



# GENERATIVE AI IN PRACTICE

100+ AMAZING WAYS  
GENERATIVE ARTIFICIAL  
INTELLIGENCE IS CHANGING  
BUSINESS AND SOCIETY

BERNARD  
MARR

WILEY



# **GENERATIVE AI IN PRACTICE**



# **GENERATIVE AI IN PRACTICE**

**100+ AMAZING WAYS  
GENERATIVE ARTIFICIAL  
INTELLIGENCE IS CHANGING  
BUSINESS AND SOCIETY**

**BERNARD MARR**

**WILEY**

This edition first published 2024

© 2024 by Bernard Marr

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by law. Advice on how to obtain permission to reuse material from this title is available at <http://www.wiley.com/go/permissions>.

The right of Bernard Marr to be identified as the author of this work has been asserted in accordance with law.

#### *Registered Offices*

John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, USA

John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

For details of our global editorial offices, customer services, and more information about Wiley products visit us at [www.wiley.com](http://www.wiley.com).

Wiley also publishes its books in a variety of electronic formats and by print-on-demand. Some content that appears in standard print versions of this book may not be available in other formats.

Trademarks: Wiley and the Wiley logo are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates in the United States and other countries and may not be used without written permission. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc. is not associated with any product or vendor mentioned in this book.

#### *Limit of Liability/Disclaimer of Warranty*

While the publisher and authors have used their best efforts in preparing this work, they make no representations or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives, written sales materials, or promotional statements for this work. This work is sold with the understanding that the publisher is not engaged in rendering professional services. The advice and strategies contained herein may not be suitable for your situation. You should consult with a specialist where appropriate. The fact that an organization, website, or product is referred to in this work as a citation and/or potential source of further information does not mean that the publisher and authors endorse the information or services the organization, website, or product may provide or recommendations it may make. Further, readers should be aware that websites listed in this work may have changed or disappeared between when this work was written and when it is read. Neither the publisher nor authors shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

#### *Library of Congress Cataloging-in-Publication Data:*

Names: Marr, Bernard, author.

Title: Generative AI in practice : 100+ amazing ways generative artificial intelligence is changing business and society / Bernard Marr.

Description: Hoboken, NJ : John Wiley & Sons, Inc., 2024.

Identifiers: LCCN 2024000295 (print) | LCCN 2024000296 (ebook) | ISBN

9781394245567 (cloth) | ISBN 9781394254255 (adobe pdf) | ISBN

9781394254248 (epub)

Subjects: LCSH: Artificial intelligence—Economic aspects. | Artificial intelligence—Social aspects.

Classification: LCC HC79.I55 M36528 2024 (print) | LCC HC79.I55 (ebook) |

DDC 658/.0563—dc23/eng/20240111

LC record available at <https://lcn.loc.gov/2024000295>

LC ebook record available at <https://lcn.loc.gov/2024000296>

Cover Design: Wiley

Cover Image: © Jannatul Koraise/Adobe Stock

Set in 11/14 pts Minion Pro by Straive, Chennai, India

To my wife, Claire, my anchor in the shifting seas of life, whose love lights the way through every storm. And to my children, Sophia, James, and Oliver, my brightest stars in the vast universe, who remind me every day that the most profound truths often come from the simplest curiosities.





# CONTENTS

|  |           |
|--|-----------|
| <i>About the Author</i>  | <i>ix</i> |
| <i>Introduction</i>  | <i>xi</i> |
| <b>Part 1 Setting the Scene for an AI Revolution</b>                               | <b>1</b>  |
| 1 Unveiling Generative AI: A New Frontier  | 3         |
| 2 Tracing the Evolutionary Blueprint of Generative AI                              | 17        |
| 3 Revolutionizing Societies and Business Ecosystems                                | 29        |
| 4 Risks and Challenges to Manage   | 45        |
| 5 Impact of Generative AI on Jobs  | 63        |
| <b>Part 2 Generative AI in Practice</b>  | <b>77</b> |
| 6 A New Dawn in Media and Entertainment  | 79        |
| 7 Advertising and Marketing: Bridging Creativity with AI                           | 97        |
| 8 Reinventing Customer Engagement through Intelligent Systems                      | 109       |
| 9 Retail Reimagined: The Rise of Virtual Try-ons, AI Shopping Assistants, and More | 121       |
| 10 Personalized Learning: The Future of Education                                  | 133       |
| 11 Healthcare Transformation: From Personalized Advice to Operational Improvements | 143       |
| 12 Video Game Design and Testing: The Generative AI Approach                       | 155       |
| 13 The Legal Sphere: AI-Assisted Document Creation and Review                      | 165       |
| 14 Crafting Tomorrow: AI in Design and Development                                 | 173       |
| 15 Banking and Financial Services: AI as a Disruptive Force                        | 189       |
| 16 Coding and Programming: The AI Revolution                                       | 201       |
| 17 Data Insights: Harnessing the Power of Generative AI                            | 211       |

## CONTENTS

|               |   |            |
|---------------|---|------------|
| <b>Part 3</b> | <b>Moving Forward with Generative AI</b>                              | <b>223</b> |
| <b>18</b>     | Implementing Generative AI: Keys for Success                          | 225        |
| <b>19</b>     | Glimpses of the Future: Predicting the Trajectory of<br>Generative AI | 241        |
|               | <i>Appendix: GenAI Tools</i>  | 249        |
|               | <i>Index</i>  | 271        |

# ABOUT THE AUTHOR

**Bernard Marr** is a world-renowned futurist, influencer, and thought leader in the fields of business and technology, with a passion for using technology for the good of humanity. He is a multi-award-winning and internationally bestselling author of over 20 books, writes a regular column for *Forbes*, and advises and works with many of the world's best-known organizations. Bernard has a combined subscriber base of 4 million people across his social media channels and newsletters and was ranked by LinkedIn as one of the top five business influencers in the world.

Bernard helps organizations and their management teams prepare for future trends and create the strategies to succeed. He has worked with or advised many of the world's best-known organizations, including Amazon, Microsoft, Google, Dell, IBM, Walmart, Shell, Cisco, HSBC, Toyota, Nokia, Vodafone, T-Mobile, the NHS, Walgreens Boots Alliance, the Home Office, the Ministry of Defence, NATO, and the United Nations, among many others.

Connect with Bernard on LinkedIn, X (@bernardmarr), Facebook, Instagram, and YouTube to take part in an ongoing conversation; subscribe to Bernard's podcast; and head to [www.bernardmarr.com](http://www.bernardmarr.com) for more information and hundreds of free articles, whitepapers, and e-books.

If you would like to talk to Bernard about any advisory work, speaking engagements, or influencer services, please contact him via email at [hello@bernardmarr.com](mailto:hello@bernardmarr.com).



# INTRODUCTION

It feels like generative AI has come out of nowhere, doesn't it? Perhaps you were happily going through life thinking artificial intelligence was something *other people* had to worry about. And then boom! Suddenly, everyone's talking about this new thing called "ChatGPT" and how it's going to take over everyone's jobs.

As you've no doubt noticed, there's a lot of hype around generative AI (or GenAI as I call it in this book), and tools like ChatGPT. I expect you've picked up this book because you want to cut through the chatter and understand just what the deal is with GenAI. Is it really worthy of the hype? How might GenAI impact your job? Should your organization be leveraging this technology?

To answer the first question, yes, GenAI really is worthy of all the noise. I believe it's one of the most powerful, transformative technologies that humans have ever had access to. It's right up there with the emergence of the internet. Seriously! We'll cover the second and third questions throughout this book but, spoiler alert, GenAI (probably) won't take your job. That said, it will almost certainly change the way you work. And yes, your organization should absolutely be looking to harness this transformative technology. That's why I wrote this book.

## The Incredible Impact of Generative AI

I'm not the only one convinced that GenAI is utterly transformative.

One study led by Harvard found that GenAI tools helped workers at the Boston Consulting Group gain a 40% performance boost.<sup>1</sup> We'll see many

## INTRODUCTION

examples throughout the book of organizations using GenAI to accomplish work more easily, lighten the burden of mundane tasks, and provide a better employee (and customer) experience.

GenAI will be so ubiquitous that Bloomberg predicts the GenAI market will explode from £40 billion in 2022, to a whopping US\$1.3 trillion by 2032.<sup>2</sup> What's more, according to research by McKinsey, GenAI could add up to US\$4.4 trillion in value to the global economy annually – and save up to 70% of workers' time.<sup>3</sup> It's no wonder McKinsey refers to GenAI as “the next productivity frontier.”

That's the economic impact, but what about our everyday lives and the way we do business? That, too, will be fundamentally altered by GenAI. We'll talk about the business and societal impact in Chapter 3, but to whet your appetite, GenAI will change how we work, how we shop, how we consume content, how we experience healthcare, how we learn (at school and otherwise), how we play video games, and even potentially how we date. Adam Selipsky, CEO of Amazon Web Services, says GenAI will “pretty much change every application inside of companies, every application that consumers interact with. It is a profound technological change that we're still at the very beginning of.”<sup>4</sup> I couldn't agree more.

But wait, back up a minute . . . US\$4.4 trillion in economic benefit? I know what you're thinking. *How the heck can chatbots add so much value?*

## Because Generative AI Is More than Chatbots

We'll delve into a more detailed definition of GenAI in Chapter 1, but for now, all you need to know is that GenAI is a facet of artificial intelligence that allows computers to create content, including (but not limited to) text. One of the ways in which this technology can be harnessed is through more intuitive, more responsive chatbots – chatbots with advanced language capabilities that can respond to complex queries, and understand *context* as well as content.

ChatGPT is a chatbot. Developed by OpenAI and available free for public use (although a paid-for, upgraded version is available), it's probably the most

## INTRODUCTION

advanced chatbot we've ever seen. It can answer almost any question you throw at it. It's brilliant. It's a great example of GenAI in action. However, GenAI is much bigger than ChatGPT. And its uses extend far beyond chatbots.

Therefore, this is not a book about ChatGPT (although ChatGPT will obviously feature in several examples throughout). This book shines a light on the vast array of tasks that GenAI tools can accomplish – from designing video games to interpreting medical scans, and more. Yes, GenAI gives computers the ability to converse and answer questions. But it can do so much more on top of that.

Almost every time I type “GenAI,” I think of the word “genie.” And for good reason. Working with GenAI is a bit like having your own personal genie to help lighten the load, get more done, and generally make life easier. (If only it could grant infinite wishes. . .)

That said, as we'll see in this book, getting the best out of GenAI requires a balance between human expertise and machine intelligence. This isn't about total automation – it's about humans collaborating with GenAI to *do things better*. At the end of the day, GenAI is just a tool. An incredible tool. But a tool nonetheless – and it's up to us to use it thoughtfully.

With that in mind, my hope is that GenAI will be used not just as a productivity tool, but as a force for good in our world. As an example, in Chapter 11, we'll see how GenAI can be used to democratize access to healthcare for people around the world. And in Chapter 14, we'll see how GenAI is speeding up the process of discovering life-saving new drugs. True, it can also be used to generate fake content to sway elections or be harnessed by criminals for all sorts of nefarious purposes. But GenAI also has the potential to help solve some of humanity's biggest challenges.

## What to Expect from This Book

The bulk of this book focuses on practical applications of GenAI across a wide range of sectors. In other words, we'll explore how organizations are already using this technology – and, in the process, help you unearth

## INTRODUCTION

potential use cases for your own organization. That's the focus of Part 2 of this book, practical examples and takeaways from other organizations that have deployed GenAI.

Then in Part 3, we'll look at keys for success when implementing GenAI in your own business. Plus, you'll find predictions for the future of GenAI.

But before all that, Part 1 sets the scene for this powerful, transformative technology. We'll explore what the technology is, how it works, how it will change our world (and the world of business), and how it will impact jobs. We'll also take an honest look at the risks and challenges that surround GenAI.

Before you tuck into Part 1, it's important to note that GenAI technology is rapidly evolving. And it's getting better and better all the time. Indeed, one of the things that made this book challenging to write is the fact that the technology is advancing so darn quickly. Amazing new use cases and updates to GenAI tools were emerging literally every week. As an example, I'd barely finished writing Part 1 when OpenAI launched a new version of ChatGPT that could not just answer written questions, but also understand speech and visuals, and respond in an artificial voice.

Safe to say, by the time you read this, new tools and new examples will have surfaced that continue to surprise and delight. It's truly an exciting time.

## Notes

1. Enterprise workers gain 40 percent performance boost from GPT-4, Harvard study finds; *Venture Beat*; <https://venturebeat.com/ai/enterprise-workers-gain-40-percent-performance-boost-from-gpt-4-harvard-study-finds/>
2. Generative AI to become a \$1.3 trillion market by 2032, Research finds; *Bloomberg*; <https://www.bloomberg.com/company/press/generative-ai-to-become-a-1-3-trillion-market-by-2032-research-finds/>
3. The economic potential of generative AI: The next productivity frontier; *McKinsey*; <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier>
4. AWS CEO: Generative AI will 'pretty much change' every application consumers interact with; *YouTube*; <https://www.youtube.com/watch?v=jQ18HJkLJjw>



# Part 1

## **SETTING THE SCENE FOR AN AI REVOLUTION**

I said in my introduction that Generative AI (GenAI) is one of the most powerful technologies humans have ever had access to. But what exactly is GenAI and how does it work? How did we get to this point? And how, broadly speaking, might GenAI change our world?

In Part 1, we'll answer all those questions and more. We'll define *GenAI* and how it works, explore the evolution of GenAI until this point, outline the risks associated with GenAI, and take a big-picture look at how GenAI is going to change our world – including the jobs that humans do. This will set the scene nicely before we delve into GenAI use cases across various sectors and industries in Part 2.



# 1

# UNVEILING GENERATIVE AI: A NEW FRONTIER

Okay, let's go back to basics. What is generative AI (artificial intelligence)? How does it work? And what is the technology capable of? You'll find out in this chapter as we delve under the hood of GenAI, tug at a few wires, and examine what the heck's going on in there.

I really want this chapter to give you an inspiring feel for the many things that GenAI is capable of – but also to drive home the point that GenAI isn't just about ChatGPT (Chat Generative Pre-trained Transformer). Sure, ChatGPT is a prime example of GenAI (and it certainly hooovers up the majority of GenAI's press), but there's a lot more to GenAI than ChatGPT . . . as you'll find out in this chapter.

## **What Is Generative AI? A Quick Explanation**

Actually, let's start by defining artificial intelligence (AI) in its broadest sense. The term "AI" refers to computer algorithms that can effectively simulate human cognitive processes, like learning, decision-making, and problem-solving.

GenAI is a groundbreaking subset of AI – the cutting edge of the cutting edge – that is able to create new content based on patterns and structures it has learned from existing data. Like any AI, GenAI tools are given enormous amounts of data to learn from (what's known as "training data"). They learn

from the training data, and then use the patterns or rules that they've learned to create new content that's similar to, but not exactly the same as, the data they have been trained on.

### An example or two

A good example is DALL-E 2 – the text-to-art platform that allows anyone to generate artworks. Or, of course, there's ChatGPT, the language model that can create text based on conversational text prompts. (You'll find a much bigger list of GenAI tools in the Appendix, by the way.) These systems learn from huge training datasets – ChatGPT, for example, was trained on vast amounts of text from the internet, including web pages, articles, and books.

Text and images are perhaps two of the best-known uses of GenAI so far, but the technology is capable of so much more. With GenAI you can generate product designs, computer code, music, video, voices, and even entire visual worlds. We'll talk more about GenAI's capabilities later in the chapter, but to whet your appetite, imagine being able to create unique video game worlds rendered in real time, or have a book written *just for you*, or have your favorite celebrity read you today's news. The possibilities are mind-blowing.

The capabilities are already quite impressive, but in the future, GenAI systems will be able to create pretty much anything that humans can. And this, in turn, means GenAI can turn anyone and everyone into an author, musician, computer programmer, filmmaker, or other type of creator.

### How GenAI differs from the AI we are used to

AI is increasingly part of the world around us, including the search results you get on your phone, your conversations with Alexa, and the movie recommendations that Netflix serves up on an evening. So what makes GenAI different to these “traditional” AI tools? (I realize it sounds strange to refer to “traditional AI” when it's hardly been around that long, but I do so to distinguish between the AI that we're already used to in everyday life and this new evolution of AI systems. One technical term for traditional AI is “discriminative AI.”)

Traditional AI systems also learn from large amounts of data, but they deliver a different output. Traditional AI systems are used to make *predictions* based on existing data. And we use those predictions to help us make better decisions, at work and in everyday life. This could span anything from listening to new music on Spotify, and viewing recommended products on Amazon, to identifying which of your company's customers are most likely to buy a certain product.

This new wave of GenAI tools goes even further, by *creating new content* based on existing data. In other words, GenAI isn't just about simulating human cognitive processes like decision-making and problem-solving – it's about simulating *human creativity*.

To further illustrate the difference, imagine you're playing computer chess. The computer knows all the rules, can predict your moves, and makes its own moves. It's not inventing new chess moves; rather, it's selecting the right move based on existing strategies. That's traditional AI – it's like a master strategist who can make smart decisions within a set of rules. And it does it very well. But GenAI? Well, that could, in theory, come up with new ways of playing chess that we haven't invented yet.

So, traditional AI excels at pattern recognition, while GenAI excels at *pattern creation*. Which is very cool indeed.

That said, GenAI and traditional AI aren't mutually exclusive. They could be used in tandem to provide even more powerful solutions. For example, a traditional AI could analyze user behavior from your company's website, and then a GenAI could use the analysis to create personalized content for users.

## How Does Generative AI Work?

Think of it like learning to draw by looking at many pictures. After looking at many pictures, you try to draw something new on your own. GenAI does something similar: it "looks" at a lot of data (text, visual, or other), learns the patterns within that data, and then tries to create something new that fits those patterns.

So, in very simple terms, GenAI is like an artist or writer that has studied lots of existing works and then tries to create its own work based on what it has learned. This process is powered by complex algorithms that mimic how our brain works in order to learn from data and identify patterns.

That's the super-simple explanation. Let's get a little more technical.

### **Introducing machine learning and neural networks**

We'll talk more about the evolution of GenAI in Chapter 2, but as a quick primer, GenAI grew out of a field of AI study and practice called “machine learning” – indeed all of the AI we see today is based on machine learning. While traditional computer algorithms are coded by a human to tell a machine exactly how to do a particular job, machine-learning algorithms are able to make decisions based on what they learn from the data. The more data they're fed, the better they get at this process.

Another term you'll need to get to grips with is “neural networks,” as this is the core technology that GenAI is built upon. A neural network is essentially an advanced machine-learning model inspired by the way human brains work. While a less complex machine-learning model may need some human intervention in the process, a neural network has the ability to learn and make decisions by itself, and can even learn from its own errors – rather like the way a human learns through a process of trial and error.

Here's how a neural network works:

- **Training:** neural networks learn through a process called “training.” During training, the neural network is fed a lot of data (which could be text, images, or whatever), and it learns to identify patterns and relationships in the data.
- **Learning:** as the neural network is exposed to more and more data – and we really are talking about vast amounts of data – it gradually gets better at identifying patterns and understanding the underlying rules that govern the data.

- **Layers:** neural networks are organized into layers, and each layer is responsible for identifying different types of patterns. The initial layers might identify simple patterns, and as we move deeper, the layers are able to identify more complex patterns.
- **Generative models:** GenAI often uses specific types of neural networks called “generative models.” In addition to recognizing patterns, generative models are able to generate new data that is similar to (but not exactly the same as) the data they were trained on.
- **Input and output:** once the generative model is trained, you can give it an input (e.g., a partial image or a text prompt), and it will generate an output (like a completed image or a piece of text) based on what it learned during training.
- **Randomness:** GenAI introduces a certain amount of randomness in the generation process, which means that it can produce slightly different outputs each time, even when given the same input over and over again.

### Examples of generative models

I just mentioned generative models, the neural networks that enable GenAI to create new content. Here are some examples of generative models used in GenAI applications:

- **Large language models (LLMs):** by gobbling up large amounts of text, LLMs learn the semantic relationships between words and use that data to generate more language. An example of an LLM is GPT-4, created by OpenAI, which powers the ChatGPT tool.
- **Generative adversarial networks (GANs):** these work by pitting two competing algorithms against each other, one tasked with generating data that resembles its training data and the other tasked with trying to tell whether the output is real or generated. This type of model is typically used to create images, sounds, or even video (including deepfakes).
- **Variational autoencoders:** this is a type of model that learns how data is constructed. It's often used to generate synthetic data.

- **Diffusion models:** these work by adding random data (known as “noise”) to the data it’s learning about, and then figuring out how to remove it while preserving the original data. This way, the model learns what’s important and what can be discarded. Diffusion models are most commonly used in image generation.
- **Foundation models:** this is something of an umbrella term for models that are pre-trained on a broad range of data at an enormous scale and then fine-tuned for specific tasks. These are large-scale, general-purpose models that are the foundation of LLMs and other GenAI tools.

With different models able to do different things, it’s clear that GenAI has a wide range of applications. Which brings us to. . .

## What Can Generative AI Do?

In Part 2, we’ll delve into how GenAI is already being used in practice (with lots of real-world examples), but for now, I really want to make the point that GenAI is capable of creating all sorts of content.

## GenAI is so much bigger than ChatGPT

Of course, ChatGPT gets a lot of attention – and for good reason: it’s an impressive tool, and creating text is a major application of GenAI. Which is probably why “ChatGPT” and “generative AI” have almost become synonymous terms. But GenAI is capable of so much more than writing.

Take Coca-Cola’s Masterpiece advert, for example. A collaboration between human artists and GenAI, the ad brings many of history’s greatest artworks to life on the screen in a way that’s never been done before. GenAI has also been used to create a new Beatles song by rebuilding partially recorded lyrics by John Lennon, combined with new material by Paul McCartney.

But GenAI isn’t just relevant to creative content. It’s also being used to speed up drug discovery, with one UK company recently announcing that it’s created the world’s first AI-generated immunotherapy cancer treatment.



## UNVEILING GENERATIVE AI: A NEW FRONTIER

Then there's "generative design" – an emerging field where GenAI is used to create designs and production processes for new products. In one instance, General Motors used generative tools created by Autodesk to design a new seat-belt bracket that's 40% lighter and 20% stronger than its existing components.

And we can't talk about GenAI without talking about "deepfakes," which blur the lines between reality and fiction by making it appear as if real people have done or said fake things. GenAI is the technology behind deepfakes, and it's only going to get better at creating fake – but incredibly realistic – content. Deepfake Tom Cruise was one of the earliest and most famous examples (Google it if you haven't seen it – it's uncanny). More insidiously, potential candidates on both sides of the 2024 US presidential elections have starred in deepfakes designed to discredit them.

As if spreading false information wasn't bad enough, there are also outright criminal applications of GenAI, including attempts to extort money by staging hoax kidnappings using cloned voices, and, in one memorable example, fraudulently scamming money by posing as a company CEO.

As the technology has become more sophisticated, GenAI's capabilities have expanded greatly. To summarize, GenAI can be used to generate:

- Text
- Images
- Video
- Music and sound
- Designs
- Data analysis
- Computer code
- Synthetic data
- Research
- Video games and virtual worlds

Let's explore each usage in a little more detail.

## **Text – writing text that’s (pretty much) indistinguishable from a human writer**

Alongside ChatGPT, there are other generative text tools like Google’s Bard and Meta’s Llama. These tools can be used to write anything from essays and articles, to plays, poems, and novels.

Here are some of the incredible things that generative text tools can do for you:

- Writing assistants: helping you draft emails, reports, and other written materials efficiently.
- Creative writing: assisting authors in coming up with unique story ideas, characters, plotlines, or even drafting entire narratives.
- World-building: aiding authors in creating vivid and immersive worlds for their narratives, with tools that help outline histories, geographies, and cultures of fictional settings.
- Writing prompts: offering a variety of writing prompts to help writers overcome creative blocks and generate new ideas.
- Grammar and style corrections: offering real-time suggestions for improving the grammatical accuracy and stylistic fluency of written content.
- Translation assistance: help with translating texts to different languages while retaining the nuances of the original content.
- Accessibility: providing features like speech-to-text to help people with disabilities draft texts.
- Song writing: creating song lyrics, even in the style of your favorite artist.
- Recipe writing: coming up with recipes that suit your parameters (e.g., “a dinner recipe that uses butternut squash, feeds a family of four, and takes no longer than 45 minutes”).
- Plain-English explanations and text summaries: helping you understand a complex topic in plain English, or providing a succinct summary of a long piece of text.
- Multiple-choice questions: generating quiz or test questions for a variety of topics, to beginner, intermediate, or advanced levels.

- Travel itineraries: aiding you with everything from finding flights and accommodations to suggesting popular attractions to visit. Even where to get a good meal, based on your dietary needs and budget.

### **Images – creating images to your specifications**

Many GenAI tools – such as Midjourney or Stable Diffusion – can take a natural language prompt (i.e., regular, conversational language) and use it to generate a picture. Tell it you want an image of a two-headed dog wearing an Elvis costume flying a spaceship into a black hole and watch as it (or something close to it) appears before your eyes.

This can be useful for:

- Art creation: assisting artists in generating unique artworks by understanding and mimicking different art styles.
- Style transfer: enabling artists to apply the styles of famous artworks to their creations.
- Automated sketching: assisting in automatically generating sketches based on the descriptions provided, aiding artists in the initial stages of their work.

### **Video – from editing to creation**

While not yet as advanced as text or image generation, tools are beginning to emerge that allow us to create and edit video simply by describing what we want to see.

Typical uses include:

- Enhanced editing: automating intricate editing tasks including cut detection, color correction, and subtitle generation, thereby streamlining the post-production process.
- Dynamic special effects: allowing real-time rendering of high-quality special effects, motion tracking, and 3D modeling, significantly reducing the time and effort involved in post-production.

- 3D modeling: facilitating the creation of 3D models and environments for integration into videos, helping to create immersive visual experiences.
- Sound design and synthetic voice: enhancing audio experiences through AI-generated music compositions and synthetic voices. Which brings us to. . .

### **Music and sound – from voices to songs**

GenAI tools can create human-like voices (voice synthesis), allowing computers to speak words. They can also create music and sound effects.

In practice, this can be used for:

- Harmony suggestions: proposing harmonious chord progressions and melody lines.
- Generative music: creating entire musical pieces automatically based on a set of input parameters.
- Mood-based creation: offering tools that help composers create music tailored to specific moods or emotions.
- Voice synthesis: generating realistic voices that can read text naturally, providing a human-like auditory experience.
- Language and accent variability: offering a wide range of language and accent options, helping to create diverse and inclusive auditory experiences.
- Customizable voices: providing tools to create customizable voices, allowing users to personalize their auditory experiences.

### **Graphic design and generative design – streamlining design work**

GenAI offers huge potential for graphic designers and product designers to streamline the design process – from automating aspects of visual design to creating multiple product design variations.

Some of the ways this may prove useful include:

- Design suggestions: aiding designers by providing design suggestions.
- Color palette suggestions: providing suggestions for color palettes that work well.
- Stock image integration: offering seamless integration with stock image libraries, giving designers easy access to a wide range of resources.
- Architectural design: assisting architects in generating building designs optimized for specific criteria like materials cost, energy efficiency, and spatial requirements.
- Product design: helping designers to come up with optimized and innovative product designs by exploring a vast number of design alternatives in a short time.
- Fashion design: assisting fashion designers by proposing new clothing designs based on current trends, historical data, and designer inputs.

### **Data analysis and reporting – democratizing data analysis**

With GenAI tools, you don't need to be a data scientist to interrogate data. From generating automated reports to providing useful predictions, there are lots of ways GenAI can help businesses get the most out of data.

In terms of automated reporting, GenAI offers:

- Real-time reporting: offering tools that generate reports in real-time, providing up-to-date information for decision-making.
- Visual representation: creating visual representations of data, such as graphs and charts, to make reports more understandable and engaging.
- Natural language summaries: generating summaries of reports in easy-to-understand language.

And in terms of predictive analysis, GenAI can deliver:

- Anomaly detection: identifying unusual patterns in data that may indicate potential issues or opportunities.

- Forecasting and customer insights: utilizing historical data to make accurate forecasts about future trends, and identify customer preferences.
- Simulation and modeling: creating detailed simulations based on data analysis, allowing organizations to explore potential scenarios and make better decisions.

### **Coding – computer programming made simpler**

As well as ChatGPT, tools like Microsoft's GitHub Copilot and Amazon's CodeWhisperer make it easy for anyone to generate computer code with very little technical knowledge.

This can span:

- Code generation: creating code based on high-level descriptions or partially completed code.
- Code review: assisting in reviewing codes by identifying bugs, security vulnerabilities, and providing suggestions for optimization.
- Automated testing: creating tests automatically based on the software's specifications, helping to improve the software's reliability.

### **Synthetic data – solving privacy issues and more**

GenAI makes it easy to create entirely synthetic data for use in training other AI models. And for everyday businesses, synthetic data can help them overcome the privacy and data security obligations that come with real-world data.

In practice, this may include:

- Data augmentation: creating additional data through techniques like image augmentation to enhance the training of AI models.
- Privacy preservation: generating synthetic data that preserves the privacy of individuals by not using real personal data.
- Balanced datasets: creating balanced datasets that help in reducing biases in AI models, promoting more fair and equitable AI systems.