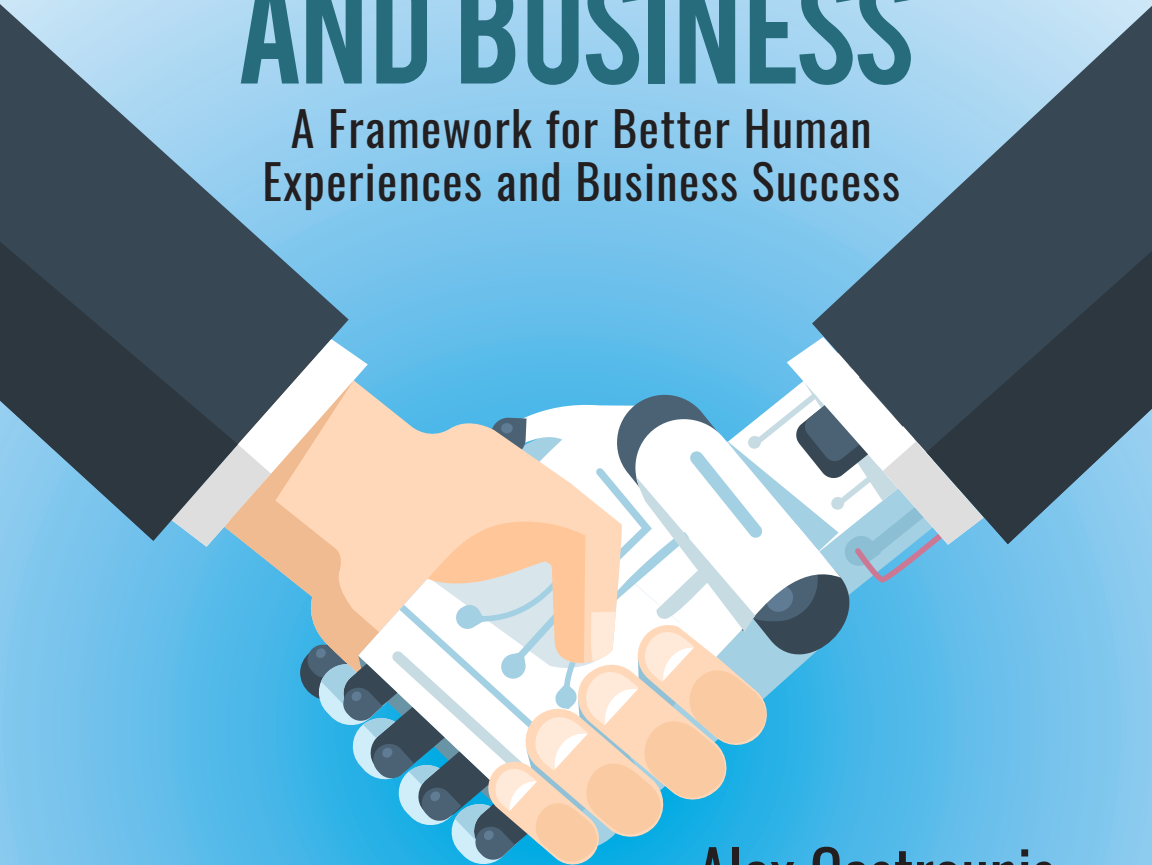# AI

FOR PEOPLE AND BUSINESS

A Framework for Better Human Experiences and Business Success

Alex Castrounis

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If you're an executive, manager, or anyone interested in leveraging AI within your organization, this is your guide. You'll understand exactly what AI is, learn how to identify AI opportunities, and develop and execute a successful AI vision and strategy. Alex Castrounis examines the value of AI and shows you how to develop an AI vision and strategy that benefits both people and business.

AI is exciting, powerful, and game changing—but too many AI initiatives end in failure. With this book, you'll explore the risks, considerations, trade-offs, and constraints for pursuing an AI initiative. You'll learn how to create better human experiences and greater business success through winning AI solutions and human-centered products.

- Use the book's AIPB Framework to conduct end-to-end, goal-driven innovation and value creation with AI

- Define a goal-aligned AI vision and strategy for stakeholders, including businesses, customers, and users

- Leverage AI successfully by focusing on concepts such as scientific innovation and AI readiness and maturity

- Understand the importance of executive leadership for pursuing AI initiatives

> *"A must read for business executives and managers interested in learning about AI and unlocking its benefits. Alex Castrounis has simplified complex topics so that anyone can begin to leverage AI within their organization."*
>
> **—Dan Park**
> GM & Director, Uber

> *"Alex Castrounis has been at the forefront of helping organizations understand the promise of AI and leverage its benefits, while avoiding the many pitfalls that can derail success. In this essential book, he shares his expertise with the rest of us."*
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> **— Dean Wampler, PhD**
> VP Fast Data Engineering, Lightbend

Alex Castrounis is the founder and CEO of Why of AI and an adjunct for Northwestern University's Kellogg/McCormick MBAi program. Alex has spent the last two decades advising businesses on how to use data, analytics, and technology to drive business and customer success.

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by Alex Castrounis

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Praise for *AI for People and Business*

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Alex Castrounis has been at the forefront of helping organizations understand the promise of AI and leverage its benefits, while avoiding the many pitfalls that can derail success. In this essential book, he shares his expertise with the rest of us.

—Dean Wampler, PhD, VP, Fast Data Engineering at Lightbend

With the enormous impact AI is having across many different industries, it's imperative for all organizational leaders to develop a baseline understanding... and this book provides just that.

—David Bledin, Director at Google

A long-overdue deep dive into how AI changes organizational ecosystems and the lives of people who inhabit them. The AIPB Framework is the essential roadmap for every businessperson on the AI journey.

—Mark Fetherolf, CTO of Numinary Data Science, Coauthor of Real World Machine Learning (Manning)

A well organized, very readable, non-technical survey of the often misunderstood science of AI and machine learning. I highly recommend this book for business leaders and curious consumers aspiring for literacy in this important field.

—Richard B. Noyes, Angel Investor and former CFO,
Astra Pharmaceuticals NA

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Preface

The Motivation Behind This Framework and Book

After earning my master's degree in applied mathematics (awarded with distinction), I became an IndyCar race car engineer and race strategist who competed in more than 100 races worldwide, including many times in the Indianapolis 500. I also ran the vehicle dynamics and data science department at Andretti Autosport, which helped drive results for a four-car IndyCar racing team.

In American professional motorsports, winning the Indianapolis 500 is the ultimate goal. I attended my first Indianapolis 500 when I was still in high school. If you've never been, I highly recommend it. This event is truly the greatest spectacle in racing and is the largest single-day sporting event in the entire world. The track itself is the largest sporting facility in the world in terms of capacity.

The first year I attended, 1992, turned out to be the closest Indy 500 finish in history (and still is), and ended with Al Unser, Jr., beating Scott Goodyear for the win by 0.043 seconds! Think about that! That's less than half of one tenth of one second after racing for almost three hours, at an average speed of 220-plus mph, and for 500 miles (the equivalent of driving from Chicago to Toronto)!

I was so blown away that I walked out of the Indianapolis Motor Speedway (IMS) that day telling those with me that I would someday work in IndyCar racing, and the rest is history. Additionally, and very serendipitously, my racing career began with me working for Al Unser, Jr., the driver who won that very same Indy 500 that I attended as a kid. I came on board as chief assistant engineer to Alan Mertens, the engineer who designed the car with which Unser won in 1992!

Figure P-1 shows an image of an article in *Racer* magazine following the 2007 Indianapolis 500, where I was the race engineer and strategist for Davey

Hamilton. I'm shown on the right celebrating a ninth place finish after starting 20th, this was Davey's remarkable comeback race following 23 surgeries to reconstruct his legs and feet after a horrific and massive crash at the Texas Motor Speedway in 2001.

Figure P-1. Racer Magazine 2007 Indianapolis 500 article (reprinted from RACER Magazine with permission)

As my racing career progressed, I quickly learned that professional motorsports involves generating competitive advantage on steroids. Racing at that level requires intense innovation, continuous optimization, perfection, advanced analytics of inordinate amounts of data, rock-solid teamwork and collaboration, and the ability to execute and adapt on the fly at an often unrealistic pace. All of this while under intense pressure and accountability. Ultimately, professional motorsports is all about maximizing insights to drive—and benefit from—decisions, actions, and outcomes in the least amount of time possible. This is how competitive advantage and top results are produced.

As an IndyCar race car engineer and race strategist using AI, machine learning, and data science to optimize race car setups and race strategy for a given combination of driver, track layout (super speedway, short oval, road course, street course), and conditions (weather, track surface), I was able to help my teams win many races and podium finishes, including winning the historic final Champ Car (formerly CART) race in Long Beach, California. I worked directly with many notable drivers and team owners, including Michael Andretti, Al Unser, Jr., Jimmy Vassar, Will Power, Tony Kanaan, Danica Patrick, and Ryan-Hunter Reay to name a few.

You might be wondering what this has to do with this book, the framework it's about, and AI in general? The answer is everything! Let me explain.

After about 10 years in racing, I decided to transition into the tech industry. I quickly realized that, much like in racing, companies are also constantly trying to beat their competitors to win. One thing that quickly became clear to me is that what it takes to win races doesn't apply only to racing, but also to companies, regardless of industry or size. Although the definition of winning might be different for every company (e.g., achieving specific business profit and growth goals), what it takes to win is the same. In both racing and business, winning, and especially winning consistently, requires competitive advantage, which is the ability to understand, act, and achieve performance levels in ways that your competitors can't.

Based on my professional experience in both racing and business, competitive advantage comes primarily from two areas. First, for products with some form of user interface (UI), competitive advantage comes from superb design, an optimized user experience (UX), and from features that delight. Second, and most important in my opinion, it comes from having the "right" data, creating a winning strategy to take advantage of it, executing that strategy, and then using data to continuously improve and optimize things over time.

Since leaving racing, I have leveraged my expertise in business, analytics, and product management to help companies of all sizes in many industries to benefit from technological innovation and digital transformation, and to build great data products. Through speaking and teaching, I have also helped thousands of people grasp the details and benefits of data science and advanced analytics.

I am the founder and CEO of Why of AI and an adjunct for Northwestern University's Kellogg/McCormick MBAi program, as well as a trusted advisor, keynote speaker, and author. I have spent the last two decades advising busi-

nesses on how to use data, analytics, and technology to drive business and customer success. My primary goals are to help people and organizations better understand AI and machine learning, as well as help to identify beneficial AI use cases and help create strategies for building responsible, successful AI solutions.

This book, and the framework that it presents, is based on these goals and my nearly 20 years of real-world innovation, experience, and expertise; it is intended to guide the creation of better human experiences and business success through end-to-end AI-based innovation built on a winning AI vision and strategy.

Navigating This Book

The book is divided into four parts. Part I introduces and details the AI for People and Business (AIPB) Framework, its North Star, benefits, and components. It ends with a nontechnical overview of AI and machine learning, as well as an overview of real-world AI applications and opportunities. This will help spark ideas, and provide the context required for developing a vision and strategy around relevant AI applications and use cases.

Part II is about developing an AI vision. It begins with an in-depth discussion of *why* to pursue AI, followed by defining AI vision-aligned goals for different stakeholders such as businesses, customers, and users. We then go over what people need and want, and how to turn that into great AI-based products and better human experiences.

Part III is about developing an AI strategy. It is focused on concepts such as scientific innovation, AI readiness and maturity, and key considerations for achieving success with AI. You should use these concepts to perform appropriate assessments as defined by AIPB to develop a strategy to fill gaps and address key considerations, as well as for developing a vision-aligned AI solution strategy.

Part IV concludes with a discussion of the potential impact of AI on jobs, final thoughts, and the future of AI, particularly what to expect and watch out for.

Please feel free to visit *https://aipbbook.com* any time for the latest AIPB information and resources. Thanks for picking up a copy of this book. I hope you enjoy it!

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I would like to thank you, the reader of this book. Writing it was a major and very difficult undertaking that is made 100% worth it if you read it and learn something new and valuable.

I would like to thank Alan Mertens and Chris Mower for taking a risk on hiring an unknown and relatively inexperienced race car engineer and race strategist. It is because of them that I have worked and competed at the highest level of professional motorsports, traveled the world, worked with some of the greatest

names in the sport's history, and experienced the indescribable thrill of winning races. All of this helped build the foundation for my post racing professional successes.

Thanks to all of the teachers, experts, colleagues, and mentors who have helped me throughout my professional journey. People who share knowledge and expertise for the purpose of benefiting others are certainly helping to make the world a better place.

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Thank you to all of the people at O'Reilly Media with whom I might not have interacted directly or in a significant way, but who helped produce this book. I would also like to thank O'Reilly Media for publishing my book. I have read many O'Reilly books, attended conferences, benefited from its online learning platform, and am a fan in general. It is an honor to put my name alongside O'Reilly Media on this book.

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The AI for People and Business Framework

Artificial intelligence (AI) is exciting, powerful, and game changing. The mainstream hype machine has generated gail-force winds behind its sail, to the point that AI is on virtually everyone's radar and is part of the vernacular and yet is barely understood by the majority of people.

Do you ask yourself any of the following questions?

- What is AI, and what value can it bring to my business? What value can it bring to my customers, users, or even me?

- How do I develop a vision and strategy around AI and my data in general?

- How do I determine whether I'm ready to pursue AI initiatives and what should be my key considerations?

- How do I identify specific opportunities, use cases, and applications of AI for my business?

- How can I apply AI to solve real-world problems that are aligned to my goals?

- How do I measure the success of AI initiatives?

- How is AI different from machine learning, data science, neural networks, and deep learning?

- What data do I need to power AI applications?

- How do I take advantage of AI in an ethical, unbiased, and regulatory compliant way?

- Is there a framework that I can use to get the most value from AI, while mitigating risk and ensuring the best chance of success?

This book was written for you if you answered yes to any of these questions. Also, a hint on the last question—the answer is yes, and it's called the AI for People and Business (AIPB) Framework, which is what this book is about! The goal of this book is to hopefully answer all of these questions with the assistance of AIPB, at least at a high level. This is also a book about innovation, and another primary goal of the book is to help executives and managers develop a vision and strategy for building great, highly successful AI-powered products and services that create better human experiences and business success.

With that, welcome to Part I of the book. Part I begins with a discussion of what success with AI looks like, and also challenges to achieving it. This is followed by covering AIPB, the framework on which this book is based. This discussion includes what makes AIPB unique and powerful based on its North Star, benefits, structure, and approach.

Part I concludes with a nontechnical overview of AI and machine learning, as well as an overview of real-world AI applications and opportunities. This will help spark ideas and create the high-level context and understanding for you that is required for developing a vision and strategy around relevant AI use cases and applications.

Part II of the book is dedicated specifically to developing an AI vision, and Part III to developing an AI strategy.

Let's begin by learning about success with AI.

Success with AI

This book is for you if you are an executive or manager interested in engaging AI within your organization. This book is for you if you want to understand exactly what AI is, why AI is able to provide value for your business and the people who interact with it, how to identify AI opportunities, and how to develop and execute a successful AI vision and strategy.

Reading this book should help dissolve the often nebulous and mysterious perception of AI and give you the right assessment tools, processes, and guidance so that you and your business can gain the requisite, level-appropriate understanding and begin using AI today. This book will also benefit data and analytics practitioners (e.g., data scientists) and anyone else who is interested in learning more about AI from a strategic, business-level perspective.

This book, and the AIPB Framework that it introduces, will hopefully help answer your AI questions and guide your journey to success with AI.

Racing to Business Success

As I mentioned in the preface, the ultimate goal in American professional motorsports is to win the Indianapolis 500. And in this event, where anything can happen, the timely advanced analysis of data—including historical events, sensor data, telemetry, computer simulation, driver feedback, and more—makes all the difference. Since shifting to tech from working as an IndyCar engineer and race strategist for various teams, I've discovered that the same goes for business. In the age of big data and advanced analytics, developing and executing a vision and strategy to turn your company's data into top results might be the only way to win.

Making decisions and taking action based solely on historical precedent, simple analytics, and gut feel no longer gets the job done—nor does pursuing near-

sighted goals or commoditized technologies. And yet, too many businesses remain mired in the status quo. More and more, it's those that effectively use analytics who succeed; that is, those that extract information such as patterns, trends, and insights from data in order to make decisions, take actions, and produce outcomes. This includes both traditional analytics and advanced analytics, which are complementary.

I use the umbrella term *advanced analytics* in a way similar to a definition given by Gartner: "Advanced Analytics is the autonomous or semiautonomous examination of data or content using sophisticated techniques and tools, typically beyond those of traditional business intelligence (BI), to discover deeper insights, make predictions, or generate recommendations." Advanced analytics techniques include those associated with AI, machine learning, and others covered in this book.

Data is a core advantage if, and only if, you know how to use it. All companies should begin to think of themselves as data and analytics companies, regardless of what their core offerings are. As long as data is involved, this is a critical step in getting ahead of the competition while also gaining an increased ability to create huge benefits for both people and business.

Many companies increasingly know this and want to undergo a data and analytics transformation, but struggle to identify real-world AI opportunities, use cases, and applications, as well as create a vision and strategy around them.

Turning an AI idea into actual benefits that are realized by people and businesses is difficult and requires the right goals, leadership, expertise, and approach. It also requires buy-in and alignment at the C-level. All of this is what I call *applied AI transformation*; it is what this book, and particularly the framework that it presents, is all about. Note that I call it *applied AI transformation*, and not digital transformation. I think this distinction is critical and I'll briefly explain why.

Terms like innovation, transformation, and disruption are thrown around all the time, and usually in a broad context. Similarly, the phrase digital transformation is equally as broad and therefore its meaning isn't necessarily clear. Don't get me wrong—there is value to the phrase and its intended meaning, and there are many companies that absolutely need to undergo a digital transformation, and the sooner the better. But simply saying you need to undergo a digital transformation may generate more questions than answers. Some of these questions include: what does digital transformation mean exactly? What specific technologies or technology systems (e.g., AI, blockchain, Internet of Things[IoT]) should

we be using and which should we choose first? How do we prioritize between different digital goals and initiatives? How will digital transformation meet our goals and by how much? How much will it cost and what's the potential ROI? When will we realize that ROI?

All three words in the phrase "applied AI transformation" have a specific and intended meaning. Due to the relative infancy of AI and its limited use (so far) in real-world applications, AI is widely viewed as being largely theoretical. The term applied is intended to distinguish between theoretical AI and AI that is applied to real-world use cases, something for which we're now seeing a significant and diverse proliferation. The term transformation is as expected, and in the case of AI, means harnessing AI to generate certain benefits or outcomes not attainable through other methods, or in other cases, to produce high-impact outcomes much more efficiently (time and cost) and with greater value. In this context, applied AI transformation leaves no room for ambiguity—it means applying existing and emerging AI techniques to build real-world solutions that can transform businesses and people's lives. Whether pursuing a digital transformation or applied AI transformation, both require a vision and strategy. AIPB helps guide this in the case of an applied AI transformation.

Why Do AI Initiatives Fail?

There are many reasons why AI initiatives might fail. One reason is that AI is still generally not well understood. Few executives and managers truly understand what AI really is, the current state of AI and its capabilities, the value it represents, what's required for AI success, the difference between AI hype and reality, the differences and unique benefits of AI as compared to alternate forms of analytics, the differences between AI and machine learning, and much more. AI can have tremendous benefits for companies, customers, users, and/or employees, but it's not always obvious how, nor is it obvious what data, techniques, time, cost, and trade-offs are required. It's also not always obvious how to measure the success of AI solutions after you build them.

Companies also might not have the "right" data and advanced analytics leadership, organizational structure, or talent in place. AI is an extremely technical subject area and requires translators between management and advanced analytics experts, a responsibility usually held in the context of software by business analysts and product managers. Like their executive counterparts, very few of these folks understand AI either, thus spawning new data-centric versions of these roles (e.g., data product manager), although that's relatively new and talent

is scarce. Also, due to the relative infancy of data organizations within companies, real-world data organization structures (e.g., leadership, reporting, functional alignment) are all over the place. Most important, these data organization structures might not be optimized for cultivating internal adoption, alignment, and understanding around AI initiatives, nor for successful delivery of AI initiatives in general (e.g., roles, responsibilities, resources).

When considering investments in technology, executives are rightfully concerned with understanding final outcomes, costs, time to value, ROI, risk mitigation and management (e.g., bias, lack of inclusion, lack of consumer trust, data privacy and security), and whether to build or buy. Unlike traditional technology investments associated with undergoing a digital transformation—for example, building a mobile app or data warehouse—AI is better characterized as scientific innovation, a concept that implies an inherent amount of uncertainty in a way similar to that associated with R&D.

AI is a field based in statistics and probability and is rapidly advancing in both state-of-the-art and potential applications. It might be impossible to avoid some amount of appreciable uncertainty with AI. Not understanding this or incorrectly setting expectations is another potential cause of failure. So is not pursuing AI in an Agile and Lean way and appropriately respecting the exploratory and experimental nature of AI. Appropriate assessments should be performed as part of a broader approach tailored specifically to the unique characteristics and potential challenges of AI. The AIPB Framework is intended to help companies address and avoid potential points of failure and maximize their chance of success with AI.

Lastly, building successful AI solutions that benefit both people in addition to business requires a basic understanding of what people need and want, and also what the ingredients are for making great products and user experiences given that many of these ingredients will apply to making great AI solutions, as well. Fundamentally, people use products and services that are useful, better than the alternatives, are enjoyable and delightful, and that result in a good experience. AI solutions that are able to deliver on all of these will succeed, whereas those that miss on just one ingredient can fail.

Why Do AI Initiatives Succeed?

AI initiatives (and undergoing an applied AI transformation) succeed when decision makers like you try to better understand AI, including its benefits, opportunities, potential applications, and challenges. AI initiatives also succeed when the

why behind them is clearly and concretely established, is aligned to goals for both people and business, and is used as the North Star that guides everything else.

Further, AI initiatives succeed when the appropriate data and analytics organization is prioritized and built (some recommendations for which we cover in this book). This includes leadership, organizational structure, and talent that fills strategically appropriate analytics roles and responsibilities. This type of organization is able to do the following:

- Identify and prioritize AI opportunities.

- Help prioritize company-wide investment in AI.

- Cultivate AI adoption and alignment.

- Properly set expectations around AI initiatives.

- Generate a shared vision and strategy around AI.

- Help break down silos.

- Democratize data and analytics.

- Help continually advance the organization's data and analytics competency.

- Foster a cultural transition from a gut-driven, historical precedent–based, simple analytics–based organization to a data-driven and/or data-informed organization.

- Build, deliver, and optimize successful AI solutions.

Additionally, successful data and analytics organizations are able to properly assess their AI readiness and maturity level and identify gaps and develop a prioritized strategy for filling in those gaps. They are also able to analyze specific key considerations and any associated trade-offs on an initiative-by-initiative basis, similarly identify gaps and prioritize filling them, and also make the right decisions as needed throughout the initiative's life cycle.

Data and analytics organization members must be able to work cross-functionally and collaboratively with experts from all functional areas of an organization in strategic ways, and as needed. AIPB uniquely defines a high-level set of cross-functional experts who must work together during certain phases of AI initiatives to ensure successful outcomes.

Creating a real-world deliverable that delivers on its intended benefits requires an effective sequence of iterative phases, which the AIPB Framework uniquely defines in the context of AI. Each of these phases has a related output defined by AIPB as well, all of which are key ingredients of successful AI solutions. Understanding concepts that we discuss, such as scientific innovation, particularly in the context of AI, contributes to success, as well.

Harnessing the Power of AI for the Win

To help answer the questions and accomplish the goals discussed so far, this book presents the AIPB Framework that I have created based on my nearly 20 years of innovation experience and expertise. It is a formalization of the real-world strategies, approaches, and techniques that I've used successfully throughout my professional career, with companies spanning many industries and ranging from IndyCar racing teams, to early-stage startups, to large corporate enterprises. It also represents a unification of my expertise, knowledge gained from experience, and what I've found works best in the areas of business, analytics and product management and pursuing innovation in general.

I call it AI for People and Business (AIPB), because it is specifically focused on creating successful AI solutions for better human experiences and business success. AIPB will help executives and managers due to its unique and purpose-built North Star, benefits, structure, and approach. It is an end-to-end framework to guide pursuing AI initiatives, including everything from performing appropriate assessments, to developing an AI vision and strategy, through to building, delivering, and optimizing production AI solutions.

The intention of this book isn't to say that AIPB is *the* definitive framework that should replace everything else. In fact, as we will soon discuss, AIPB is high level and modular. This means that for your initiative or project, your team should use whatever subframeworks that it thinks work best (or those that I recommend, if preferred).

In explaining the framework that I've developed, my intention is to help guide your thinking at a high level so as to help eliminate some of the confusion that comes with trying to innovate with AI. Whether or not this particular framework is implemented, I think this discussion of AIPB and other topics covered in this book will provide a conceptual way of thinking about successfully using AI in an organization.

We cover the comprehensive, end-to-end AIPB Framework in detail in the next couple of chapters. The remainder of the book will cover almost everything

that any executive or manager should understand about AI at the appropriate level, with a primary focus on developing an AI vision and strategy. In my experience, developing an AI vision and strategy is what the target audience of this book tends to struggle with most.

This focus should help decision makers better understand AI and more confidently make decisions and investments around AI initiatives. If, by simply understanding the concepts presented by AIPB and the contents of this book, executives and managers are able to progress further ahead with advanced analytics than where they are today, that's a win.

About the Author

Alex Castrounis is the founder and CEO of Why of AI. He is also an adjunct for Northwestern University's Kellogg/McCormick MBAi program, where he created and teaches the program's core AI and machine learning course.

Alex has spent the last two decades advising businesses of all sizes, from startups to Fortune 100s, on how to use data, analytics, and technology to drive business and customer success. A significant part of his work has been helping companies embed artificial intelligence, machine learning, and data science into every facet of their decision making, operations, and products.

Outside of work, Alex is a husband and cat dad.