**Artificial Intelligence**

**101 Things You Must Know Today About the Future**

Introduction

Media stories about AI are often sensationalized, such as whether robots will take over all our jobs or when AI will become more intelligent than humans. However, these stories don’t provide much practical information about how AI will impact our day-to-day lives.

AI and its possible impacts on the world is one of the most important issues of our times. Whereas digital transformation and the use of AI used to be optional for companies and society, it will now be mandatory.

There are three critical aspects of AI to which we should devote more attention and resources worldwide:

1. Continuing the re-education efforts to help millions who will lose their jobs to AI, robotics, and automation.
2. Creating legislation and ethical standards for the use of AI, automation, and robotics to protect the general wellbeing of all humans fairly and equally.
3. Working to prevent technology addiction and other mental problems which can result from excessive use of AI.

This book provides simple examples of how AI will create new opportunities and challenges for both the business world and society in general.

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Chapter 1 Introduction to Artificial Intelligence

**1. What Exactly Is Artificial Intelligence?**

“The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision making, and translation between languages.”

“Using computers to do things that normally require human intelligence.”

“AI is software or a computer program with a mechanism to learn. It then uses that knowledge to make a decision in a new situation, as humans do. The researchers building this software try to write code that can read images, text, video, or audio, and learn something from it. Once a machine has learned that knowledge, it can be put to use elsewhere.”

“AI is the ability of machines to use algorithms to learn from data and use what has been learned to make decisions like a human would.”

What advantages do machines have over humans:

* Machines don’t need to take breaks.
* Machines can analyze massive volumes of information all at once.
* The ratio of errors is significantly lower for machines that perform the same tasks repetitively.

We’ll explore the ways that the development and adaptation of AI will open up new opportunities and challenges to both the business world and society as a whole.

The idea that computers or software programs can both learn and make decisions is particularly significant and it is because of these two capabilities that AI systems can now accomplish many of the tasks that were once reserved for humans.

AI-based technologies are already being used to help humans benefit from significant improvements and increased efficiency in nearly every area of life. Another benefit of AI is that it allows machines and robots to perform tasks that humans consider to be difficult, boring, or dangerous. In turn, this will enable humankind to do things that were once thought impossible.

One drawback to AI technologies is that machines will also be able to perform many tasks that currently require a human touch, which will significantly disrupt the labor market. AI also has the potential to cause political power struggles.

There are many AI-based applications in use today including:

* Static image recognition, classification, and tagging
* Algorithmic trading strategy performance improvements
* Efficient, scalable processing of patient data
* Predictive maintenance
* Object detection and classification
* Content distribution on social media
* Protection from cybersecurity threats

AI will give us the potential to better see, hear, and understand the world around us. AI will be able to make our lives easier by offering suggestions and predictions relating to important questions in our lives, impacting areas like our health, wellbeing, education, work, and how we interact with others.

**Machine Learning** – one of the primary approaches to AI, where machines have the ability to learn without being explicitly programmed. ML is broken down further into three areas **Supervised** (task driven; regression, classification), **Unsupervised** (data driven; clustering, relationships are discovered without human intervention), and **Reinforcement** (algorithm learns to react to the environment, these systems are not given explicit goals except to maximize some reward).

**Deep Learning** – a subset of ML that has networks which are capable of unsupervised learning from data that is unstructured or unlabeled. DL is one of the most powerful and fastest growing applications of AI and implements neural networks, which are layered to recognize complex relationships and patterns in data. DL requires huge datasets and huge computational power to function properly and effectively. Currently, DL is implemented in speech recognition, natural language processing, computer vision, and vehicle identification for driver assistance.

Refer to Andrew Ng course at ***deeplearning.ai*** and the website ***deeplearningbook.org***. One of the best and most trustworthy sources of up-to-date AI-related news is the ***AI Index*** at [www.aiindex.org](http://www.aiindex.org).

**2. Will Artificial Intelligence Be Able to See, Hear, and Understand?**

AI today has the ability to see (computer vision), hear (speech recognition), and comprehend (natural language processing). In the near future we will see achievements accelerate in these three technologies. We can be sure that AI will offer us immeasurable benefits when these systems are able to see, hear, and comprehend perfectly. Consider your own work. How could the application of one or more of these three AI technologies help you perform your work more efficiently?

Vision may be the most significant, as it offers the most beneficial uses for things like self-driving cars, facial recognition, drones, and robotics. In Lasse’s opinion, computer vision will be used just about everywhere, including in almost every device in your home and in every business. As with many other AI technologies, computer vision is now accessible to any company, organization, government, or individual via cloud-based computer vision services – CVaaS (computer vision as a service).

**3. What Makes Artificial Intelligence So Important Right Now?**

AI will soon power most of our activities in society and business, drastically affecting the way we work and live. “Learning how AI works and understanding its implications for our lives is at least as important as learning to read and write.” What trends drive the need to understand AI?

* **Speed of AI implementation** – at this point only a handful of people truly understand all of the implications these quickly evolving technologies will have for our world. The rapid adoption and implementation creates many opportunities and challenges.
* **Potential impacts of society** – the scope and diversity for adoption and implementation are huge.
* **Prioritization of AI by every large tech company** – nearly every big tech company is heavily investing in AI research and development which clearly demonstrates the importance that AI holds for businesses in general.
* **Shortage of knowledge workers** – there is a significant need for talent that can build out AI solutions and services. There is also a significant need for AI champions that can help translates AI benefits to increase adoption rates.
* **Companies that first apply AI correctly** – will confer significant first-mover competitive advantages.
* **Legal implications worldwide** – in almost every country, laws and regulations will need to be reviewed and updated to incorporate the new trends of the AI era especially in finance, transportation, and healthcare.
* **Ethical development** – companies should, in theory, develop new technologies ethically and responsibly to serve humanity and improve standards of living around the world.
* **Communication of advantages and opportunities** – sharing information about the benefits of AI will be an important factor in helping people to feel comfortable with adopting new AI technologies.[[1]](#endnote-1) In the future, the most productive members of society will work together with AI, forming robot to human partnerships and thus making their endeavors much more efficient. It is important to share knowledge with everyone on how this can be done properly.
* **Collaboration between private and public sectors** – in addition to large tech investments in AI, strong and open collaboration internationally is needed, as well as involvement by public and private sectors companies of all sizes.
* **Helping science to fight pandemics and other health crises** - countries that were best able to fight COVID, such and Taiwan and South Korea, used AI technologies to protect their citizens and to mitigate the outbreak. Countries should think diligently about investing in AI to help with preparing for and protecting against future health crises.
* **Vigilance about harmful and potentially dangerous AI developments is needed** – especially in instances where AI is used for surveillance and monitoring of citizens. According to “The Global Expansion of AI Surveillance” report, 75 countries currently use AI for surveillance purposes through smart city platforms, facial recognition, and smart policing. This is making governments more powerful and at the same time ignoring both civics and ethics.

**4. Is Date the New Oil?**

As you think about AI, you may ask questions like “Why is AI so important?” or “Why are so many large tech companies focusing their efforts on developing and applying AI tools?”

From a technology perspective the two key drivers are **computing power** and **data** (volume, velocity, veracity [quality]). “Data is the new oil.” Today, the world’s most valuable companies are often those that have access to the largest quantities of data. Just like oil, companies that had the earliest access to data, were quick to take advantage for their short-term financial gain without considering the possible long-term consequences of using them irresponsibly. In the future, we need solutions that will protect the security and privacy of user data, ensuring that it can be used and shared ethically.

Data, however, is better than oil because with proper access and insight it can be democratized. It is safe to assume that the technologies we have now will be even more powerful ten years from now as access to more data becomes available. Examples of technologies that will benefit are self-driving cars and interconnected smart cities.

Data comes in two primary flavors – structured and unstructured. Traditionally, structured data has been more often used than unstructured data. Structured includes simple data inputs like numerical values, dates, currencies, and addresses. Unstructured includes text, video, and audio. More recent trends in AI have made it possible to analyze more unstructured data results in application designed for recommendations and predictions. Merrill Lynch approximates that 80 to 90 percent of the world’s data is unstructured.

The five steps that big tech companies take to improve their AI solutions:[[2]](#endnote-2)

1. Obtain more data – the key idea here is that big tech makes their products / services so powerful, useful, and appealing that people willing give up their data privacy to use the product /services knowingly or unknowingly.
2. Betta AI-trained products – ensuring that AI-based tools create a personalized experience.
3. Greater number of users – grow user base through word of mouth and buzz.
4. Higher revenues – a larger number of users almost always means access to more revenue.
5. Access to high-quality data scientist and ML experts – as companies grow revenue, they are better able to attract some of the world’s top AI/ML experts.

These five steps form a virtuous cycle as show on the left. Eventually, the more data scientists and AI/ML experts that come to work for a company, the more significant their research in AI can be, which then allows the company to become not only more valuable but also better prepared for the future.

**5. How Rapidly is AI Technology Growing?**

If you consider all the tasks that AI-powered machines could actually perform, it would be mind-boggling! One of the key features of AI is that it enables machines to learn new things, rather than requiring programming specific to new tasks.[[3]](#endnote-3) This suggests that future computers will be able to learn and self-improve. Research **DeepMind**, a leading AI research company owned by Google. Look at **OpenAI**, a non-profit AI research company, that in 2018 created AI that was able to beat the top human teams in the multiplayer strategic game Dota 2. This achievement involved AI requiring teamwork and collaboration.

Even though AI has been successful at winning several games over humans, this does not mean that AI is even close to having human-level intelligence. It might have surpassed humans in mathematical intelligence, but it is nowhere near us in other areas of intelligence, including linguistic, spatial, musical, kinesthetic, interpersonal, and intrapersonal just to name a few. Also, AI cannot comprehend what it reads the same way we can because it lacks emotional intelligence. For humans, emotions often play a huge role in how we interpret and comprehend what we are reading.

The main focus for the next few years should be on how to apply AI correctly and ethically in several vital sectors such as education, health care, and business operations.

AI is becoming increasingly better at performing different tasks in the background utilizing sensors, devices, and intelligent systems, without us even noticing it. This is known as “ambient computing” and this ability will improve exponentially over time. Ambient computing is also helped by the reduction in size of devices that utilize AI such as those used in the Internet of Things. Additionally, as voice commands continue to become more commonplace things like personal assistants, there will be less demand for devices that require typing, such as smartphones.

Our daily lives will be interconnected with various businesses and services that will work for us automatically, without us actively requesting it, and sometimes without us even realizing it. It’s highly likely that by 2025 – 2027, so many things in our daily lives will function in an ambient environment. It will be like electricity is today: something that is always working in the background, which we never think about until it stops working.

**6. What is the Fourth Industrial Revolution and How is it Related to AI?**

In recent years there has been an enormous digital revolution, which initially began in the 1980s with the rise of personal computers and the birth of the Internet. Today, there are several new technologies that are little known by the general public but are already beginning to impact how we live and conduct business. This makes keeping up with the pace and complexity of innovation challenging especially when you consider that many technologies can be combined. In addition to AI, other influential and noteworthy include 3D printing, robotics, IoT, autonomous driving and robotics, nanotechnology, and quantum computing. The overarching challenge in all of this is that new technologies are often implemented faster than the average person takes to understand them. These technologies are formative of the Fourth Industrial Revolution.

**First Industrial Revolution** (18th to 19th century) – water and steam power

**Second Industrial Revolution** (1870 – 1914) – electricity, mass production, assembly line

**Third Industrial Revolution** (1980s – present) – digital, automation, personal computers, internet

**Fourth Industrial Revolution** (today and the future) – technology embedded in society, AI, robotics, nanotechnology, quantum computing, biotechnology, IoT, 3D printing, autonomous vehicles

AI is at the core of the Fourth Industrial Revolution. There are incredible opportunities available to anyone who truly understands the potential of the Fourth Industrial Revolution. Want to be relevant in the future job market or create a successful business venture? Learning about the foundational technologies of the Fourth Industrial Revolution and you’ll have more opportunities at your fingertips than you could ever fulfill!

While AI is important, it is equally crucial to appreciate the characteristics that make us uniquely human, valuing skills like social and emotional intelligence and creativity. Also, we are faced with not only the challenge of understanding new technologies but also knowing how to use them well and this involves upping our digital literacy and ability to understand digital marketing. Look at the book ***The Fourth Industrial Revolution*** by Klaus Schwab.

**7`. What are the Most Common Advantages and Disadvantages of AI?**

Generally, there is an imbalance in mainstream media coverage concerning the advantages and disadvantages of AI. For example, the enormous number of people that will lose their jobs to AI and automation is under-reported. The real challenge, once the benefits – which are over-reported – are reaped, is going to be how to re-educate

1. To what extent have people adopted AI without even realizing it? What are some examples of this “unaware” adoption. [↑](#endnote-ref-1)
2. Kai-Fu Lee, CEO of Sinovation Ventures [↑](#endnote-ref-2)
3. What are examples of this capability? DeepMind and its ability to learn how to play Go (2017) from scratch is an example, but how is this extensible to non-gaming applications? [↑](#endnote-ref-3)