computer Science Institute at the University of California, Berkeley, 1997-1998.

I first stumbled upon Alpaydin's *Machine Learning* while compiling a concise yet solid reading list for managers and project leaders, colleagues whose work is not centered on machine learning, but whose research would unquestionably benefit from its capabilities. As an interdisciplinary researcher implementing machine learning tools within the aerospace domain, I often find that my first bottleneck isn't technical, but conversational. Many collaborators, especially those from mono-disciplinary backgrounds, engage with machine learning only through fragmented headlines or overhyped media narratives. Yet, as Research and Development offices seek to better leverage their data repositories and enhance their toolsets—often through fields outside their core expertise—the need for informed, grounded dialogue becomes urgent. In an environment saturated by polarized perspectives and oversimplified soundbites, it's rare to find an introduction to machine learning that is both technically sound and genuinely accessible, without veering into either a pedantic tone that loses the audience or a sensationalist one that gets colorful nuggets of information rather than

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grounded knowledge.

This revised and updated edition answers that need. Ethem Alpaydin, a scholar embedded in the field and capable of communicating complex ideas in layman terms, writes with precision but without condescension. He conveys foundational knowledge of machine learning clearly, often with intuitive metaphors and real-life examples. His measured tone and poised lens make the book stand out as a cogent statement of the factual capabilities of the field and its state.

One of the particular strengths of *Machine Learning* is the causal narrative Alpaydin uses to trace the field's evolution, linking scientific progress, data complexity, and the necessity for automated pattern discovery. Rather than presenting machine learning as a sudden revolution, he frames it as an inevitable extension of scientific inquiry itself. This framing not only helps readers grasp why machine learning emerged but also how it functions within the broader pursuit of knowledge and advancing the science behind science itself.

Alpaydin explains in logical, layman's terms, "We are now at a point where this type of data analysis can no longer be done manually, because people who can do such analysis are rare; furthermore, the amount of data is huge and manual analysis is not possible. There is thus a growing interest in computer programs that can analyze data and extract information automatically from them—in other words, learn" (37).

The chapters introducing the machine learning model types are clearly explained without complex mathematics, all the while weaving in relatable examples and rooting us in everyday challenges that would be an onerous task for humans. The well-placed mentions of artificial intelligence help in differentiating what machine learning is and isn't, and how the two intersect.

Finally, the addition of a chapter that explores the challenges and uncovered risks since the first edition (2016) is a shrewd move: It addresses data privacy; bias in data collection and manipulation; and model interpretation. This chapter also answers ethical and social questions with refreshingly succinct clarity. These have been particularly pressing in the machine learning/AI field, and Alpaydin acknowledges this has been a topic with every new technology. Echoing the sentiment of famed author Isaac Asimov, who warned that "science gathers knowledge faster than society gathers wisdom," Alpaydin considers the perils of divorcing innovation from responsibility.

Overall, Machine Learning is an ideal entry point for anyone unfamiliar with the field and needing to understand its mechanisms, capabilities, and consequences. It's concise, yet still relays the foundations of machine learning; it's thorough without burdening the pages with mathematics and algorithms, and it's grounded without downplaying the risks and pitfalls of a promising but severely unregulated field, one which can easily mine the internet and social media for data and usher in a new era of the internet.

As Alpaydin tells us, "We are already exposed to more data than what our sensors can cope with or our brains can process" (162) and thus Machine Learning will help us make sense of an increasingly complex world. If you are looking for a methodical, insightful overview of what machine learning is, its capabilities and its future, this book is the best entry point.

Ethem Alpaydin, *Machine Learning (Revised and Updated 4th Edition)*, Cambridge: MIT Press, 2021. 222 pages. \$15.95.

BIOGRAPHY

Khadija Ouajjani was a Fulbright Scholar in aerospace engineering at Wichita State University from 2016-2017. She is an intersectional researcher in the aircraft industry, currently specializing in the integration of machine learning into crashworthiness and advanced materials science. With a PhD focused on leveraging ML for defect prediction in support of aircraft certification standards, she works to bridge disciplinary gaps, collaborate on survivability-centered and numerical simulation crashworthiness projects, as well as help non-specialists engage meaningfully with machine learning tools. She can be reached at KhadijaOuajjaniPhD@proton.me

