

HOW TO COMPETE IN THE AGE OF ARTIFICIAL INTELLIGENCE

IMPLEMENTING A COLLABORATIVE
HUMAN-MACHINE STRATEGY FOR YOUR
BUSINESS

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How to Compete in the Age of Artificial Intelligence: Implementing a Collaborative Human-Machine Strategy for Your Business

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ISBN-13 (pbk): 978-1-4842-3807-3

ISBN-13 (electronic): 978-1-4842-3808-0

<https://doi.org/10.1007/978-1-4842-3808-0>

Library of Congress Control Number: 2018958917

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Cover designed by eStudioCalamar

Distributed to the book trade worldwide by Springer Science+Business Media New York, 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax (201) 348-4505, e-mail orders-ny@springer-sbm.com, or visit www.springeronline.com. Apress Media, LLC is a California LLC and the sole member (owner) is Springer Science + Business Media Finance Inc (SSBM Finance Inc). SSBM Finance Inc is a **Delaware** corporation.

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Contents

About the Authors	v
Acknowledgments	vii
Introduction	ix
Chapter 1: The Economics of Artificial Intelligence	1
Chapter 2: Reimagining Competitive Advantage in the AI World ...	41
Chapter 3: Board to CEO: “What’s Your AI Strategy?”	75
Chapter 4: Inside the Black Box: Understanding AI Decision Making	91
Chapter 5: Intelligent Process Automation = RPA + AI	125
Chapter 6: Cybersecurity and AI	143
Chapter 7: Intelligence of Things = IoT + Cloud + AI	155
Chapter 8: IT Operations and AI	173
Chapter 9: Decentralized Autonomous Organizations = Blockchain + AI + IoT	189
Chapter 10: Ethics and AI	207
Chapter 11: Putting It All Together: Toward a Human-Machine Collaborative Ecosystem	215
Index	231

About the Authors



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Acknowledgments

During the writing of this book, we were fortunate to be amidst many well-wishers, colleagues, and our families, who have been immensely helpful and supportive by playing several roles—co-writers, coaches, and down-right fierce critics. This book could not have been written without their help.

We are also grateful to the many clients, analysts, and strangers who unknowingly contributed to this book when they patiently listened to our ramblings, downright stupid questions, and crazy thoughts. Sometimes they candidly admitted when something did not make sense and sometimes they vociferously agreed and nudged us to keep researching and writing.

Our efforts to write this book would have been futile without the continuous guidance from the Apress team (Shiva, Rita, and Laura). You have our sincere appreciation for your support throughout this project.

A special thank you to Rita Fernando Kim from Apress for her hard work on reviews and for keeping us on schedule.

I am deeply indebted to my loving family—Snigdha, Pratik, Pratyush, and Rexie. Without their love, affection, and support, it would be impossible to survive in the corporate madness, let alone write books.

—Soumendhra Mohanty

I am grateful to Soum (Soumendhra Mohanty) for the opportunity to work with him on this book. It is his idea and his book, and I am really glad that I could contribute in some ways. There couldn't have been a better opportunity for “my first-book” project! I'd also like to thank Shweta, my wife, for her patience and support throughout all my ventures, including this one.

—Sachin Vyas

Introduction

Over the last several years, as we met with hundreds of CxOs, senior executives, business function owners, technology leaders, and practitioners, we realized that there are fundamental questions that everybody was trying to make some sense of:

- What is AI?
- Why now?
- How does it impact my function or business or even the company at large?
- What should I do?

This book is collection of thoughts, assimilating ideas, and views—some thought provoking, some mundane—addressing several aspects of how to compete in the age of artificial intelligence. Once you start reading the book, you will realize that the chapters are written in a blogish manner, which is precisely by design. This is to give you free-flowing thought and help you generate your own ideas.

With the short preamble out of the way, let's get started.

The original AI-powered Watson supercomputer that conquered the contestants on the *Jeopardy* television game show was about the size of a bedroom, with 10 odd rack-like machines forming the four walls. Today's intelligent machines are very different. They no longer exist solely within bedroom sized rooms, but are cloudified and run several 100 “instances” of AI services at once. The outputs are consumed simultaneously by recipients all over the world, through multiple channels—smart assistants, smart phones, smart devices, smart appliances, smart vehicles, smart utilities, smart plants, smart factories, smart buildings, smart homes, etc. The result? We are living in a world of “always-on” intelligence.

This pervasiveness of AI is triggering another interesting phenomenon—the more we use it, the smarter it becomes. Anything it learns in one interaction gets immediately transferred to the other interactions. AI is not one large monolithic program. It is actually a combination of diverse sets of artificial narrow agents (ANIs), each specialized to do a particular task and with capabilities like conversational interface, image recognition, voice recognition,

text-to-speech, speech-to-text, logic-deduction, natural language parsing, natural language generation, knowledge base, self-learning, and adaptive engines.

Slowly and steadily, a picture of the AI future is emerging. The AI on the horizon looks more like “AI as a service” embedded into everything, and almost invisible. A century ago, we transformed everything to be powered by electricity to augment human capabilities; going forward we are at a similar tipping point, where we will “AI-fy” everything to augment human capabilities and in some cases introduce autonomous AI to eliminate human tasks altogether. Thanks to technologies like Cloud, GPU, Big Data, Blockchain, IoT, ML and DL, the process of “AI-fying” will become simpler in the coming days, transforming everything by infusing it with AI. In fact, don’t get surprised if the business plans of the companies going forward are going to take X and add AI.

Take the example of Google. Every time we type a query or click on a link, we are becoming an active participant in training the Google AI. Starting from how to date to how to conceive to how to raise children to DIY scientific experiments to how to manage relationships to how to prepare an effective resume to what are the most asked interview questions and corresponding answers, with each of the queries we are feeding into Google’s search engine, we are helping Google AI record our behavior. This includes what we think, what we want to know, when we seek information, why we are seeking information, how we use that information, and so on. Perhaps in 10 years, Google’s main product will be “Mind as a Service” and you will be able to rent the mind of a CEO, developer, or scientist.

This is the point where things become sketchy. Ethical policies and associated debates come into play.

What is propelling this massive growth of AI? Three technology breakthroughs acted as catalysts:

- **Massively parallel computation:** Thinking, which is the process of reasoning about something, is a massively parallel process where billions of neurons in our brain act simultaneously, passing signals to other neurons through layers of networks. The final outcome is judgment. We were handicapped to perform massively parallel processing until the graphics processing unit (GPU) was invented. The GPU unlocked new possibilities, where neural networks (loosely based on the way neurons work in our brain) can facilitate hundreds of millions of connections between the nodes, almost at a sub-second processing time.

- **Big Data:** The intelligence that we claim is ours is taught to us over time. When the human brain sees something it's never seen before, it takes time to deduce what the image is! The same rule applies to AI. Thanks to digitization and proliferation of smart phones, we have access to massive amounts of real-world data. Our ability to collect, clean, standardize, and store this real-world data provides us with an enormous training ground for AI. The result? We are beginning to see intelligence infused into almost everything, consequently transforming everything into a “smart” thing.
- **Better algorithms:** A lot goes on inside our brain in order to analyze our surroundings. We use heuristics and mental mind-maps to reason. However, it is incredibly hard for us to codify the thinking process. Our earlier endeavors to codify the reasoning process resulted in writing lengthy programs, mostly in the form of “IF then Else...” and these programs were not adaptive enough to changes. Deep-learning algorithms give us a way to generate reasoning from the data itself, not from complex programs consisting of hundreds and thousands of conditions, but from the data itself churning out patterns and recommendations. We can now collect lots of data and apply sophisticated algorithms to arrive at predictions. The only drawback is that some algorithms are so complex that we just can't understand the results we get.

To illustrate the impact of these three catalysts, let's discuss what happened after IBM's supercomputer Deep Blue defeated the reigning chess grand master Garry Kasparov in a famous man-versus-machine match in 1997. Kasparov had his superlative genius mind on his side; Deep Blue had instant access to a massive database of all previous chess moves played thousands of experts. Kasparov realized that man-plus-machine would be far more beneficial than man-versus-machine. The concept of a “centaur player” (a human/AI cyborg) began to emerge where AI augments the human-chess player's skills. The result? Today, the best chess player is “Intagrand”—a team of humans and several different chess AI programs.

Interestingly, another pattern began to emerge. Instead of diminishing the interest of human chess players, AI-enabled chess programs actually inspired more people than ever to play chess. Perhaps there was something really motivating and rewarding for the human chess players and the AI chess programs, both turning up the ante to stay one step ahead of the other, and consequently both learning from each other to become better players. The result? There are more grand masters now than there were when Deep Blue first defeated Kasparov.

This brings up another point. If AI can help humans become better chess players, by all means it is also possible for AI to help us become better in other spheres of life and professions.

Fantastic so far! How do all of these technology advances relate to business?

Well, the signs are there, however subtle at this point in time they may be. The world around us, and hence our businesses and the roles we play in a business context, are increasingly impacted by AI prevalence. It will require CxOs to adopt a new approach to role delegation—from implementing strategic AI advisors to augmenting employees.

Modern organizations value empowered AI as much as they value empowered people. For example, CEOs must make it clear when smart algorithms, rather than human associates, are to be consulted. This can be difficult. Some of the most important decisions regarding machine learning are usually about the extent of authority the AI agents should have. Business leaders who automate a factory now recoil at the idea of letting AI determine their entire business strategy. In the absence of clear delineation of authority as well as accountability, human-AI conflict will result from dual empowerment.

Business leaders committed to taking advantage of AI should consider the following four AI-related imperatives.

- *AI as strategic advisors:* AI can effectively play the role of the strategic advisor. The primary deliverables of the AI strategist are to reframe problems, assist in strategy development, and assist in defining the course of action and the execution plans. These algorithms will constantly produce data-driven insights and recommend optimal courses of action. Human intervention and oversight will solely be required to identify which decisions are deferred to the algorithms and how the decisions are implemented.

The AI strategist will have a broader view across the systems and business processes and competitive intelligence, which will invariably present major operational challenges, such as inter-process and interpersonal conflicts. Hence, it is all the more important that the output of the AI strategist should be transparent and explainable to all. That way the trust factor will evolve between human and machine.

- *AI as task executioners:* The AI strategist has done its job in defining the problem statement and execution plans, and the human associate has validated it and given a go-ahead. What next? You will need algorithms to analyze business processes, create clear task descriptions and goals, and define detailed service-level agreements and key performance indicators. Managers and employees responsible for task execution will now perform higher order tasks—instead of focusing on operationalizing (allocating resources, managing employees, and managing escalations) the project execution, they will spend most of their time reviewing whether the algorithms are offering improved outcomes and innovation. Among the important benefits that algorithms offer are high-level reliability and predictability.
- *AI as a virtual assistant to employees:* Even the most talented employees have their limits. Compared to these employees, AI algorithms are geniuses boxed into a task's scope. Therefore, the question on business leaders' minds is whether the average manager and employee can effectively work together with intelligent agents.

Modern enterprises like Google, Alibaba, Amazon, Netflix, etc. have already started using AI assistants in cases where actionable insights can improve the productivity of their employees and can help achieve the business outcomes. Employees have no other choice but to learn to treat the algorithms as valued. On the one hand, the collaboration culture of the human-machine will mean much more scalability and predictability to the outcomes. At the same time, it may to a large extent weaken accountability in the organization. One reason for this may be that in rapidly evolving scenarios, where everybody (human and machine) is running against time to deliver the outcomes, it may not be clear to managers whether they need to retrain the employee or the algorithms.

- *AI as an autonomous organization:* Is this possible? Well, if you have done the previous three, then why not? It is already happening with many Wall Street hedge funds. These companies are allowing AI full autonomy in steering the organization to new levels of risk, profitability, and innovation. Executives in these hedge funds have handed over an unimaginable portion of the decision-making process to their algorithms.

Final Thoughts

The four imperatives of incorporating AI into the enterprise may seem far-fetched now, but this process is inevitable. As the capabilities of AI continue to advance, increased oversight will lead to additional insight, and the software will learn continuously and will be viewed as an accountable agent rather than inanimate code. However, CEOs, board members, and senior executives will have a critical role to play—they must closely monitor the algorithms and promote simulations to determine the boundaries of the technology. Furthermore, business leaders should be careful about doing too many AI-led activities too soon, as doing so may create unforeseen implications on responsibility and accountability. They must ensure clarity in deference, delegation, and direction.

In this book, chapter by chapter we touch upon many aspects of AI in the context of an organization's processes, strategies, advantages, and consequences, as well as what it means for an individual in any role. In Zen, "koans" are just tools or building blocks to get to the end goal. Similarly, we sincerely hope that this book will serve as a tool to guide you and find solutions to the problems you are facing.

Now it's time to get on to the first chapter of the book and learn about the economics of AI, including what defines AI and what makes its adoption so difficult!