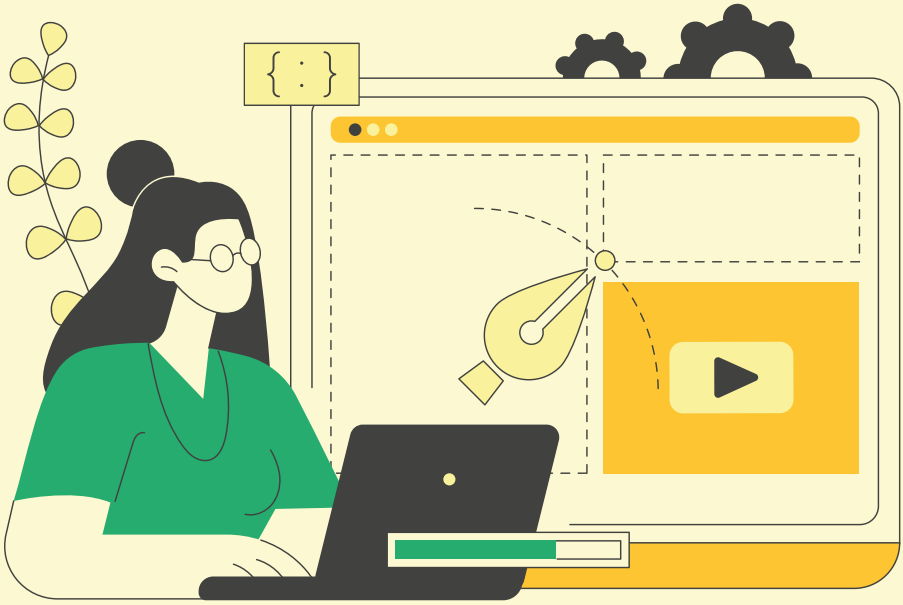

The Early-Career Professional's Guide to Generative AI

Opportunities and Challenges for an AI-Enabled Workforce

Jonas Bjerg

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To my late grandmother, Eva, who taught me how to love books.

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About the Author

Jonas Bjerg is currently an Expert Manager, Data Science, at Bain & Company Inc. He manages multiple cross-functional teams of data science specialists. He has previously lived and worked in big tech in Silicon Valley for a few years. He is a thought leader that presents at several conferences including Impuls 2023 and CPH AI HUB, topics that usually cover the future of AI and how businesses can utilize it to build an advantage. He has a successful YouTube channel about technology news that has more than 11,000 subscribers and millions in video views.

Acknowledgments

It does not do well to dwell on dreams and forget to live.

—Albus Dumbledore

It has always been a dream of mine to publish a book one day. The journey to this publication has been an adventure with a steep learning curve. But I can't dwell on it any longer; now, I must return to living.

This book would never have come to be if it weren't for all my great teachers, colleagues, and friends.

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CHAPTER 1

Introduction

Almost every headline today is about how artificial intelligence (AI) is going to ruin the world. It will take all our jobs and leave us all in the dust as soon as Artificial General Intelligence (AGI) comes along. This narrative bothers me immensely. It bothered me enough to start writing this book. Make no mistake, AGI is indeed coming, and it will never be the same again once it gets here. But the same could be said for the writing press, the Internet, or every other major historical invention. Anyone who claims to know when or how our world will change instantly is lying to themselves and to everyone else. The doomsday narrative currently dominating the headlines helps nobody except those selling newspapers.

Some experts have said that they fear the development of AI, and some have even started advocating for a total ban on all AI research and development. I sympathize with these experts' perspectives. This book is not an attempt to discredit the potential detriment a mean-spirited AGI can have on our world. But I don't believe we can stop the development, not even with a global ban tomorrow. The genie is out of the bottle, so what is next? The newspapers want us all to panic—and buy tomorrow's paper. I agree with the need for oversight and regulation, but I disagree entirely with the panic agenda. Moore's law states that the number of transistors in an integrated circuit doubles every two years. This law has been in effect for decades, since 1965, and lately, it has proven too slow to keep up with the recent surge in processing power improvements, according to Nvidia CEO Jensen Huang at the GTC conference 2023.

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Regarding chip manufacturing, Moore's law is struggling to keep up nowadays, presumably due to the rise in demand from the AI industry. The fact that something will be better in the future is almost a universal truth regarding technology. Very few things decrease in technical capability over time. Total bans on nuclear technology or illegal drug development have done very little to slow their technological progress. So, if we accept that AI is here to stay, what's next? And how should we prepare for such a future?

I'm writing this book primarily to help students because I believe this doomsday narrative hurts them the most. Students today have to pick a profession, spend a little decade mastering it, and hopefully start making a living off it. This takes dedication and willpower. And it only gets harder if everyone around you keeps telling you that your job will be replaced tomorrow, so why even bother? This word "soon" also bothers me. They don't know. The experts don't even know. Five to ten years ago, all experts agreed that it simply was a given that creative jobs would be the hardest for an AI to replace. This prediction was made almost unanimously by all industry experts at the time. They didn't know how a simple transformer model could impact the world. The ironic part is that the transformer model that proved capable of these creative tasks was first published in a paper in 2017, but no expert managed to put two and two together in time to correct their prediction. Granted, the fact that experts made this statement probably also impacted investors' willingness to throw larger amounts of money toward solving these "most difficult AI problems," but the statements were proven entirely wrong, and creative jobs were, in fact, some of the first to be threatened by AI—threatened even before all the other "repetitive tasks," which were supposed to be the easiest ones to replace. Even self-driving cars have been projected to be solved by 2020—that didn't happen, at least not for level 4 autonomy, but we are very close. If the experts can't accurately predict which areas will be automated first, how is anyone else supposed to? The concept of "soon" can change with a single discovery. Superconductors at room temperature were thought to be a science fiction thing of the future, but scientists from Korea University in

Seoul got incredibly close recently. It didn't turn out to be the final solution to superconducting we were hoping for. Still, the Korean learnings will undoubtedly help the next scientist get even closer—turning the "soon" into a "now" sooner than any expert can predict.

Welcome to *The Early-Career Professional's Guide to Generative AI*. My name is Jonas Bjerg, your frustrated narrator, who will do his utmost to explain the world of artificial intelligence (AI) in as simple terms as I can manage. Even if you don't know anything today, this book will show you all the interesting nooks and crannies of AI as it stands today and give you an overview of the fundamentals of AI as well as its potential impacts on the world, as I see them—expecting to be proven wrong on several counts, like countless experts before me.

Before we delve into AI's complexities and opportunities, let's start with the classic, "Who am I, and why am I qualified to even talk about these topics?"

I've had the privilege of studying at two of the world's premier institutions. I was fortunate enough to study under some of the best minds in the field; their insights and cutting-edge curriculum shaped my understanding of AI and its potential—it laid my foundation.

I've studied law, international business, and business analytics (the core data science part). After graduating with top marks and all the bells and whistles I could dream of, I entered the tech arena, landing a coveted position at one of Silicon Valley's top tech firms. Here, I was exposed to the rapid advancements in technology and the practical applications of AI. This hands-on experience and my academic background gave me a holistic view of AI's capabilities and shortcomings.

I am wearing the hat of a data science expert manager at Bain & Company, a globally renowned consulting firm. In this role, I've consulted for some of the world's most influential companies, advising them on advanced analytics and the transformative power of Neural Networks and AI in general. If I were to put a holistic tagline to my current job, it would be as pretentious as, "We help people do the impossible," and

the secret sauce that allows us to do it is almost always statistics and AI—from building and deploying countless neural networks to tackling unconventional problems that haven't been solved before. One of my more memorable projects involved predicting characters' fates in the final season of "Game of Thrones"—a blend of pop culture and advanced technology! Another project that stands out is developing a model to predict the likelihood of product returns at the point of purchase. It offers businesses invaluable insights to optimize their operations and lower their emissions.

Beyond my work, I've become somewhat of an AI evangelist, speaking at various international forums and conferences where I am sharing my knowledge and insights on AI's impact on society.

I've engaged in enlightening debates with thought leaders, industry experts, and curious minds worldwide.

I cringe rather harshly writing down these "accomplishments," but I think they are important for you, the reader, to know before we proceed.

Now, back to the regularly scheduled programming. As I pen down my thoughts in this book, the world stands at a pivotal moment. In recent years, these moments seem ever more frequent. This time, it is because of the emergence of ChatGPT from OpenAI. This groundbreaking technology has provoked and impressed almost every industry—evoking every emotion from awe to anxiety. The headlines provide no solace here. Many are apprehensive about the future, fearing job losses due to rapid AI advancements. But if history has taught us anything, progress, while challenging, often paves the way for broader opportunities and growth. This is not apparent if one only reads the recent news articles. Through this book, I aim to share my convictions, insights, and vision for an AI-integrated future, hoping to provide clarity and optimism in these exciting yet uncertain times.

First, I will explain the core building blocks that make up the current landscape of transformer models and, more broadly speaking, AI as a whole. Once a basic understanding of these concepts is clear, we can

start the philosophical discussions and bring everything in a historic and societal context to help calm the doomsday-sayers. It is not the first time a new technology has significantly changed our world, and it won't be the last. So, let's learn from the past and act accordingly in an informed way.

The latest significant breakthrough in mainstream media is ChatGPT. And it truly is a remarkable achievement in the realm of artificial intelligence. But what is it actually? The "GPT" in its name has coined quite a number of phrases in pop culture, but what does it stand for? "Generative Pretrained Transformer." To break it down:

- **Generative:** This term indicates an ability to generate output, often in the form of text. Rather than just analyzing or processing information, it can produce entirely new content, often with a level of coherency and creativity that rivals human output.
- **Pretrained:** This means that the model is "fine-tuned" for specific tasks. Essentially the model undergoes extensive training on vast amounts of data. This pre-training phase equips the model with a broad understanding of the broader contexts, for example, language, syntax, etc., enabling it to tackle various tasks immediately, without first requiring to train on additional data from scratch.
- **Transformer:** This refers to the model's architecture or framework. This secret sauce that made ChatGPT so much better than previous models. The Transformer architecture revolutionized the field of deep learning, especially for tasks involving context. It allows models to pay selective attention to different parts of the input data, thereby understanding context and relationships more effectively.