YOU
and the
INTERNET
of THINGS

A practical guide to understanding and integrating the IoT into your daily life

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Notice to Readers

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To my mother, Beda Martin, for her endless curiosity and open-mindedness. The world desperately needs both and I am grateful to have inherited my share from her.

Acknowledgments

For Ian, who is everything, most especially an urban planning nerd and excellent researcher. Thank you for your contributions to our beautiful life and to these pages.

Much gratitude goes to my amazing editor Eileen Velthuis for her fine eye and sure hand in shaping this book. A number of professional resources made this book possible. It simply could not have been written without the technology insight, wisdom, expertise, and patient good humor of my long-time friend and colleague, Steve Dotto of DottoTech.com. Don Lekei, founder and owner of Help My Tech has been a reliable go-to resource for technology troubleshooting and expertise both personally and professionally. I thank him for his willing input here, and also for reminding me of Arthur C. Clarke's Third Law.

I am also grateful for the good-natured answering of many questions and the insights offered by more recent acquaintances: John Biehler, tech journalist and editorial director of GetConnected Media, and Rob Richardson, Senior National Account Manager for Arlo Technologies in Canada. Thank you, too, to Ryan Bradt, Sean Crocker, Dr. Kendall Ho, Mark Milner, and Ginger Purgatoria for personal interviews. I would also like to make mention of the work of US-based

Preface

Any sufficiently advanced technology is indistinguishable from magic.

— Arthur C. Clarke
Profiles of the Future (revised edition, 1973)

In 2018, I applied to enter Simon Fraser University's The Writer's Studio Program. SFU is well-respected Canadian university and the program is highly regarded among writers. The Studio is offered either in person at the university's downtown campus or as a distance learning option. At the time, I lived in a Vancouver suburb that is an hour's drive from the downtown campus. I selected and was accepted by the campus-based program. One of the key reasons I chose to commute to classes rather than enjoy the convenience of the online program was that I wanted to be part of a community of writers, and as a baby boomer, I tend toward a preference for face-to-face engagement.

Once enrolled, my peers and I shared a desire to discuss our on-going work outside of the formal Studio setting. However, we were hampered not only by the geographic distance between us but also

by the unevenness of our individual adaptation to using communication technologies. The program itself was wonderful and I have no hesitation recommending it, but while commonly used cloud-based video conferencing tools such as Zoom, and software platforms such as Skype could have enabled us to communicate in real-time via video in between formal classes, there was an uneven distribution of computer skills and tech savvy amongst participants. This created a barrier to participation outside of face-to-face or in-class sessions.

This is one of the major challenges with technology. Not all users are created equal, and not all technology is simple to access. In the words of William Gibson, the American-Canadian speculative fiction writer, "The future is already here. It's just not evenly distributed yet." (*The Economist*, Dec. 4, 2003)

In part, I wrote this book to address a gap I see in the average consumer's understanding of the impact of the internet and the possibilities and potential afforded by a networked environment on our daily lives. If you are a techno-geek, a coder, or an early adapter to new technologies, this book isn't for you. You will already have an advanced understanding of the IoT and a deep personal or professional interest in the evolution of digital technology, and feel comfortable about making intelligent choices that impact your home, health, transportation, and leisure options. You will also have a good grasp of the cost of such technologies, the learning curve required to integrate them into daily life, and an awareness of the prevalent privacy and security concerns.

If, however, like me, you lived a good portion of your life in a wholly analog environment, you know the mental shift required to embrace the internet and the digital age. If you were born before about 1985, you didn't grow up with the internet, and you are not a digital native. Instead, you are what my good friend and colleague Steve Dotto, founder of DottoTech who is known as Canada's favorite geek, calls a digital refugee. You are new(ish) to learning the culture, language, and etiquettes of a brave new online world. And, like actual refugees, in some ways we are being forced to learn and adapt. We need supportive translators and guides, helping us find a way to navigate unfamiliar territory.

I was also inspired to write this book by my mother. In 2018, Angela Crocker and I coauthored *Digital Legacy Plan: A Guide to the Personal and Practical Elements of Your Digital Life Before You Die*

(Self-Counsel Press 2019). My mom, an avid reader with a deeply curious mind, read the book cover-to-cover in just a couple of days. I had hand-delivered her copy and during our visit, when she was already deep into the book, my very intelligent 80-year old Mom peeked over the cover and said, "Honey, what's a URL?"

Let me be clear. While my mother is not internet-savvy, she has and uses a smartphone, and she and her life partner use his personal computer for email to keep in touch with friends and family and to research, plan, and book travel and entertainment. They enjoy watching their Smart TV and using the Global Positioning System in their SUV. Neither of them can be characterized as "dear old things" wandering off into their sunset years. Mom recently celebrated her 80th birthday with a 40-day South Pacific cruise and plans to continue to travel the world and live a fully engaged life. However, she struggles to keep up with the terminology and the rapidly changing technological world. Because she is lively, vital, and endlessly curious she has a keen sense of the fear of missing out, what the kids call FOMO. She wants to know what's currently trending on Twitter, and to discuss what's popular on Netflix. She wants access to the gadgets and systems that will simplify everyday activities, and to participate in digital health solutions that will aid her quest for healthy longevity. More than that she wants a basic understanding of the risks and benefits of a networked digital life, and to be able to make intelligent choices about what to invest in.

This book isn't exclusively for the scenario of the 80-year-old parent I've outlined here, but if you are dealing with aging parents and have become the de facto tech support and family IT person, this book will help you help them. More importantly, if you, like me, are straddling the digital and analog worlds, or are part of the sandwich generation, assisting aging parents or relatives, while supporting young adults who may need to make a significant investment in changing technology — and navigating these advances in your own life, this book can help you as well.

I am the right guide for this journey. In the early '90s, I started encouraging clients to consider creating websites to get their message out and connect with customers and stakeholders. The internet was new, and the governments, not-for-profit agencies, and businesses I worked with then were cautious about this new technology. Nearly 20 years later I found myself making the same arguments to

clients about establishing social media profiles, working with hundreds of businesses, organizations, and individuals to help them overcome their reluctance to engage in social networking and the normal fear of investing in the unknown. In addition to nearly a decade of writing newspaper columns about the intersection of the analog and digital worlds, this is my third book related to digital topics. I predict that the IoT is the next big technological advancement that mainstream consumers need to deal with.

And, much as I did in the early days of websites and social media, I hope to provide some practical insight and useful tools to help you, dear reader, develop a level of comfort as you navigate myriad choices and opportunities.

Introduction

As a result of advances to sophisticated artificial intelligence, machine learning, automation, and augmented and virtual reality, the internet landscape is undergoing massive change. The internet is no longer just about accessing information via electronic devices such as laptops, smartphones, and tablets. From toasters to transit systems, we are now in the age of the Internet of Things (IoT) where interconnected devices and objects are fully networked and communicate data back and forth. Devices and objects learn from these data exchanges and adapt and respond to our personal needs and preferences.

From "smart" houses to "smart" cars, from cashless banking to wearable sensors that gather personal health data, new technological innovations and the resulting IoT are integrated with nearly all aspects of daily living, impacting health, home, transportation, shopping, travel, and entertainment. Soon, everything will be "smart."

What does this mean for you? This book is a guide to understanding the effects of soon-to-be common technologies on your daily life and how to use these technologies for increased safety, security, convenience, and quality of life. Whether you are a mainstream user of technology, part of the sandwich generation — that is, somewhere

between caring for aging parents and still supporting children, or a baby boomer trying to navigate the IoT age, this book is your roadmap. If you are not familiar with internet terminology, explanations of common terms are provided throughout the book. Even if you are not a user of computers, you are no doubt a user of things, and as more and more of the objects and gadgets we interact with daily become computerized and linked to the internet, you too will be transformed into a smart technology user. It is already becoming difficult to buy common consumer products such as a television set or a refrigerator that are "dumb" or not somehow connected to something else.

1. What Is the Internet of Things?

In simplest terms, the Internet of Things can be defined as the interconnection via the internet of computing devices embedded in everyday objects, enabling them to send and receive data without requiring human-to-human or human-to-computer interaction. This interconnection and data collection and analysis is what makes our homes, cars, and coffeepots "smart." In other words, our devices, appliances, vehicles, and houses are beginning to think for themselves.

Our smartphones have connected us to everything, and have become the hub, or central brain, that controls and integrates various apps, devices, and objects that can make up a user's personal IoT network. The smartphone is at the heart of the conversation among the "things," and typical smartphone use has moved far beyond its original purpose as a mobile telephone. In this book, we'll discuss the importance of the smartphone as a hub and look at other kinds of hubs. What are the key devices, apps, and functions needed to support the personal IoT network? How do these integrate with laptops, tablets, and intelligent virtual voice assistants such as Amazon's Alexa, Google's Google Assistant, and Apple's Siri? What are these assistants, how do they work, and what are the risks?

There are widespread concerns about the Internet of Things in regard to data collection and privacy, as well as justifiable fears about the overall security of integrated internet systems. We live in a time when we are trading privacy for convenience. I will aim to offer some reassurances and resources and look at what you can (and can't) do to safeguard privacy.

There is still some distance to go in terms of efficient and affordable fully networked systems. Even though appliances and devices

are equipped with the necessary microchips, sensors, and enabling technology, the tools and protocols are not yet standardized to enable devices with different vendor origins to communicate effectively. Smartphone apps, communication hubs, and cloud-based services are enabling us to control many elements of life remotely, but the sophisticated networks to run them are not yet fully synchronized. This is something we need to consider if our goal is a simple, affordable, and easy-to-manage system.

Systems are becoming more sophisticated all the time. I opened this book with a quote from Arthur C. Clarke: "Any sufficiently advanced technology is indistinguishable from magic." Of course, technology is not magic. It may seem so, simply because as laypeople we do not fully understand it. We find the terminology baffling and the scope and scale overwhelming. It may seem that IT people and technology experts are performing a kind of magic, having the special knowledge they do about what can seem to be a mysterious and mystifying world. Luckily, experts are available to us to help with specific problems and advice online and offline. As consumers, what we need to do is prepare to learn and to adapt as IoT technology changes. This book will help you do that.

2. How to Use This Book

This book offers a high-level look at the world of the Internet of Things as it relates to home life, leisure and entertainment options, health, and daily living. Together we'll explore how networked living offers a multitude of options in terms of lifestyle, convenience, cost savings, and the personalization of goods and services. It is by no means a definitive guide. The subject matter is simply too vast. My perspective is a practical one.

As a consultant and a coach, the big questions I always ask when embarking on a project or a set of new strategies are: What is needed here? What would be most useful? It would not be possible for a single book to capture the amazing array of technological choices available to us in today's world. Even as I write this sentence technology is advancing at lightning speed. This book also does not make a moral judgment about the current or future applications of artificial intelligence, robotics, or machine learning. There are many books and resources available on those subjects and many more that discuss the impact of the IoT on business and industry.

To answer my own question here, what is needed is a broad and basic understanding of the IoT and its terminology and acronyms such as virtual reality (VR), artificial intelligence (AI), and augmented reality (AR), to name a few. We need to understand and not fear machine learning and its impact on everyday life. What will be most useful is a set of tools to help make informed, cost-effective, and safe choices. Specific products, brands, and resources are mentioned throughout to provide examples and to help you sort through the many choices available. Their mention does not necessarily imply endorsement or recommendation. I encourage you to consult with product experts and do your own research. This book is not a technical guide to setting up or troubleshooting IoT systems, although I do offer tips and insights and some guidance to help inform your choices.

Smart products will come complete with instructions on installation, maintenance, and troubleshooting, and most will have online support available 24/7. As you make decisions about the role of the IoT in your daily life, remember our friends Google and YouTube, where you can search and find up-to-date, detailed how-to information on just about everything. Throughout this book I have included the advice and insight of a number of technology and IoT experts and where they can be found online. This book also includes a downloadable kit of worksheets (see the back of the book for a web link where you can find this) that you can personalize to help you navigate the world of the Internet of Things — our world — and make sensible choices. Hopefully, it will also help increase your awareness of the role and limitations of technology in your life and in the lives of your families.

While working on this manuscript, I joined a set of older family cousins for a holiday celebration. It was hosted by my aunt and uncle, both in their 70s. They are fit and active baby boomers who golf almost daily and travel extensively. My aunt, a self-proclaimed internet luddite, is happily using the IoT in the form of a Golf Buddy, a wearable GPS analysis tool to improve her golf game. My uncle is pondering the purchase of a fully robotic lawn mower. Our visiting cousins use FaceTime and Skype to stay connected with children and grandchildren while they travel, having mapped the driving route to us on their GPS. Technology touches on nearly all aspects of our lives. It is important that we use it wisely, trusting in our capacity to adapt to it and understand it.
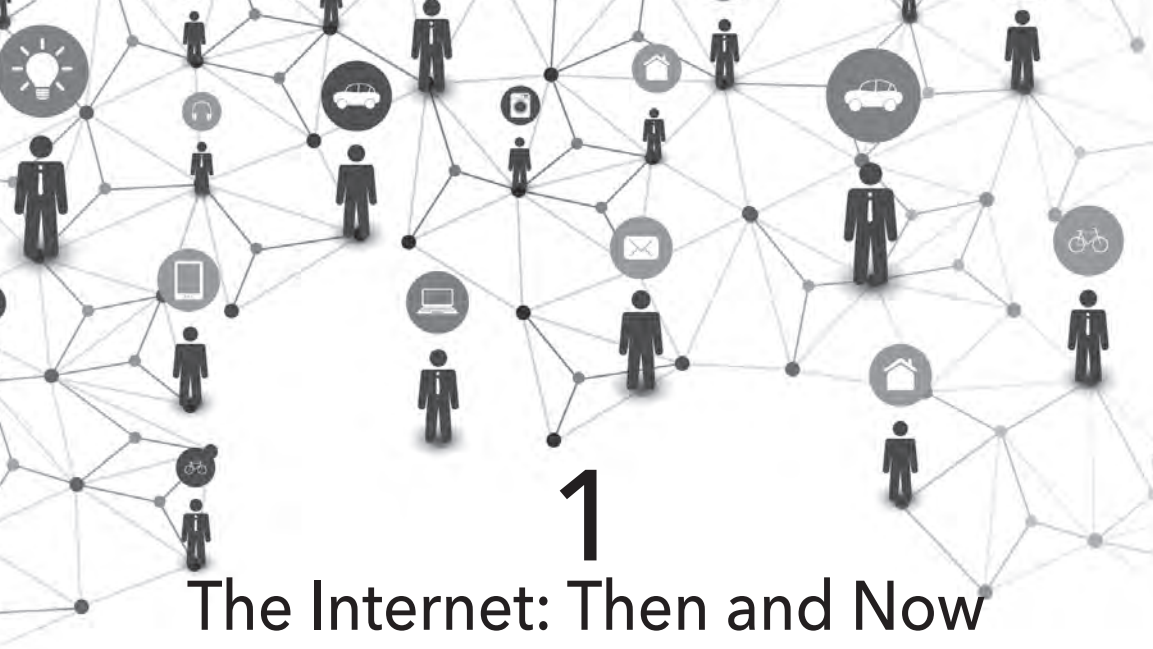
1
The Internet: Then and Now

As discussed in the introduction, we are in a new age where everything is connected to everything else. Before we get into detail about the revolutionary changes and adaptations enabled by the age of the IoT and how these might make your life easier, simpler, and more productive (or more fun!), let's spend some time examining where we currently find ourselves in terms of the digital world.

The early stages of the internet connected people to devices, data, and data management processes. Through personal computers we could connect not only to a staggering amount of information and data, but also to each other, first via message boards and email, and during the last decade, through initial social networking sites such as Facebook, Twitter, and LinkedIn.

Today, 40 percent of the world's population uses the internet. That is more than 3.9 billion people. More than 570 new websites are created every 60 seconds, and there are over 3.5 billion daily searches on Google. Per minute, 340,000 tweets are sent, with 500 million sent every day. Facebook has more than 2 billion active users with an average of 155 friends. Nearly 90 percent of the world's data has been created in the last two to three years. Most of us know and have used the internet as a tool for research, planning, and communication.

1. The Internet As a Research Tool

You are likely not a high school or university student, but perhaps you are a parent or grandparent of one. If you think back to your own student days, you probably spent long hours in the school, campus, or community library. You developed a good relationship with the local librarian or other subject matter experts and kept copious written or typed notes to track your research. Perhaps you conducted in-person or telephone interviews, and recorded them on a tape recorder or Dictaphone, later transcribing your notes to paper, filed by topic, name, or date.

If you were an academic or professional, you had access to journals or trade magazines and publications. Perhaps you did field research. Depending on your age, you may have had access to microfiche, or video, cassette, or film libraries as well. Back in the day, access to research was external — housed in institutions and somewhat difficult to access.

Even if you weren't a student, teacher, or industry professional, but simply a layperson with a practical need — say, for example you were planning a trip, or looking for a specific kind of professional or useful assistance — you needed either a referral from a trustworthy source, or you went to an expert, such as a travel agent, for example. Remember the Yellow Pages, the thick printed directory of businesses organized by category?

The internet changed all that. Essentially, the world wide web put the world of information at our fingertips. Via personal computers, we now have a single source for information. In reality, nearly everyone can get any information they need from a single desktop computer, laptop, tablet, or smartphone. You can easily store and archive anything that you need or that captures your interest, whether for personal, educational, or professional use. Digital information is here to stay, not subject to the degradation process that affects print and various kinds of film and tape. While the technology itself may change (remember floppy disks?), most hardware and software providers offer regular upgrades and updates to keep present-day technology current. The kind of information we have access to has also changed dramatically. Unlike traditional books, journals, or recordings, we can now access real-time audio, video, and live streaming on nearly any subject. This is "just-in-time" knowledge.

In terms of the internet as a research tool, it is not without concerns. Information on the internet changes and multiplies at a dizzying pace. The upside is that information can be constantly updated to maintain currency, and staying up to date is simplified for the researcher. The downside is that these resources are ephemeral. Websites may be neglected, and valuable information can be lost or ignored. Systems that are owned by government, nonprofits, businesses, schools, or individuals require human or financial resources and these may not be sustained over time. As well, a typical web search will return thousands of hits. Search algorithms have become extremely sophisticated (we'll deal more with this later) but it is still incumbent on the user to filter through the sites to weed out those that may be useless.

There is also an ongoing concern about the veracity or authority of online sources. Most professional or trade journals have a vetting process that includes meeting certain editorial standards for publication. Libraries and institutions have selection criteria for the purchasing of resources. The internet does not have these safeguards in place. In a way, the internet is a kind of wild west, enabling anyone with an opinion and basic technology skills the opportunity to present themselves as a subject matter expert via personal websites, blogs, or engagement in online forums and chat threads. In terms of online research, it is user beware. Users must exercise diligence and healthy skepticism in selecting online references and sources.

As I write this on my trusty laptop, I am referencing the work of other authors that I have downloaded onto my Kindle app on my tablet. My smartphone is by my side for quick Google searches. Several website tabs are open, and I am clipping references and resources to Evernote, appropriately tagged and notated. As a professional writer, the internet and its tools have made my job vastly easier. While early microprocessors purchased for home use were largely employed as video game consoles, rapid advances in technology and its applications, followed by the emergence of the Internet — the global system of interconnected networks and protocols that linked devices worldwide — enabled almost instant real-time communication. This convergence gave birth to new services such as email, internet telephony, internet television, online music, digital newspapers, and video streaming websites.

2. The Internet As a Communication Tool

For much of the last two decades our linked devices have provided us with an unparalleled ability to communicate across the planet. In 2004, Mark Zuckerberg and a group of friends at Harvard University devised an innovative social networking platform that connected fellow students in an online community. Today, Facebook has more than 2.2 billion users worldwide.

From the early days of Bulletin Board Systems (BBS) to email to the phenomenon that is social networking, the internet is a communication tool like no other and it has radically changed the way we communicate. In the last two decades, our devices and their enabling technology have proven to be a boon to person-to-person communication, but it is also changing how we engage with and access services and entertainment. Throughout this book we'll talk about how emerging technologies and machine learning are now enabling communication not only between people, but between devices, and the impact that this will have on our daily lives. For now, let's concentrate on how we've used the Internet as a human-to-human communication tool in the near past.

Do you remember your first email account? Mine was a personal account with AOL (America Online). One of the early pioneers of the internet in the mid-1990s, AOL originally provided a dial-up service to millions of early adapters. Dial-up services allowed connectivity to the internet through a standard telephone line. Shortly thereafter, my company obtained our first business email address. Our professional address was a lengthy one — about 25 characters. At the time we had absolutely no idea how much we would come to use that email address. Email started as a kind of a novelty, with most business then being conducted in person, by telephone, or through the fax machine.

For most mainstream home users of the internet, the motivation to obtain a home computer was driven by the desire to communicate with friends and family via the convenience of email. The continual evolution of communication technologies means we can now send, receive, and archive emails from our smartphones as well as access other communication tools such as Facebook Messenger, Instagram, and Twitter, and text apps such as WhatsApp, WeChat, LINE, and Viber. These days, almost the last thing we use our smartphones

for is as a telephone. FaceTime, Skype, Zoom, and other face-to-face video technologies enable us to connect across time and space in real-time conversations with anyone at any time.

3. The Internet As a Planning Tool

Partly because of their power to connect us to one another and partly because of their astonishing capacity to store and process data and information, computers and the internet have become the central pillars of personal and project planning. Over the last two decades we've come to rely on these tools in nearly every kind of business and industry. On the personal side, we use computers, laptops, tablets, smartphones and smartwatches to control our calendars, manage our money, shop, coordinate travel, and keep track of family and friends across the globe.

Leaving aside business and professional uses, can you imagine planning a family vacation without using the internet? What about booking service appointments, scheduling classes and leisure activities, or planning a party? Because internet use has become so completely integrated with the tasks of ordinary day-to-day life, we take for granted the scope of our reliance on it to support our basic needs and goals.

At this point it would be useful for you to take some time to assess your own (or your family's) internet use. It will help as you move toward making choices and decisions about increasing your commitment to learning about and integrating smart technologies into your daily life. Use Worksheet 1: Internet Use: Current Personal and Family Priorities to determine how much (or how little) you use the internet for research, planning, and communication now and how you anticipate using it in the future.

This kind of assessment will also help you identify your priorities. For example, perhaps you live in an area where home security is a major concern, or you have aging parents or relatives in your home who would like simplified internet access. Maybe you would like to streamline grocery shopping or meal planning? Working through a personal assessment should provide you with insight into what will work best for you and your family. It is the first step in making a simple and personalized plan for an integrated network. Keep in mind as you go, that the way you are using the internet today is not necessarily the way you will be using it tomorrow.

Worksheet 1
Internet Use: Current Personal and Family Priorities

Use this worksheet to understand the way you and your family are currently using the internet. We'll also refer to it later in the book to help determine whether or not you need more robust Wi-Fi in your home to support new Internet of Things technology.

	Family Member 1	Family Member 2	Family Member 3	Family Member 4
Name	Mom	Dad	Peter	Ellen
Research				
Evernote	☒	☐	☐	☐
Website bookmarks	☒	☐	☒	☒
Education accounts	☒	☐	☐	☒
YouTube	☐	☒	☒	☐
Recipes	☐	☒	☐	☐
Travel destinations	☒	☒	☐	☐
Major purchases	☒	☒	☐	☒
Other	☐	☐	☐	☐
Communication				
Contacts	☒	☐	☐	☒
Email	☒	☒	☒	☒
Messenger	☒	☒	☒	☒
WeChat	☐	☐	☒	☐
Viber	☐	☐	☒	☐
Smartphone	☒	☒	☒	☒
FaceTime	☒	☒	☒	☒
Skype/Zoom	☒	☐	☐	☒
Other	☐	☐	☐	☐
Planning				
Calendar	☒	☐	☐	☐
Travel booking accounts	☒	☒	☐	☐
Notifications and Reminders	☒	☐	☒	☒
Transportation options and reservations	☒	☒	☐	☐
Maps and directions	☒	☒	☐	☒
Other	☐	☐	☐	☐
Other Uses (list here)				
Note: Online entertainment and social media are covered in Worksheet 2.				
business laptop	☒	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

4. Welcome to the Internet of Things

For many years, I've had the pleasure of writing a regular digital lifestyle column for my local newspaper, one of Canada's Black Press publications. In a column in the early spring of 2019, I wrote about "domotics." Domotics (from the Latin word "domus," meaning house) combines domus with robotics, and is the term used to describe all phases of smarthome technology. It is the process or set of tools and devices that make up a "smart" home, comprising information technology, microtechnology, and electronics, including sensors and controls that monitor and automate temperature, lighting, security systems, and much else.

A smart house is one where highly automated systems govern the functions listed above. The list doesn't stop there. The integration of these technologies goes beyond obvious tasks such as turning lights off and on at preprogrammed times or automatically adjusting air conditioning or heating. Highly advanced systems will allow us to monitor and inventory the foodstuffs in our fridges, track menus and meal plans, and routinely order groceries, for example.

Domotics is only one aspect of the Internet of Things. It is a good place to start as our homes are such an important element of our lives. The home is the center of family life. It provides sanctuary and comfort, and it is the place from which we launch the practical aspects of our lives — where we eat, sleep, relax, and prepare ourselves to go out into the world of work and engage with the demands of daily life. We also have some control in our homes, and we are able to decide for ourselves how much, or how little, we will augment our domestic lives with technology.

In an article for ThoughtCo, a leading online reference and education site, author Jackie Craven suggests that, "The smarthome systems might even ensure a continuously cleaned cat litter box or a house plant that is forever watered." ("Exploring Home Automation and Domotics," ThoughtCo.com, February 19, 2019.) Further, wearable sensors can monitor which members of the family are at home, and where they are, adjusting the home environment based on the needs and preferences of the wearer. We already commonly use such tracking devices to keep track of iPhones, keys, and pets.

How might this improve the lifestyle and safety of the elderly aging-in-place, or people with disabilities? Geofencing is being

widely used in the IoT, creating virtual perimeters in real-world geographic areas, activating alerts or messages, triggered by location-based data.

Of course, many of our choices are dictated by the available technology. A rotary-dial phone is now only a collector's item. Telephone landlines are becoming a rarity, and data caps can limit smartphone use. Further, our personal choices are and will be limited (or expanded) by the positions taken by laws and regulations. For example, the introduction of emission controls on automobiles in the 1960s made certain kinds of car exhaust systems obsolete. The greening of the economy has forced automobile and other manufacturers to look for alternatives.

Social and economic trends, and changing legislation combined with advances in technology, can force consumer adaptation in the marketplace. The rise of electric propulsion fueled partly by government regulation and incentives is complemented by the increasing complexity of vehicles as environments for work and relaxation. Most of us are already using smart technology in our daily commute to make it more comfortable and time effective. We comfortably use the Global Positioning System (GPS) a satellite-based radio navigation system. Owned by the United States military, this is the technology that will enable driverless cars. Our cars are self-monitoring, notifying us when fuel or tires are low, or the engine needs servicing. Our smartphones are connected via Bluetooth to our car's audio systems, allowing us to personalize in-car entertainment, access the internet, and talk on our phones safely. We begin to take this kind of technology for granted soon after it is introduced.

Entertainment choices are already undergoing rapid change. For many, typical cable television is already obsolete, gone the way of the telephone landline. Known as cord-cutters, many television consumers are cancelling their cable accounts and moving to wholly internet TV-user apps such as Apple TV, Chromecast, or Amazon Fire TV. Live television streaming services such as Sling TV and DirecTV in the United States allow you to get most of your favorite stations streamed over the internet. Generally speaking, the fees are minimal compared to the average cable package and puts control of content in the hands of the consumer. Platforms such as Spotify and Apple Music make it possible to access millions of artists and playlists for a small monthly fee. Because of the IoT, you can listen to your favorite

songs, podcasts, or radio programs on your smartphone, portable speakers, car, computer, or television set.

The world's libraries are at our fingertips via e-reader devices and apps. I believe that paper books will always be available, but the capacity to have thousands of books on hand without taking up space, and the convenience of ebook reading is unparalleled.

Machine learning, artificial intelligence (AI) and automation, virtual reality (VR) and augmented reality (AR) are all having a profound effect on entertainment and leisure options. As these technologies become more sophisticated, so will the experiences available in regard to gaming and other leisure experiences such as travel, sports, and shopping.

Given the public interest in consumer electronics for improving health (think about the popularity of Garmins, Fitbits, and the health apps in Apple Watches, for example), there has been a rapid development and incorporation of digital medical technologies into the health-care system. It is important to build digital health literacy for patients, community members, and health-care professionals to respond to the emerging opportunities. The implications of data-based, tailor-made diagnoses and treatments are profound, not just for personal medical or health-care choices, but in the potential reduction of health-care costs. These apps and technologies not only help patients manage their own health, they help health-care practitioners facilitate and improve patient care.

5. Summing Up

We live in a world where we can communicate directly with machine intelligence through our voices, gestures, or keypads. As our machines become more familiar with our preferences, their ability to keep us safe, comfortable, healthy, informed, and entertained grows ever more precise.

Through the rest of the book I'll cover available and pending IoT options in more detail, and provide you with insights, advice, tips, and exercises to help you better understand how the IoT can fit into your life.