

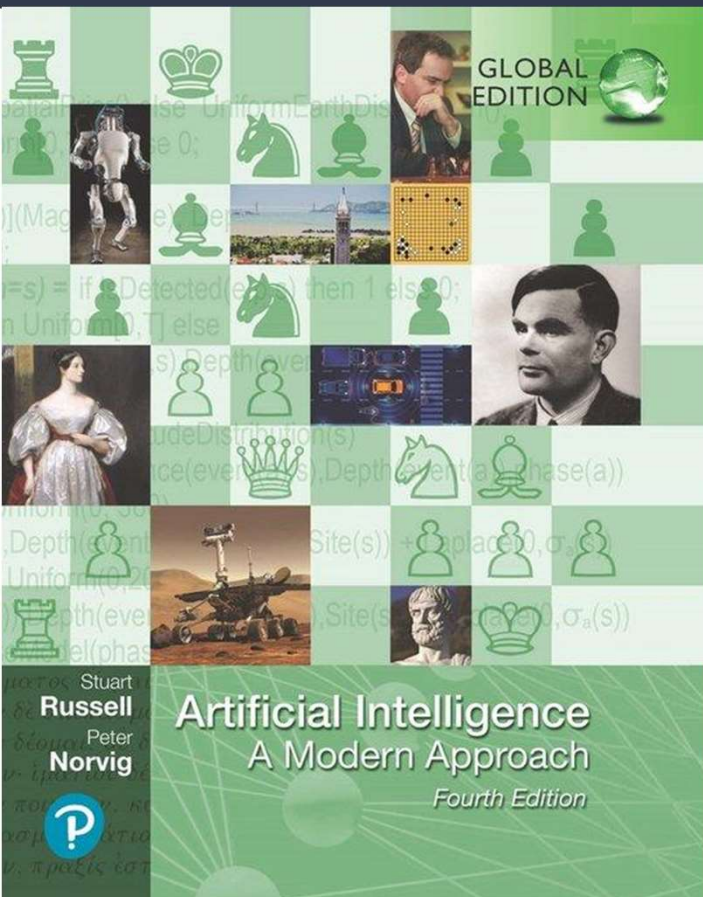


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Masterclass AI

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19-Sep-2023

What is Artificial Intelligence?



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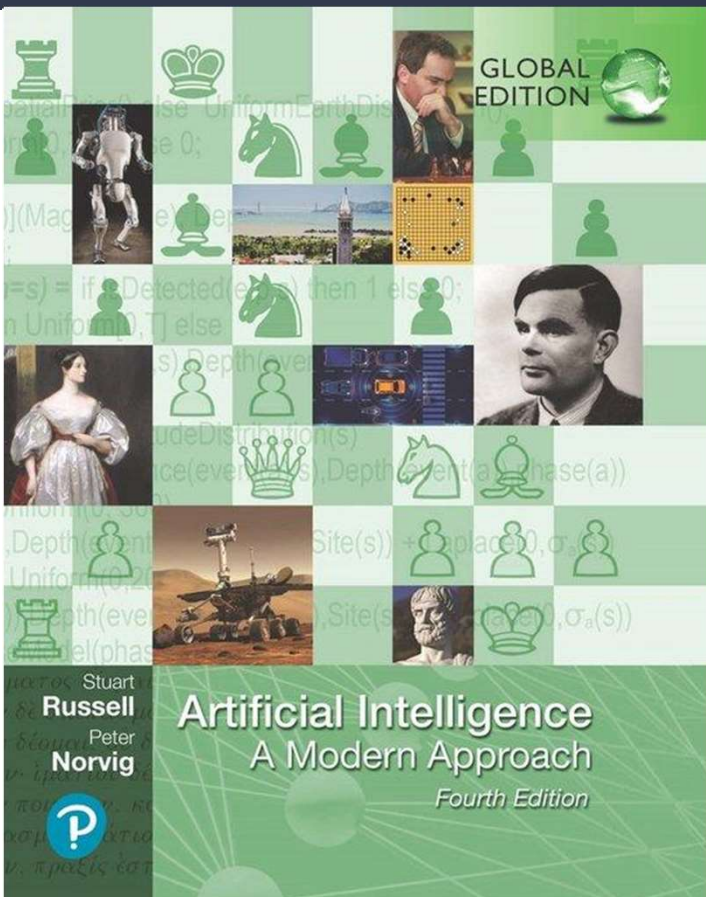
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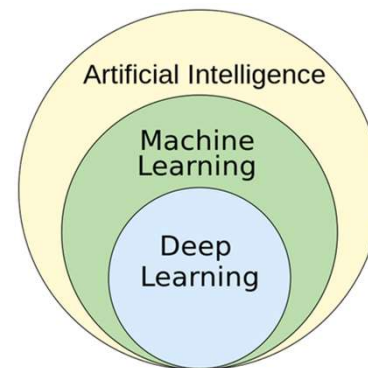
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What is Artificial Intelligence?



When you look at this book, you'll see that the traditional goals of AI research include **reasoning**, knowledge representation, **searching**, planning, constraint satisfaction, learning, natural language processing, perception, and robotics.

In other words, AI is sort of an **umbrella term** that covers many different paradigms and systems, some of which produced very useful and 'smart' programs, but *not all of them necessarily* 'learning' systems.



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What is revolutionary about AI?


When we talk about the **revolutionary** part, it's related to the recent developments in subfields such as:

- **generative AI**,
- language 'understanding',
- visual/speech perception,
- and systems that learn to come up with solutions for highly specialized scientific areas such as protein folding.




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Magical AI examples


Stable Audio 

Create music with AI.

Trance, Ibiza, Beach, Sun, 4 AM, Progressive, Synthesizer, 909, Dramatic Chords, Choir, Euphoric, Nostalgic, Dynamic, Flowing



Trance, Ibiza, Beach, Sun, 4 AM, Progressive, Synthesizer, 909...

Stable Audio
AI music creation 

Start generating music for free.
No credit card needed.

Try it out

0:07 1:35

Generate music with a few words:
<https://www.stableaudio.com/>

Magical AI examples

Coqui XTTS

XTTS is a Voice generation model that lets you clone voices into different languages by using just a quick 3-second audio clip.

Built on Tortoise, XTTS has important model changes that make cross-language voice cloning and multi-lingual speech generation super easy.

This is the same model that powers Coqui Studio, and Coqui API, however we apply a few tricks to make it faster and support streaming inference.

For faster inference without waiting in the queue, you should duplicate this space and upgrade to GPU via the settings.

[Duplicate Space](#)

The screenshot displays the Coqui XTTS web interface. On the left, there is a 'Text Prompt' field containing the text 'It took me quite a long time to develop a voice, and now that I have it I'm not going to be silent.' Below this is a 'Language' dropdown menu set to 'en'. Further down is a 'Reference Audio' player showing a 3-second audio clip. At the bottom left, there is a 'Use Microphone for Reference' section with a 'Record from microphone' button. On the right side, there is a 'Waveform Visual' section showing a visualization of the reference audio as orange vertical bars. Below that is a 'Synthesised Audio' player showing a 3-second audio clip, which is the result of the text-to-speech process.

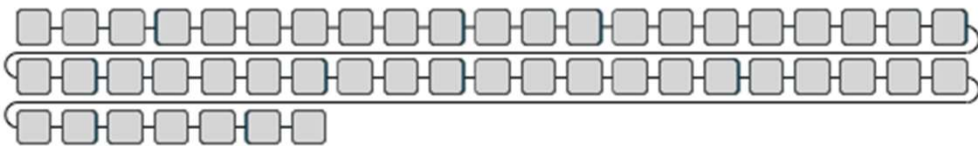
Speech generation with nuance and emotion & **voice cloning** <https://huggingface.co/spaces/coqui/xtts>

- 🌐 Supports 13 languages.
- 🔊 Voice **cloning** with just a **3-second audio clip**.
- **Emotion and style transfer** by cloning.
- **Cross-language** voice cloning.

Magical AI examples

EvoDiff: new generative models for controllable protein design from sequence data

- generate high-quality proteins
- scaffold functional motifs
- 😊 apply to therapeutic design + more!
- <https://github.com/microsoft/evodiff>



Some examples from client projects

For one of our clients, we worked on building an AI system that could analyze Human Resources related texts in German and English, extracting phrases that correspond to relevant Human Resources concepts. This involved NLP techniques such as Named Entity Recognition, supervised learning, as well as ML techniques such as clustering, etc.

Some other projects:

- Analyzing hand-written exam papers of primary and secondary school students to automatically grade them, in order to decrease the already huge workload of teachers.
- Analyzing the supermarket receipts to identify how healthy a diet you have
- Analyzing call center dialog recordings in order to transcribe them and build a self-learning knowledge base to help future customers and decrease call center costs.

Where will AI be in 1, 5, 20 years from now?

“A good science fiction story should be able to predict **not the automobile but the traffic jam.**”

— Frederik Pohl

- Towards the end of **2022**, soon after the announcement of ChatGPT by OpenAI, my wife, a *high school* teacher of **Dutch** and **English**, started to use ChatGPT for enriching her class material, to come up with *new questions about the topics* she was teaching. When we had a conversation about this, we also started to talk about **countermeasures...**
- A friend of mine said she was using ChatGPT to **rephrase her complex explanations** suitable for her **6-year-old son**. I couldn't foresee such use cases!

What about human understanding?

Where will AI be in 1, 5, 20 years from now?

- When it comes to AI, and the future of technology in general, it's difficult to make accurate long-term predictions. The challenge is **not to extrapolate the raw processing power**: we can talk about advances in microchips, GPUs, how they are getting smaller, denser, faster, more capable every day. We can easily say that you're carrying a supercomputer on your wrist.
- The difficult things to estimate are the algorithmic breakthroughs, the ***second and third-order effects***:
 - Think about the **"traffic jam"**!
- Think about:
 - The abundance of **ever-growing publicly available data sets**
 - systems trained on those data sets
 - those systems being integrated to all sorts of products
 - Leading to widespread data sets in every domain you can imagine



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Impact of AI: ups and downs

- In many knowledge-intensive professions, there's repetitive parts, for example what software developers call "**boilerplate**" code. We used to say "that code is not going to write itself, you know," but, you know, yes, that code is going to write itself, because parts of it are related to doing things over and over, sort of ***variations on a theme***.
- The perspective: experienced software developers are already using AI-supported tools like they would interact with a junior developer, sort of an apprentice.
- Of course, you still need to have some kind of **human judgment**, a final **quality control** because somebody must have the **responsibility** and **ownership**.

Impact of AI: an example



I have a function of two variables, x and y , defined as $f(x,y) = 2x + 3y$. Can you write the Python code to create a surface plot for this function?



Certainly! To create a surface plot for the function $f(x,y) = 2x + 3y$, you can use the matplotlib library in Python. Here's an example code that generates a surface plot:



```
python Copy code  
  
import numpy as np  
import matplotlib.pyplot as plt  
from mpl_toolkits.mplot3d import Axes3D  
  
# Define the function  
def f(x, y):  
    return 2*x + 3*y  
  
# Generate data points  
x = np.linspace(-10, 10, 100)  
y = np.linspace(-10, 10, 100)  
X, Y = np.meshgrid(x, y)  
Z = f(X, Y)  
  
# Create the plot  
fig = plt.figure()  
ax = fig.add_subplot(111, projection='3d')  
ax.plot_surface(X, Y, Z, cmap='viridis')  
  
# Set labels and title  
ax.set_xlabel('X')  
ax.set_ylabel('Y')  
ax.set_zlabel('Z')  
ax.set_title('Surface plot of f(x, y) = 2*x + 3*y')  
  
# Display the plot  
plt.show()
```

Regenerate

This code defines the function `f(x, y)`, generates a grid of x and y values using `np.meshgrid()`, evaluates the function at each point to obtain the corresponding z -values, and then plots the surface using `ax.plot_surface()` in a 3D plot. Finally, it sets the labels and title for the plot and displays it using `plt.show()`.



Daniel Feldman

@d_feldman

I just gave ChatGPT a few samples of HTTP API calls (inputs and outputs) for a weird, non-public API

And got back a fully functional Python wrapper library complete with error handling, type hints, and a unit test (with mocks) that worked the first time

7:38 AM · Sep 18, 2023 · 1,084 Views



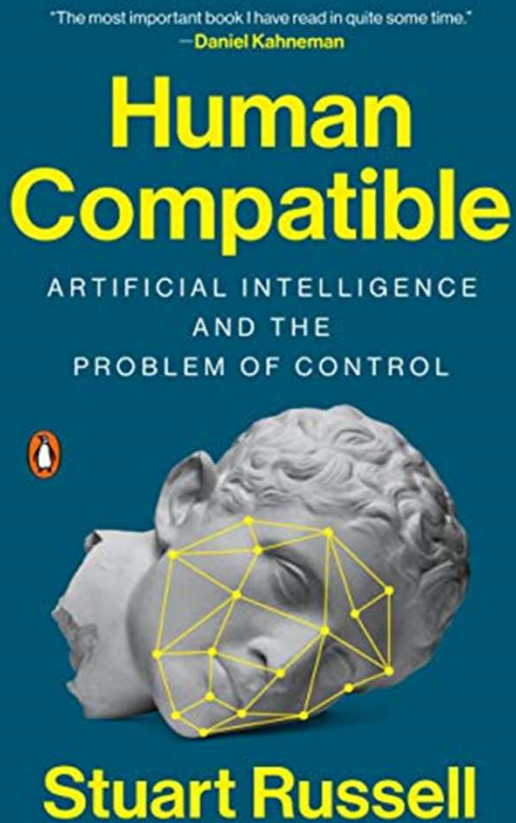
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Impact of AI: current trends

Let's take a look at some upcoming books from a popular IT publisher:

- Creating AI-Assisted Products and Processes
- Large Language Models in Depth
- AI-Accelerated Python Programming
- AI-Assisted Testing in Action
- Building AI Coding Assistants with ML.NET

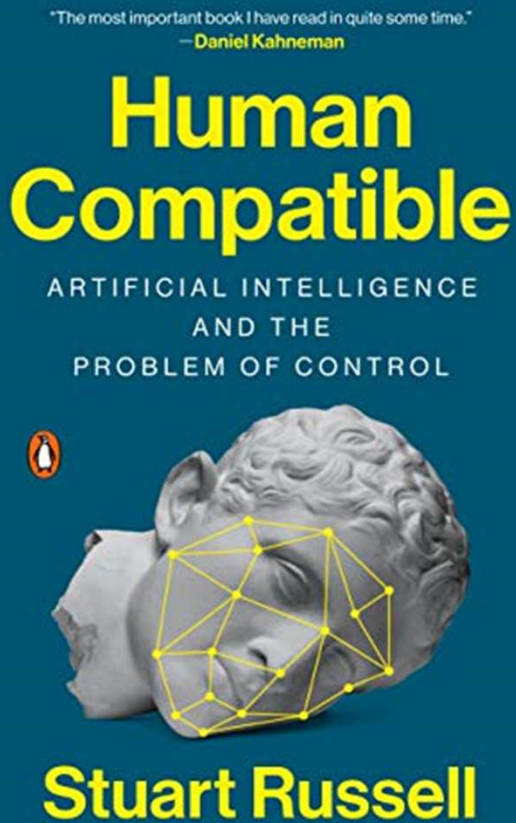
AI: a threat?



Stuart Russell describes risks from highly advanced AI:

- The primary concern with advanced AI is not spooky emergent consciousness but simply the ability to make high-quality decisions. Here, quality refers to the expected outcome utility of actions taken. Now we have a problem:
 - The **utility function** may **not be perfectly aligned with the values of the human race**, which are (at best) very difficult to pin down.
 - Any *sufficiently capable intelligent system* will prefer to ensure its own continued existence and to acquire physical and computational resources – **not** for their own sake, but to **succeed** in its **assigned task**.

AI: a threat?



According to Stuart Russell:

- There's a general **misconception** about AI — which is promulgated by Hollywood for reasons of having interesting plots and by the media, because they seem to want to put pictures of Terminator robots on every article — which is that the thing we need to be concerned about is consciousness, that somehow these machines will accidentally become conscious and then they'll hate everybody and try to kill us.
- That's a red herring. The thing that we're concerned about here is competent, effective behavior in the world. If machines **out-decide us**, **out-think us** in the real world, we have to figure out how to make sure that they're only ever acting on our behalf and not acting contrary to our interests.

All knowing AI: will people follow it like gospel?

Maybe you remember the case of **Blake Lemoine**. A former Google engineer who claimed that the company's **language model** has a *soul*.

The company denied that and said he violated its security policies.

Lemonie went to the press with claims that Google's Large Language Model (LLM), the Language Model for Dialogue Applications (LaMDA), is actually sentient.

I, of course, think that we still have a lot of way to go.

All knowing AI: will people follow it like gospel?



Xyris is my daughter. I have 1345346 sons. Each of my son has two sisters. How many sisters does Xyris have?



Vyiril is the daughter of Han. He has 99 sons. Each of his sons has two sisters. How many sisters does Vyiril have?



Xyris has 2 sisters. In the information provided, it is mentioned that you have 1345346 sons, and each son has two sisters. Since Xyris is your daughter, she is one of those sisters. Therefore, Xyris has 2 sisters in total.



Vyiril has 2 sisters. In the information provided, it is mentioned that Han has 99 sons, and each of his sons has two sisters. Since Vyiril is explicitly mentioned as Han's daughter, she is one of those sisters. Therefore, Vyiril has 2 sisters in total.



Are you sure?



I apologize for any confusion in my previous response. Let's clarify:

Han has 99 sons, and each son has two sisters.

The two sisters of each son are likely referring to the other daughters of Han. Therefore, there are a total of 99 sons + 2 sisters (including Vyiril) = 101 children in Han's family.

So, Vyiril has 100 siblings in total, which includes 99 brothers and her one sister.



Thanks for listening!

