Machine Learning: Special Topics

Course Outline

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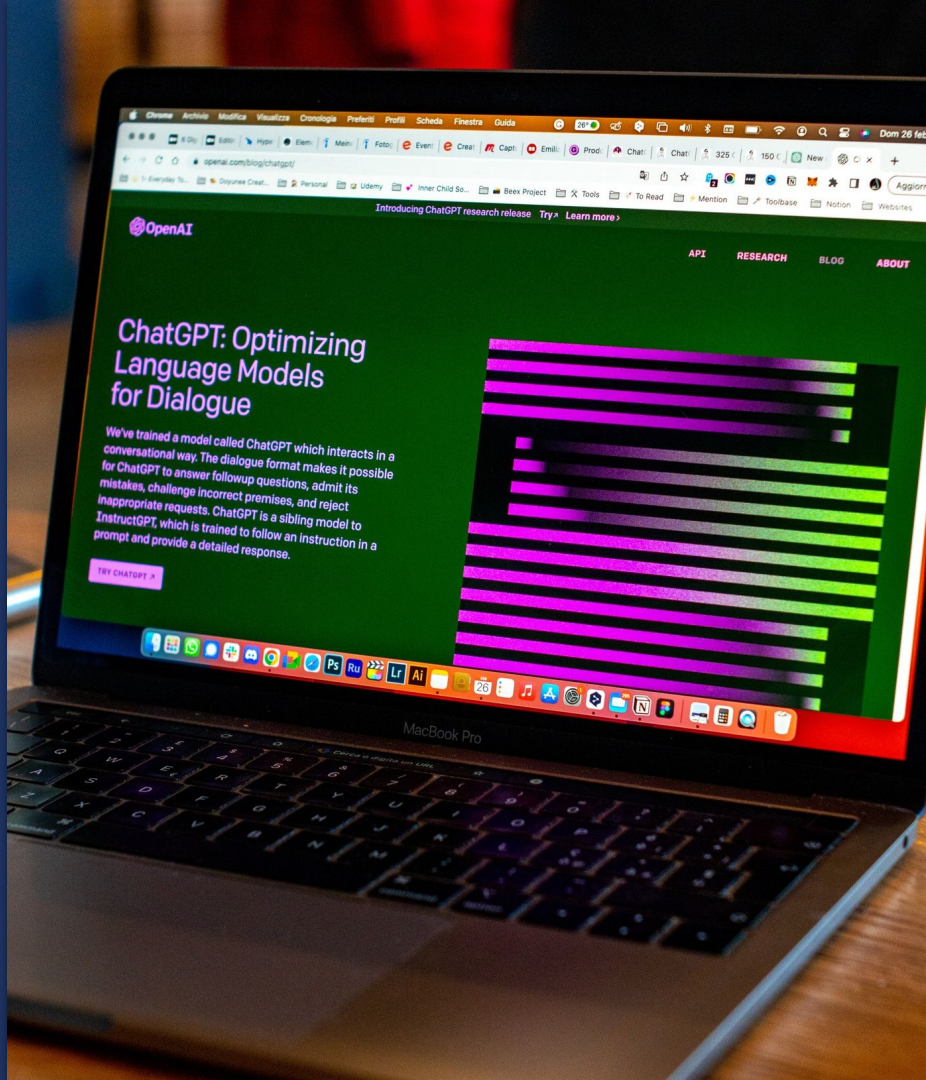
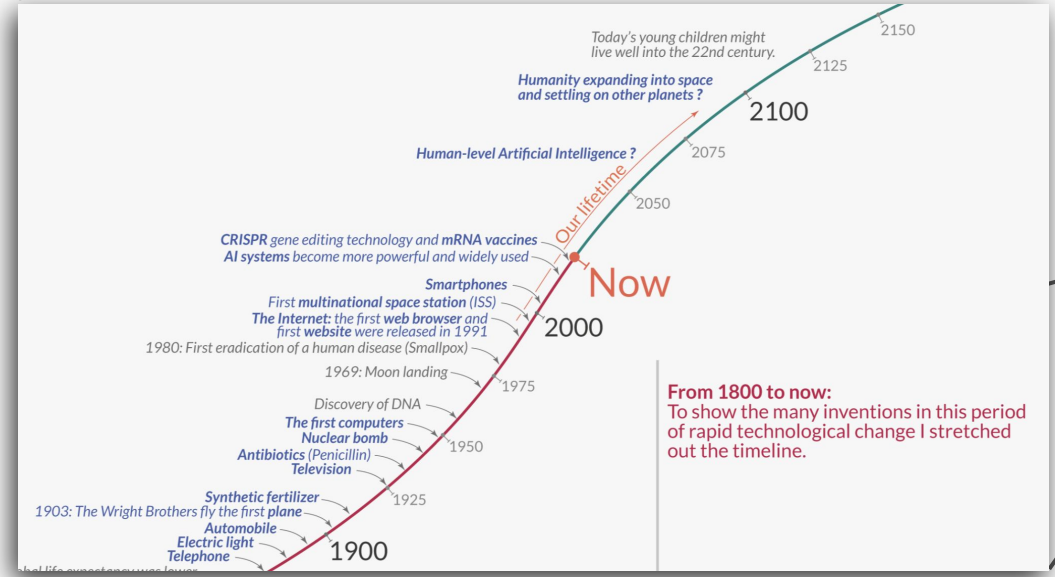
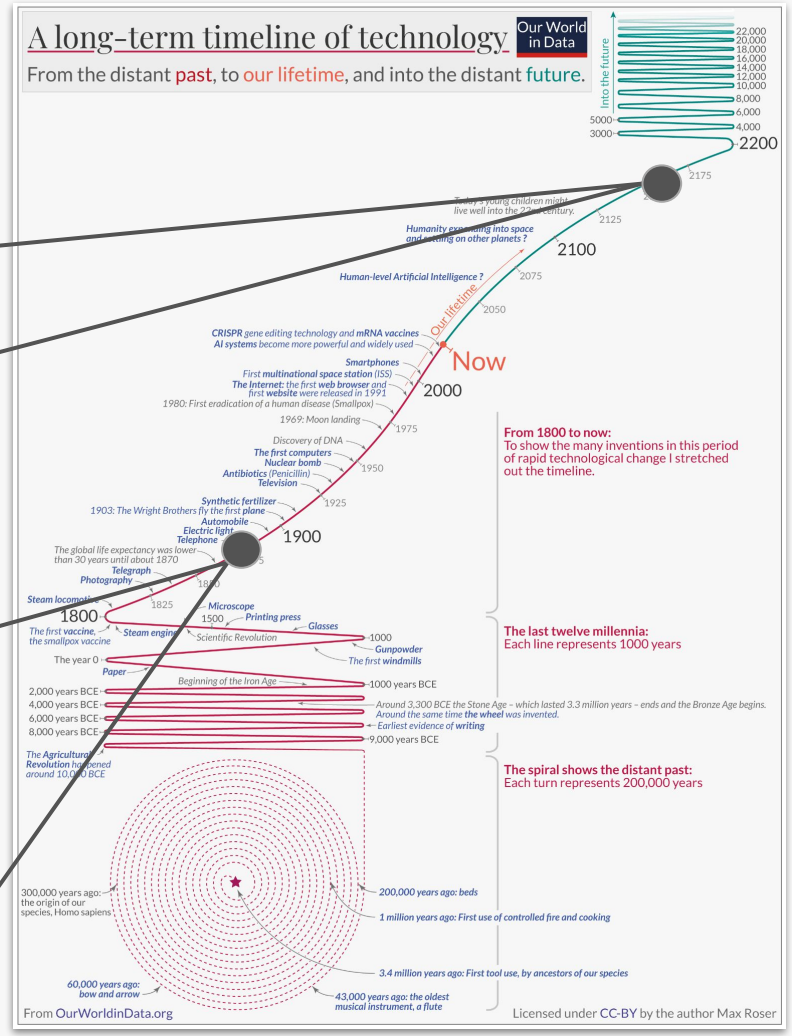
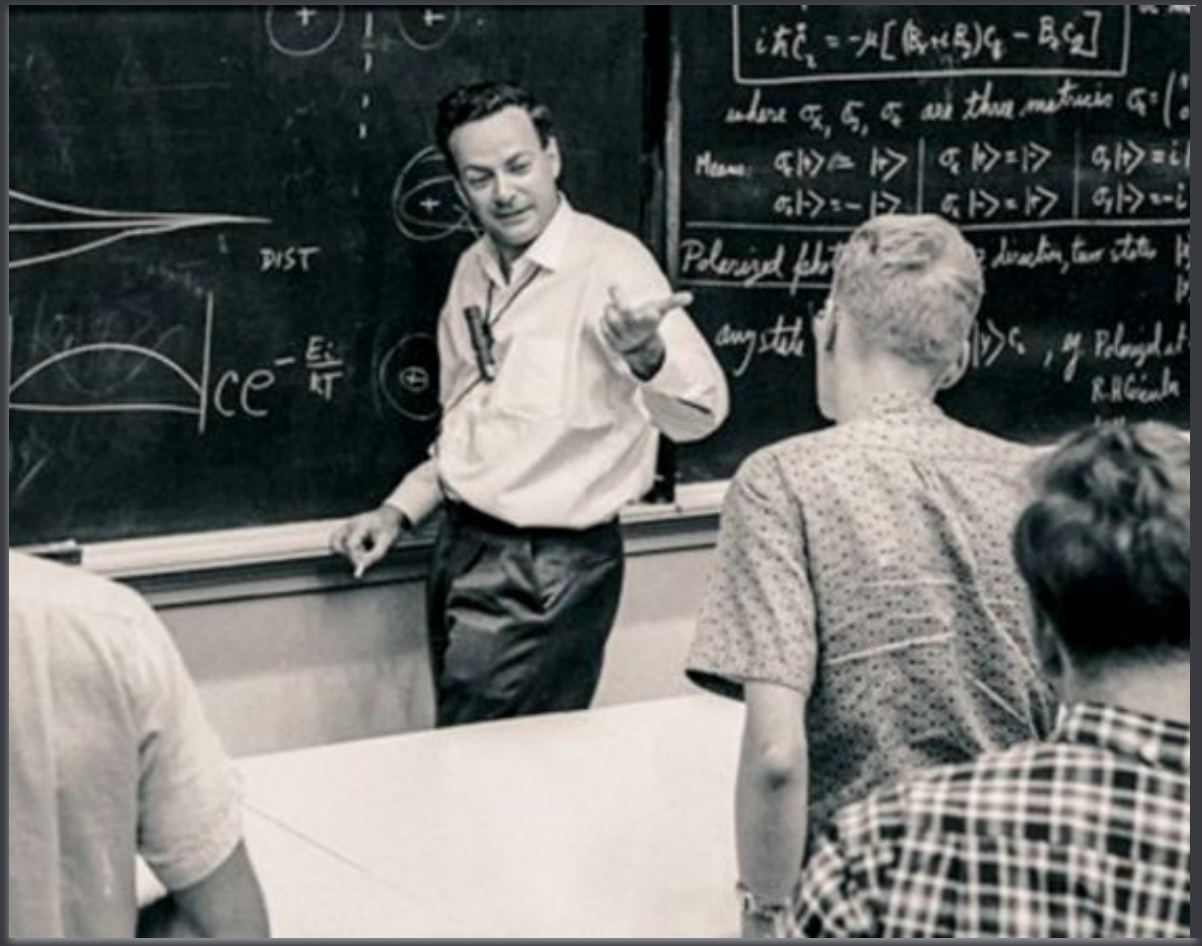






https://ourworldindata.org/technology-long-run

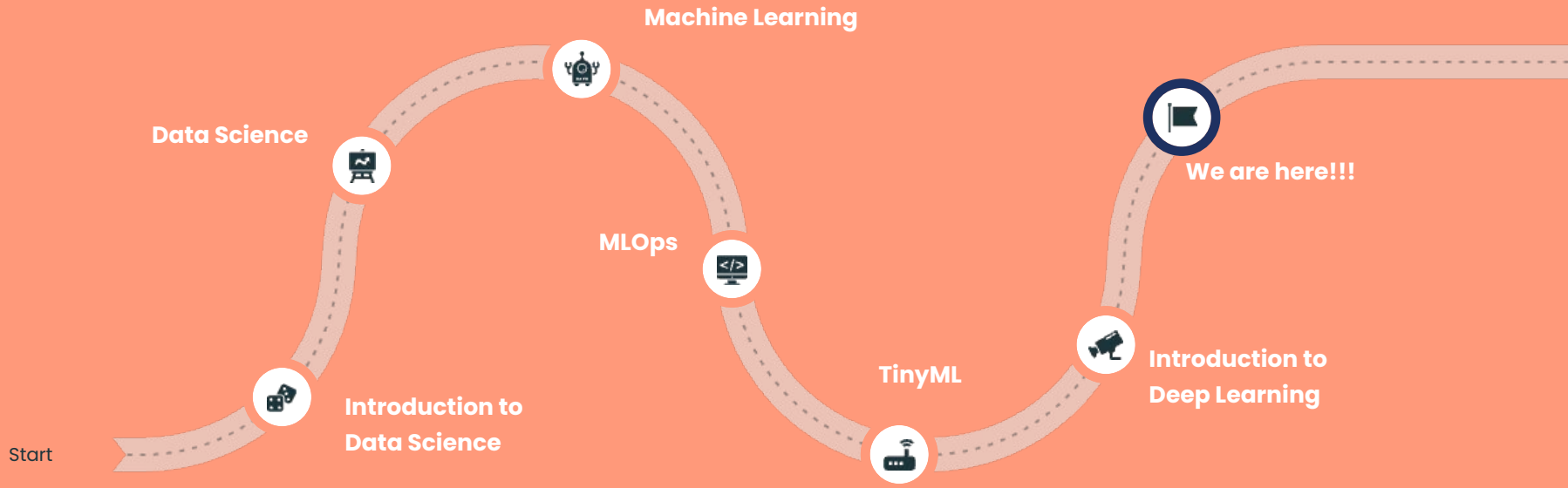


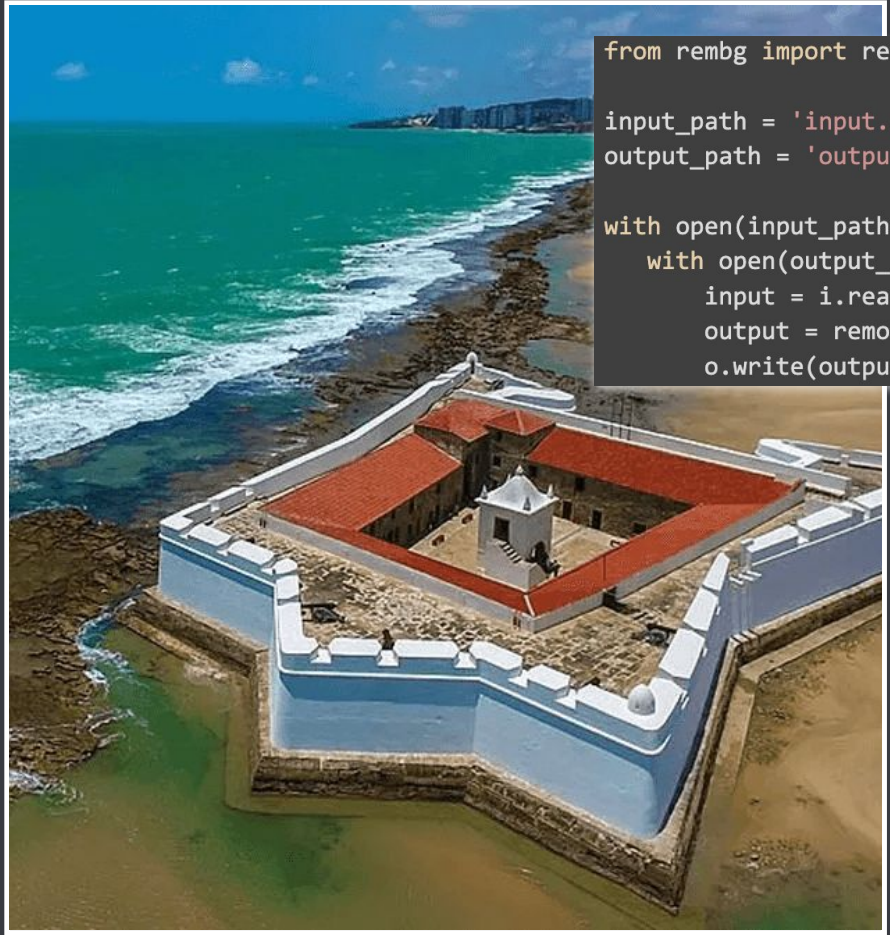
What I cannot create, I do not understand.

RICHARD FEYNMAN

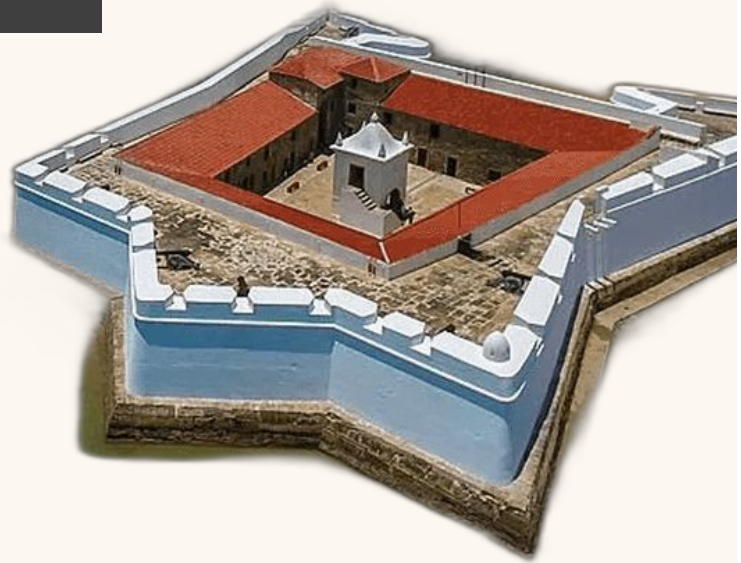
A Journey to Become an AI Research Scientist

Exploring Different Paths to Acquire Knowledge and Skills for an AI Career

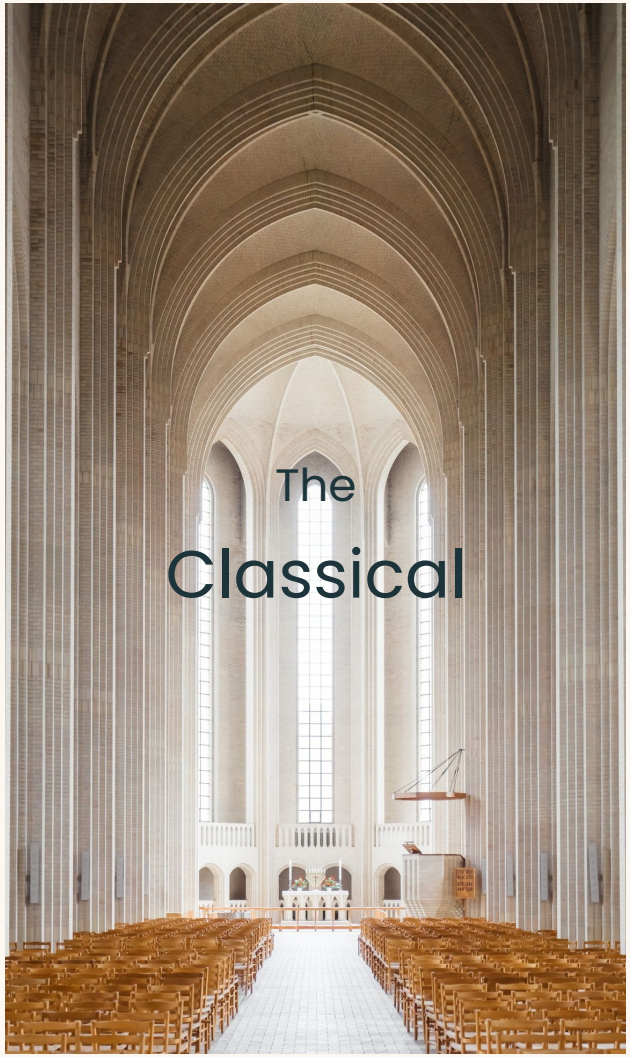


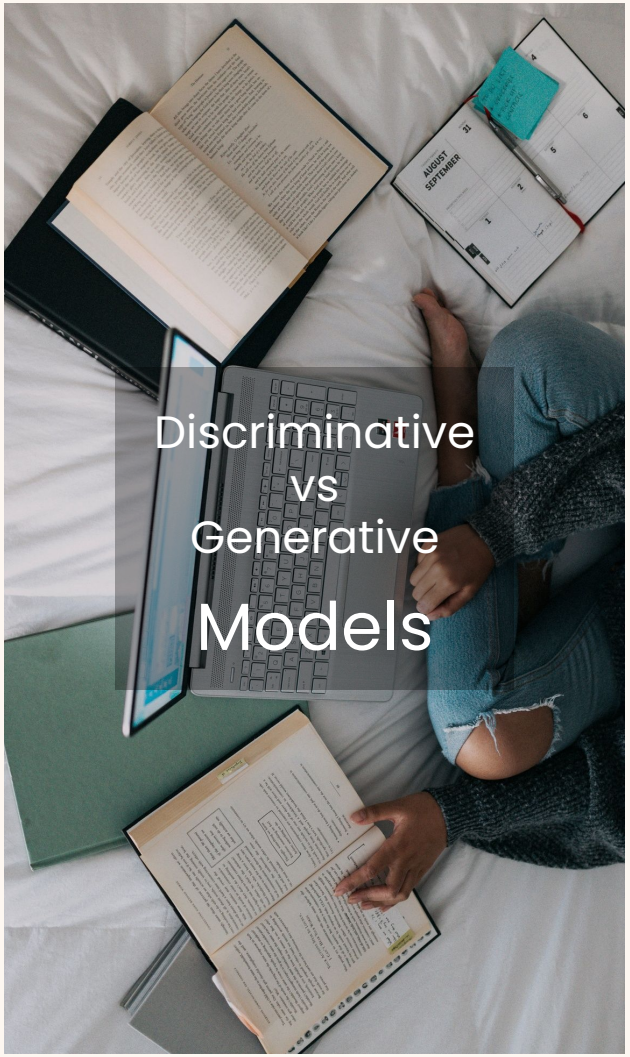


```python
from rembg import remove

input_path = 'input.png'
output_path = 'output.png'

with open(input_path, 'rb') as i:
    with open(output_path, 'wb') as o:
        input = i.read()
        output = remove(input)
        o.write(output)
```



https://github.com/danielgatis/rembg


The
Classical

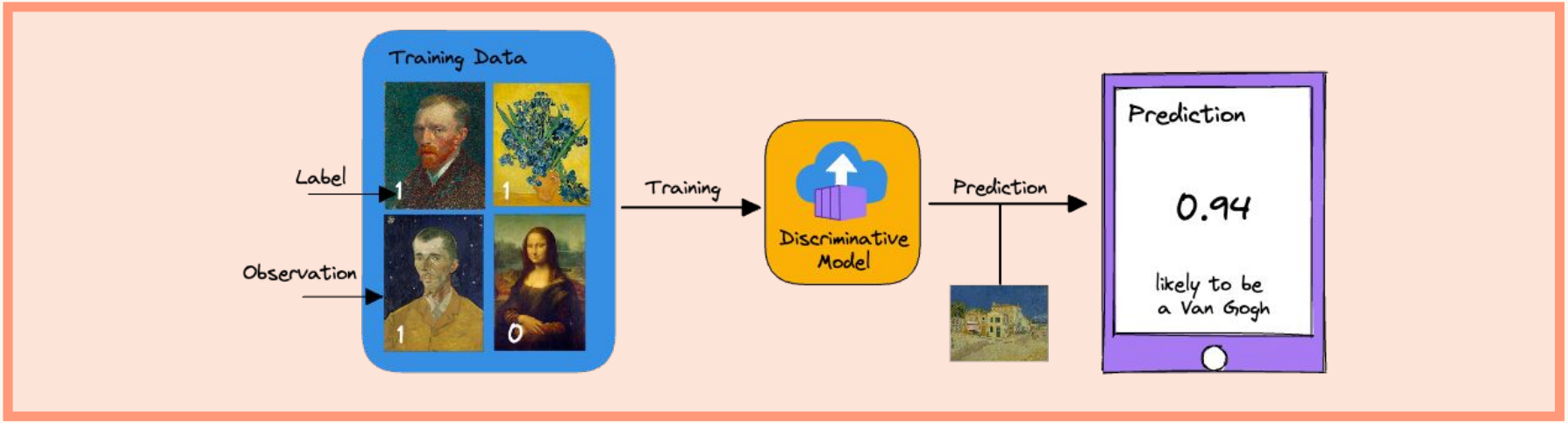

Discriminative
vs
Generative
Models


The
New

Discriminative Model

Van Gogh Paintings

Discriminative modeling estimates p(y|x)

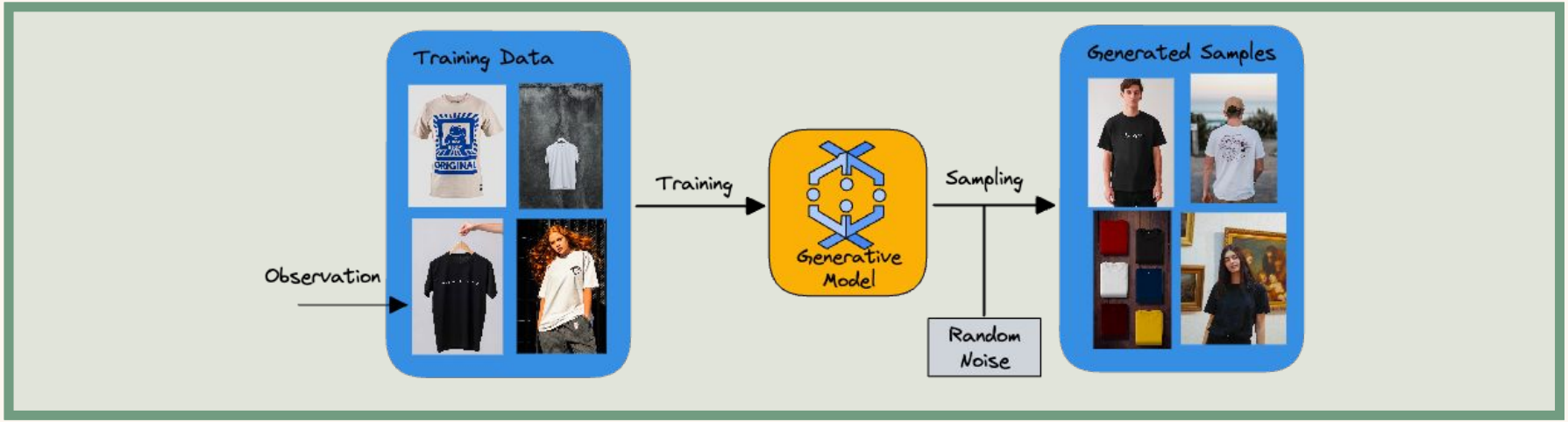


A discriminative model trained to predict if a given image is painted by Van Gogh.

Generative Model

Generate realistic photos of t-shirts

Generative modeling estimates P(x)



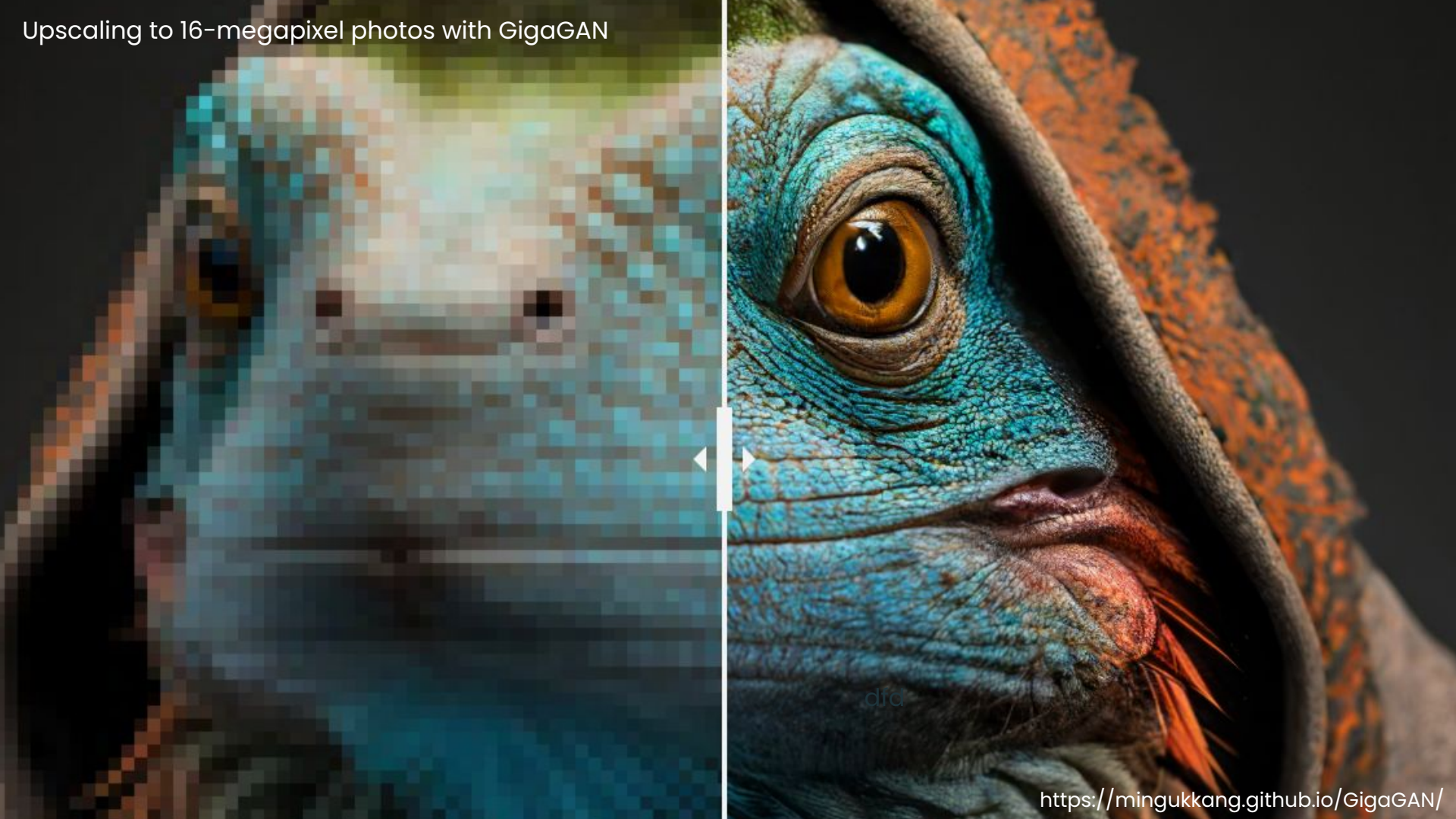
Generative modeling is a branch of machine learning that involves training a model to produce new data that is similar to a given dataset.

Brain to Image

What if Stable Diffusion can read mind?

- Send people to an MRI
- Show them an image
- Measure their brain waves
- Put their brain waves into an AI image model

Upscaling to 16-megapixel photos with GigaGAN



https://mingukkang.github.io/GigaGAN/

PEDRO E PAULO MARKUN

OPINIÃO

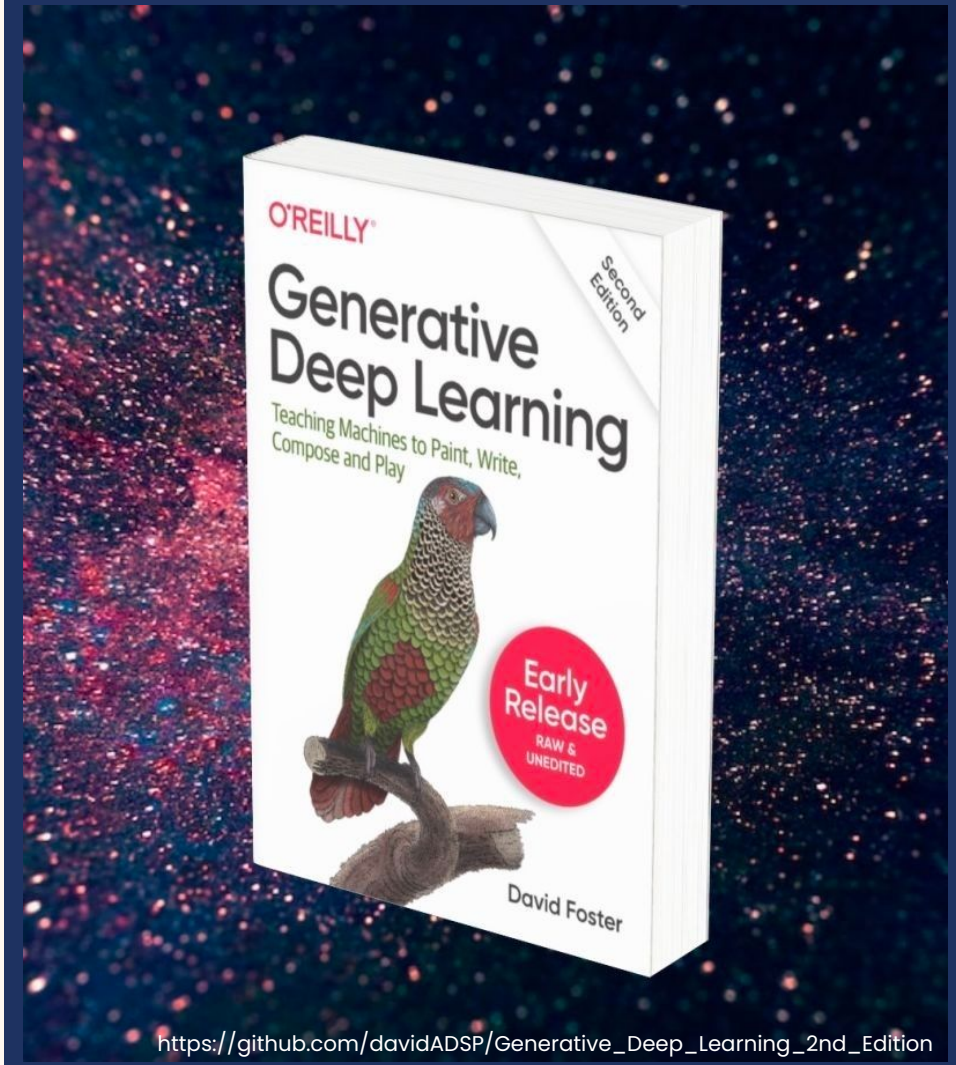
Imagem de Trump preso prova que IA já ameaça nosso conhecimento da verdade

Imagem gerada por inteligência artificial coloca Donald Trump no que parece ser uma cela de presídio
Imagem: Reprodução/ Twitter/ @EliotHiggins

Suggested Reference

Early Release

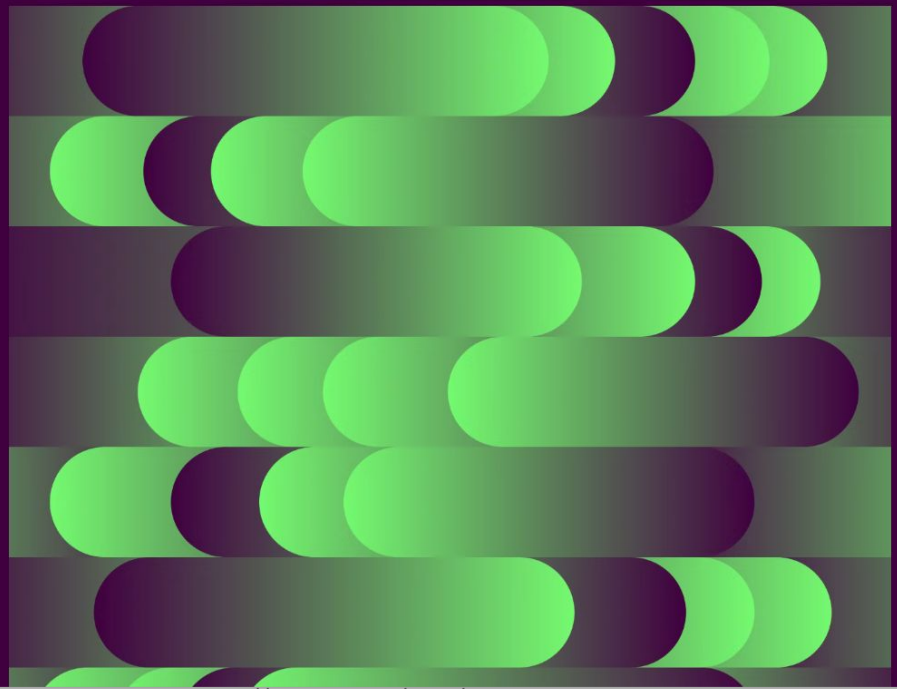
Provides a map of the generative AI landscape with theory, practical applications, working examples, code and step-by-step instructions. Can be read cover-to-cover or used as a reference book.



OpenAI Research Product Safety Company Search

Introducing ChatGPT and Whisper APIs

Developers can now integrate ChatGPT and Whisper models into their apps and products through our API.

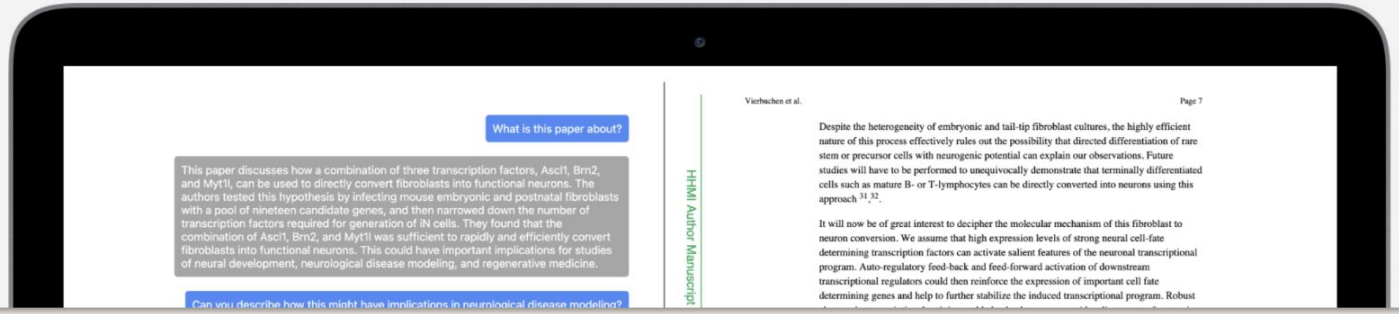


https://github.com/openai/openai-cookbook/

https://openai.com/blog/introducing-chatgpt-and-whisper-apis

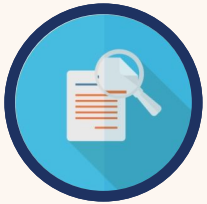
Ask AI anything about your files

Understand Technical Papers 100X Faster.
Ask Questions & Get Answers About Any File Instantly.



What if we could integrate?

Youtube



summarize.tech

ChatGPT

SpeechIt

Playlists

https://www.youtube.com/watch?v=L_Guz73e6fw

Skills for the next 18 months

Building Applications

LLMs or Text-To-Image models like ChatGPT, Stable Diffusion, or BLOOM

MLOps

Building and deploying ML applications locally and in the cloud

Engineers

Developers

Scientists

Journey Planning

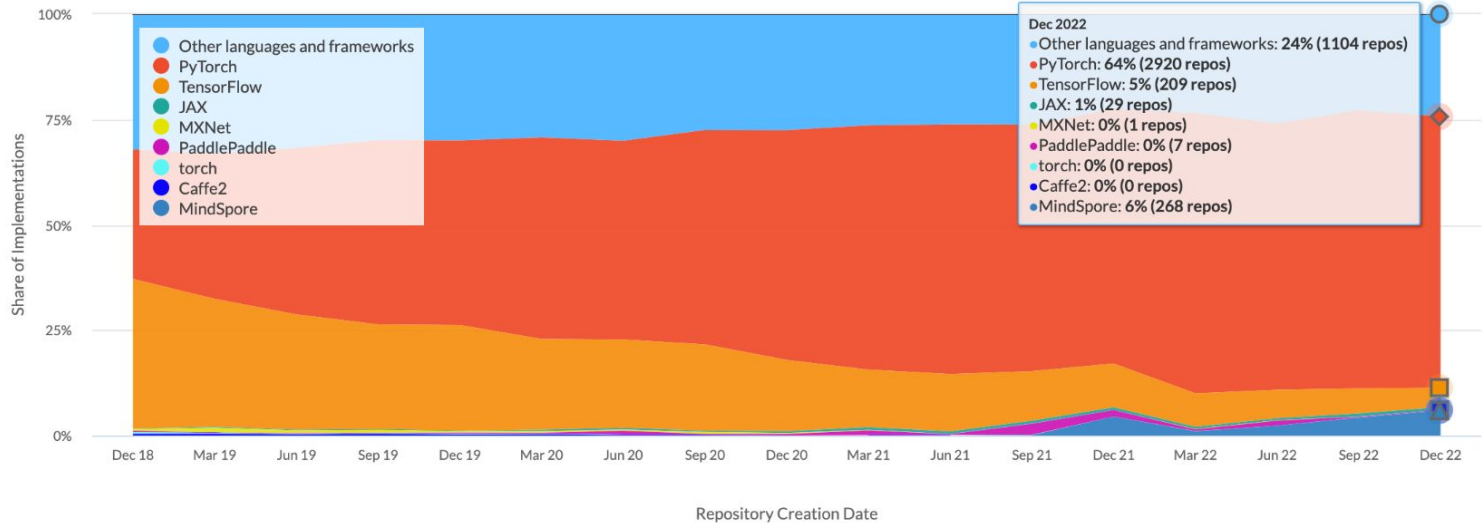
To do	Variational Autoencoders	Diffusion Models	Deep Reinforcement Learning
In progress	Unsupervised Learning	Generative Adversarial Networks	Normalizing Flows
Completed	Transformers ✔	Graph Neural Networks	

Trends

Quarter | 2018-12-01 to 2022-12-31

Frameworks

Paper Implementations grouped by framework



Syllabus

Applications

What can I do today with state-of-the-art AI applications?

Write and Read

Reading articles and writing technical notes are some of the tasks we will be performing.

Frameworks

Prioritize PyTorch and TensorFlow, we should also welcome Hugging Face and Keras.

Flipped classroom

Agile teaching methodology where we will be using flexible methods for the study.

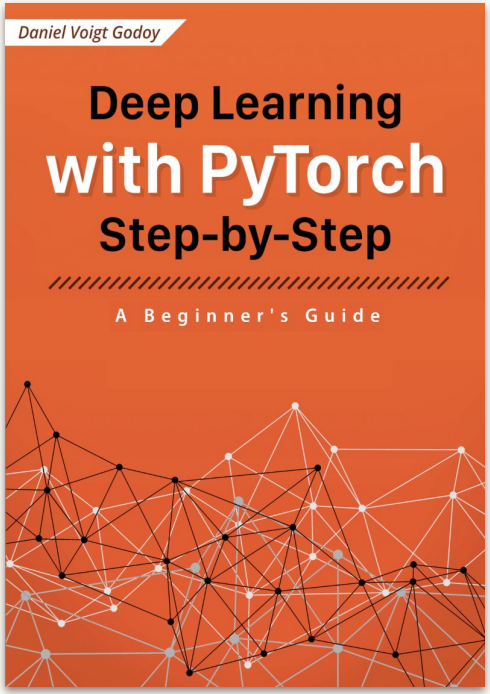
Review

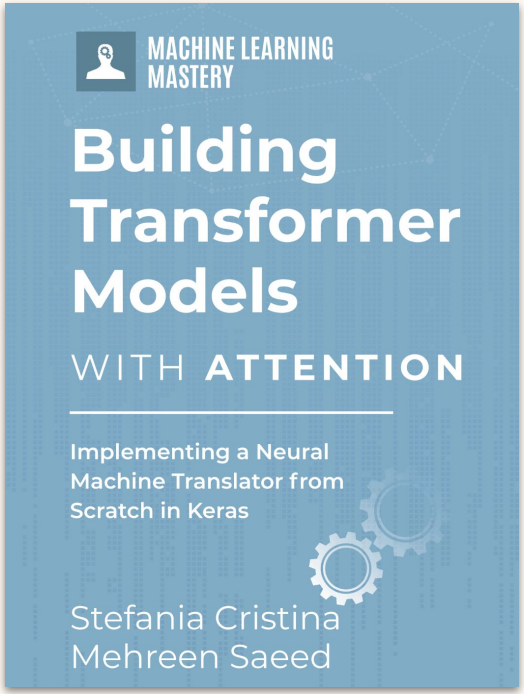
Reviewing the basics of deep learning is always important.

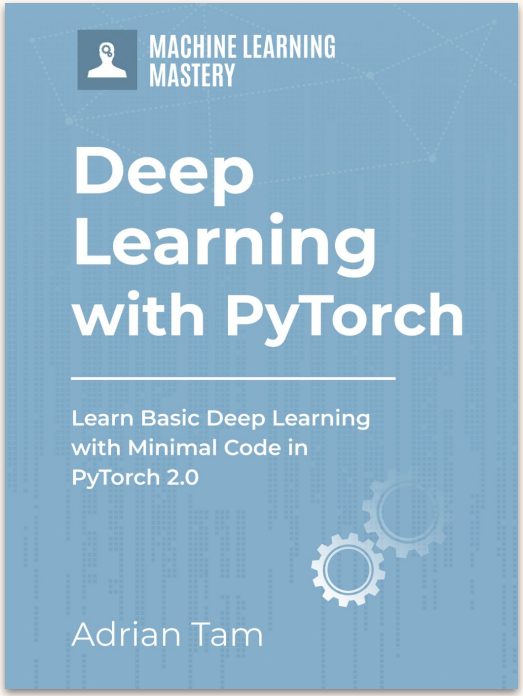
Sequential models is all you need

Transformers offer faster processing and improved accuracy approaches.

References







https://github.com/ivanovitchm/ppgeec_machinelearning_plus