

Introduction to AI/ML Concepts

A bicycle for the mind



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Developer Advocate

@SleepyDeveloper



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@subramen

Feb 18, 2023 @ 9am - 3pm EST

9:00 am - 9:20 am	Intro to AI/ML/Deep Learning
9:20 am - 9:30 am	Intro to PyTorch
9:30 am - 10:00 am	Workshop Introduction
10:00 am - 11:00 am	Workshop: Torch Vision
11:00 am - 11:10 am	Generative AI Part 1
11:10 am - 11:30 am	Workshop Introduction
11:30 am - 12:30 pm	Workshop: Summarizer
12:30 pm - 1:00 pm	Lunch Break
1:00 pm - 1:05 pm	Generative AI Part 2
1:05 pm - 1:30 pm	Workshop Introduction
1:30 pm - 1:45 pm	Workshop: Virtual Assistant Part 1
1:45 pm - 2:00 pm	Workshop: Introduction
2:00 pm - 2:45 pm	Workshop: Virtual Assistant Part 2
2:45 pm - 3:00 pm	Wrap up/Q&A

What is AI?

Artificial Intelligence

Artificial Intelligence

Refers to the simulation of human intelligence

Mimicking the intelligence or behavioral pattern of humans or any other living entity.



Artificial
Intelligence

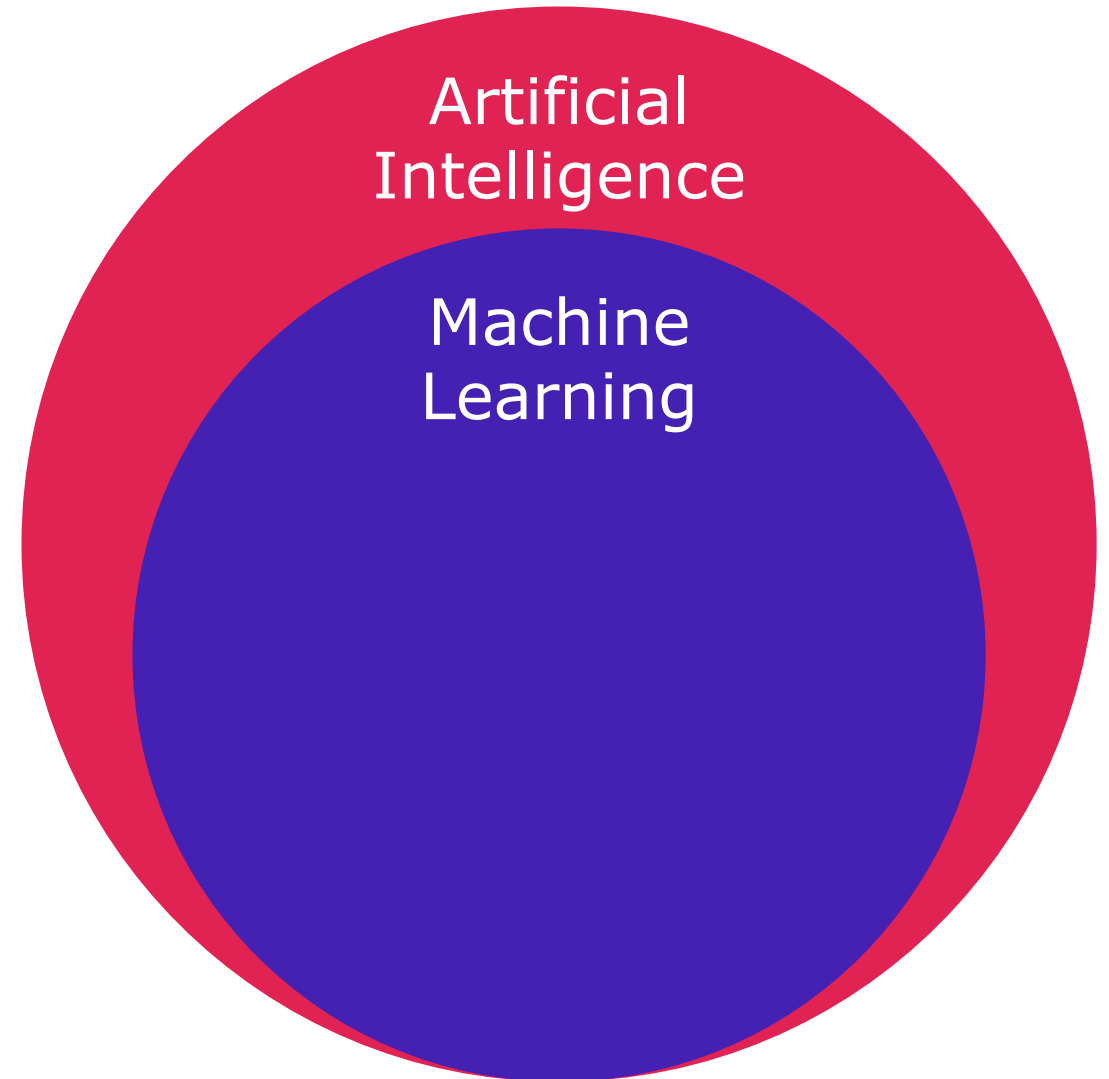
What is ML?

Machine Learning

Machine Learning

Enables computers to learn from data

A technique by which a computer can “learn” from data without using a complex set of rules. Mainly based on training a model from datasets



Innovations

ImageNet

Largest dataset of annotated images

- Created in 2009 @ Stanford University
- Creators: Fei-Fei Li & Jia Deng
- 14 million images
- 22 thousand categories of images

Large Scale Visual Recognition Challenge

ImageNet's Yearly AI Challenge to inspire and reward innovation

- Competition to achieve highest accuracy on the task
- Driven rapid advances
 - Computer vision
 - Deep learning
 - Many more

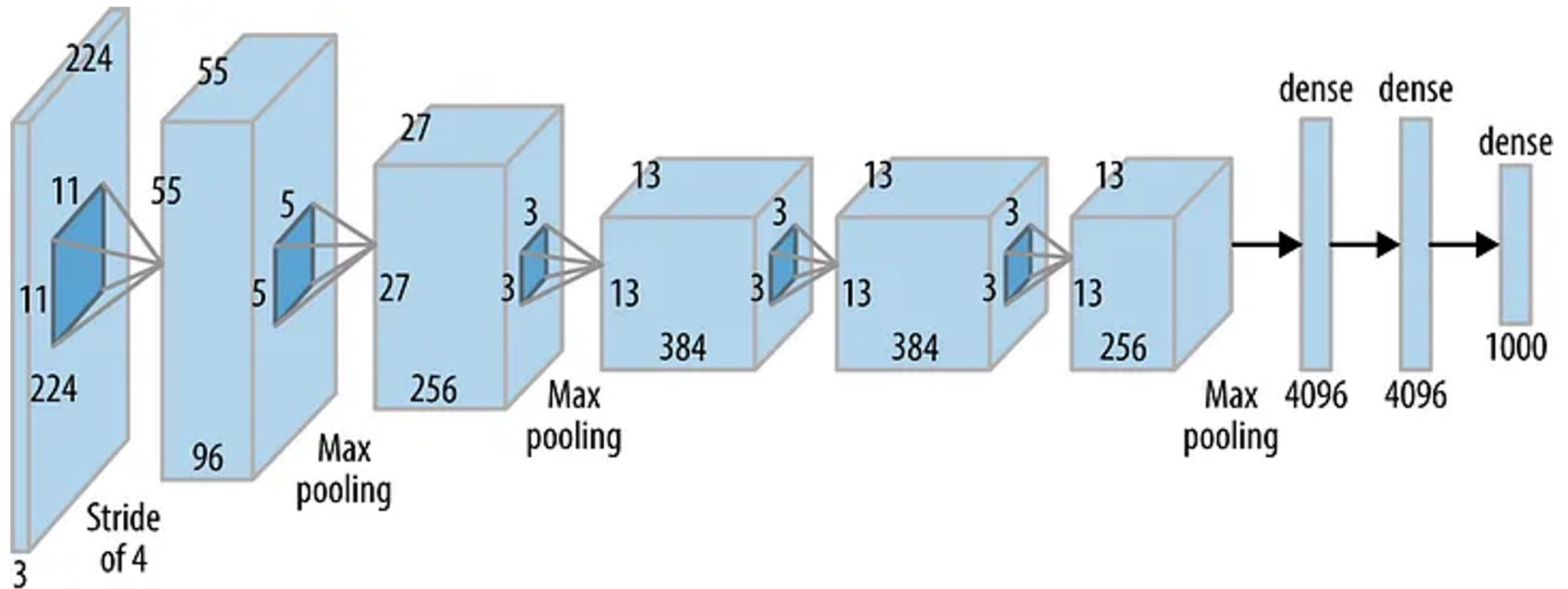
AlexNet

Winner, winner chicken dinner

- Convolutional Neural Network
- Demonstrated feasibility deep CNNs end-to-end
- 15.3% top-5 error rate!
- Enabled further innovation! (VGGNet, GoogLeNet, ResNet, etc.)

AlexNet

AlexNet Block Diagram

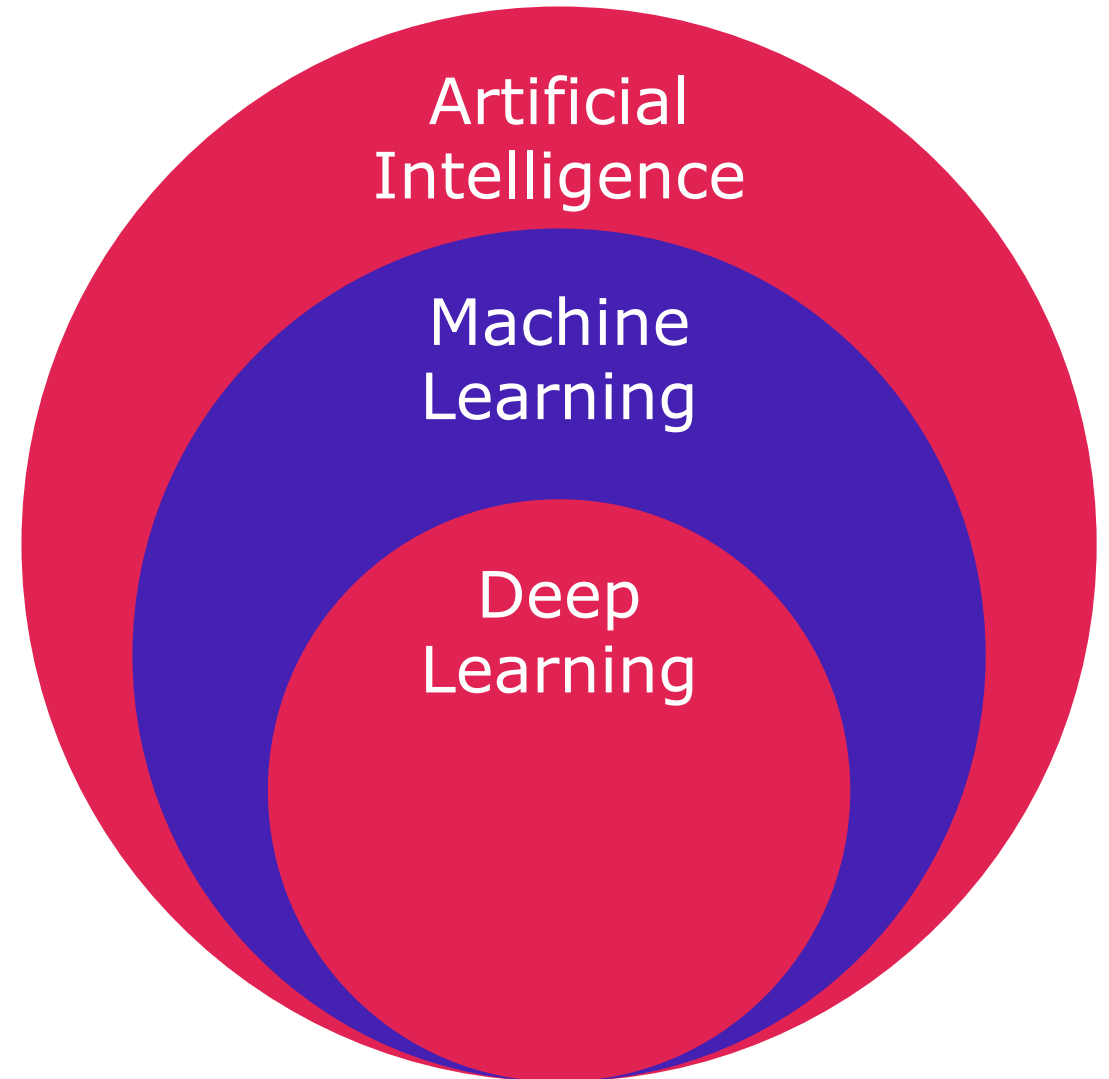


What is Deep Learning?

Deep Learning

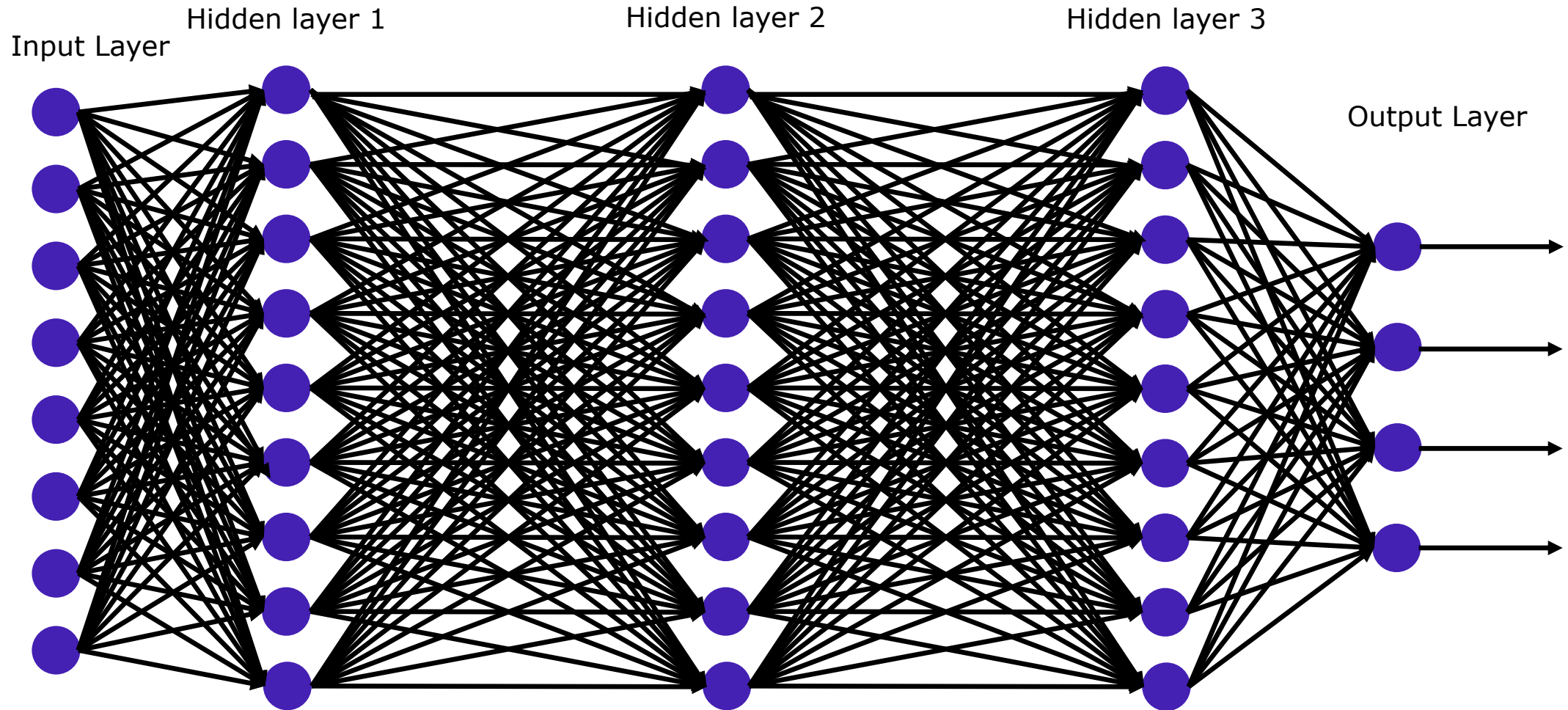
Pattern Recognition & Feature extraction w/ multi-layer neural networks

A technique to perform machine learning inspired by our brain's own network of neurons.



Deep Neural Networks

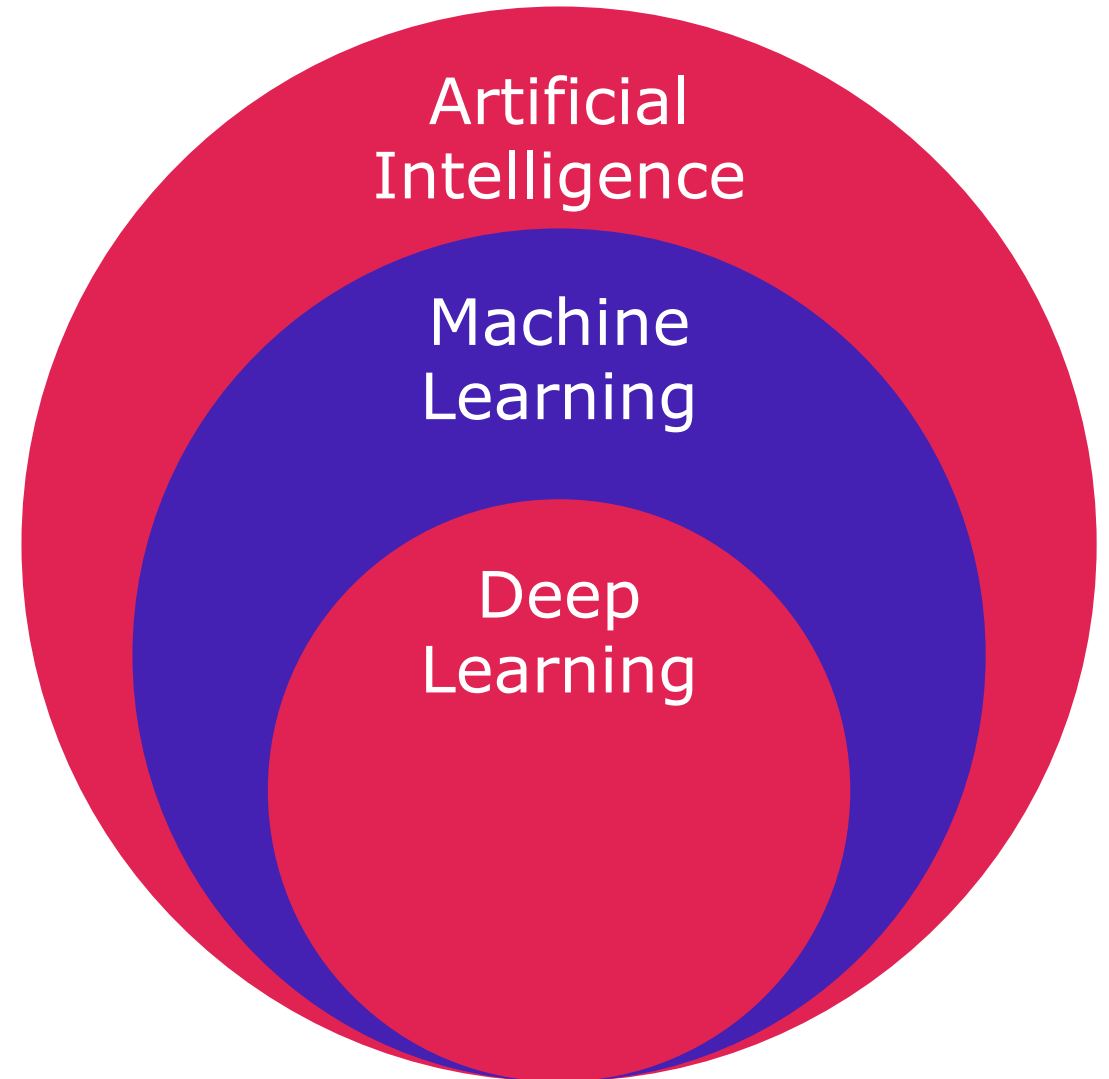
Inspired by the human brain



AI/ML and Deep Learning

Understanding how each subset fits into the overall picture

- Mimicking the intelligence or behavioral pattern of humans or any other living entity.
- A technique by which a computer can “learn” from data without using a complex set of rules. Mainly based on training a model from datasets
- A technique to perform machine learning inspired by our brain’s own network of neurons.



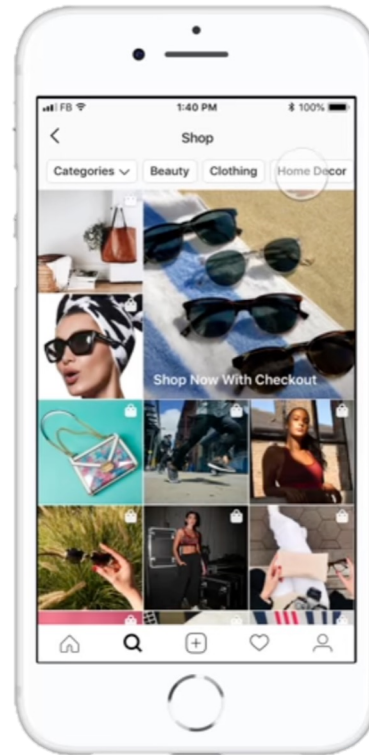
Deep Learning @ Meta

If you use Meta Products, DL is in your life

- News Feed Personalization
- Image and Video Recognition
- Language Translation
- Spam and Fake News Detection
- Predictive Analytics

How Deep Learning is used at Meta

Instagram's Explore recommender system



<https://ai.facebook.com/blog/powered-by-ai-instagram-s-explore-recommender-system/>

Introduction

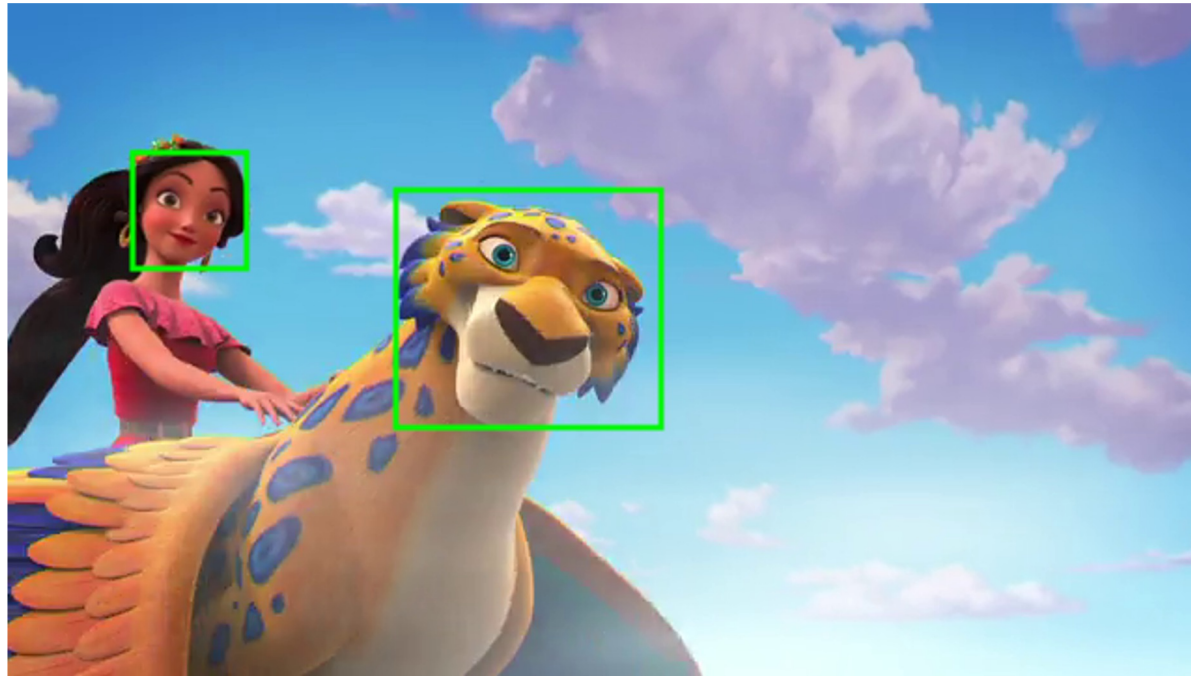
Deep Learning

Intro to PyTorch

Generative AI

Case Study: Disney

Animated face detection



<https://medium.com/pytorch/how-disney-uses-pytorch-for-animated-character-recognition-a1722a182627>

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Case Study: Disney

Non-human facial detection presents new challenges



<https://medium.com/pytorch/how-disney-uses-pytorch-for-animated-character-recognition-a1722a182627>

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Case Study: Blue River Tech

Self-driving automated weed eliminating tractors!



<https://medium.com/pytorch/ai-for-ag-production-machine-learning-for-agriculture-e8cfdb9849a1>

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Case Study: Blue River Tech

Weed detection models



<https://medium.com/pytorch/ai-for-ag-production-machine-learning-for-agriculture-e8cfdb9849a1>

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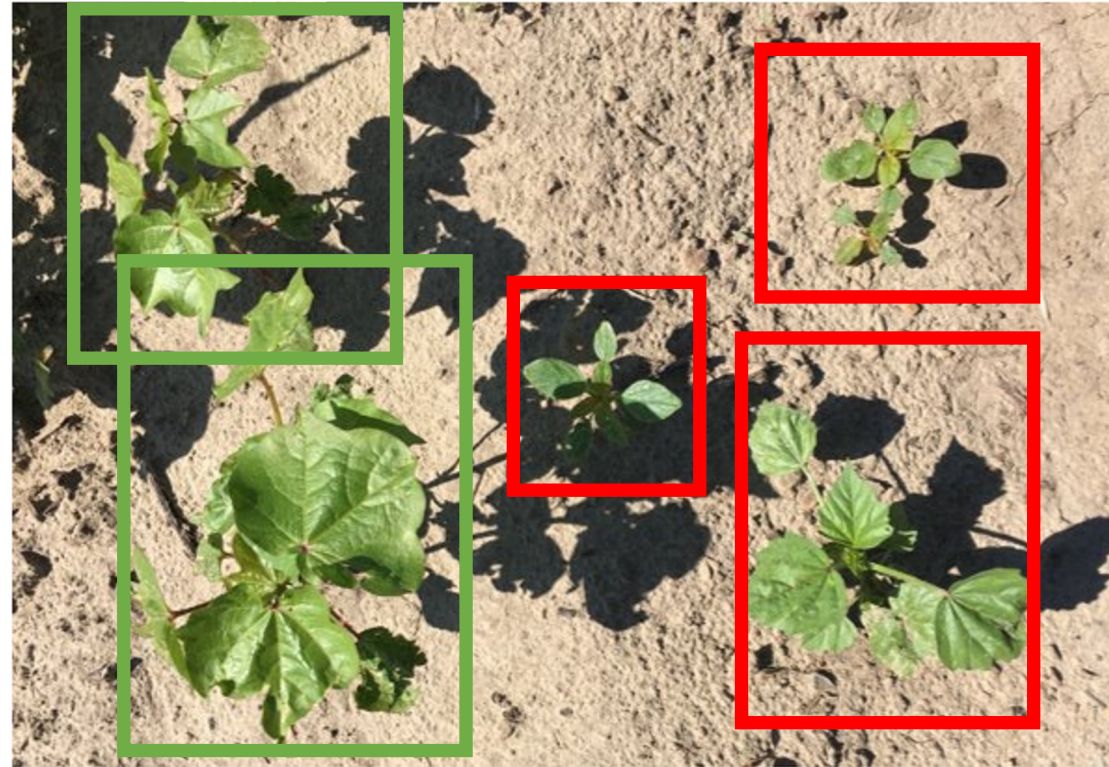
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Case Studies

Red = Weed; Green != Weed



<https://medium.com/pytorch/ai-for-ag-production-machine-learning-for-agriculture-e8cfdb9849a1>

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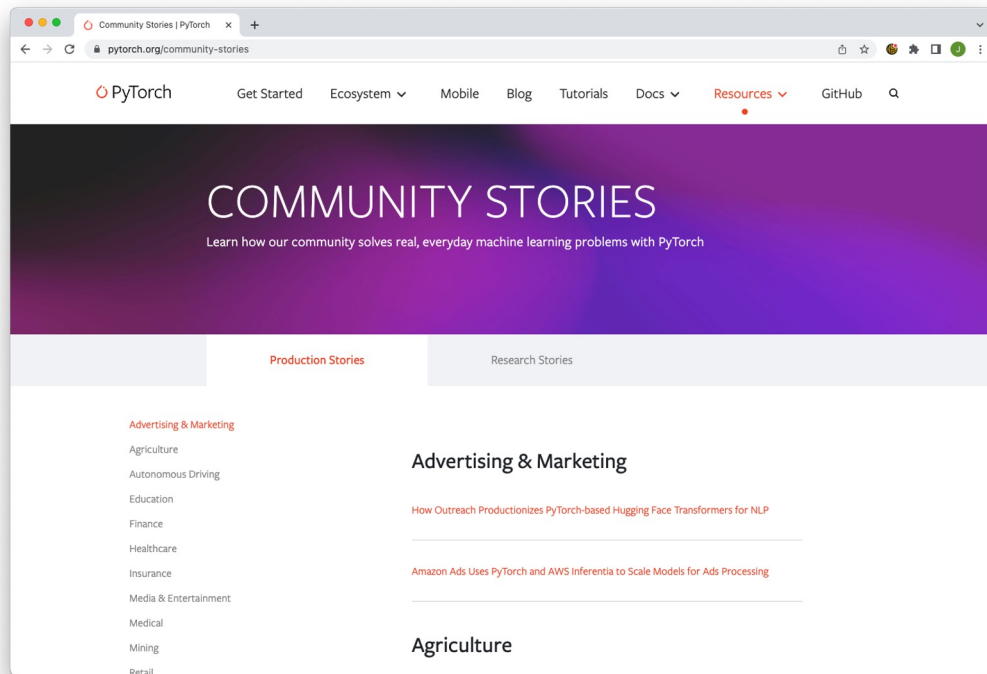
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Check out more case studies

Gain inspiration for your AI/ML projects



<https://pytorch.org/community-stories>

- Advertising & Marketing
- Agriculture
- Autonomous Driving
- Education
- Finance
- Healthcare
- Insurance
- Media & Entertainment
- Medical
- Mining
- Retail
- Technology
- Travel

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PyTorch

PyTorch

Open-source library to build and train models



- Based on the Torch Library
- Developed by Facebook's AI Research Lab
- Released in 2016
- Programming interface for building and training Neural Networks

PyTorch

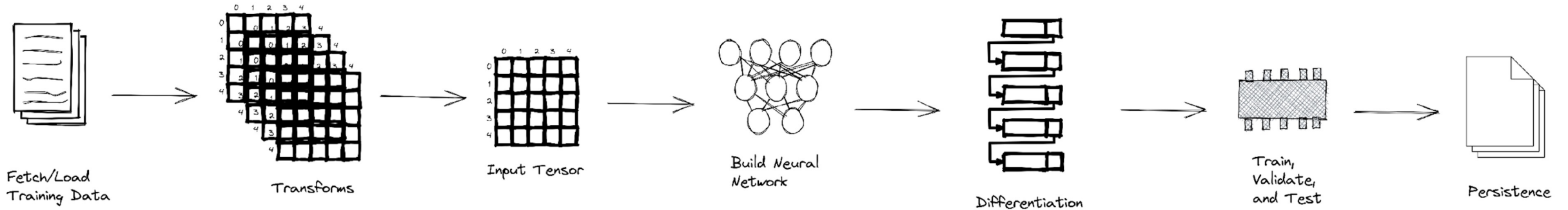
Well-known domain-specific libraries

- TorchText
- TorchVision
- TorchAudio



Typical ML Pipeline with PyTorch

Understanding the process



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Getting started with PyTorch

Useful resources

Learn the basics:

<https://pytorch.org/tutorials/beginner/basics/intro.html>

Quickstart:

https://pytorch.org/tutorials/beginner/basics/quickstart_tutorial.html

Workshop: Identify Objects with TorchVision

Identify objects with TorchVision

Is there a traffic light in this image?



Introduction

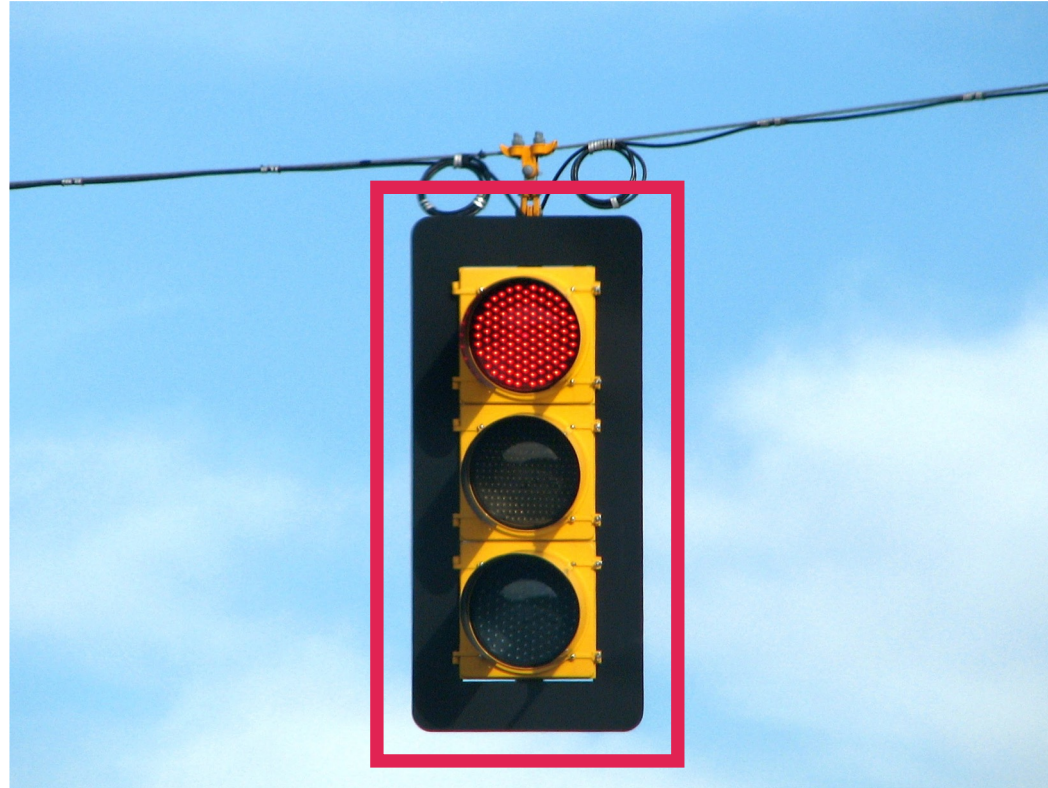
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Identify objects with TorchVision

Is there a traffic light in this image?



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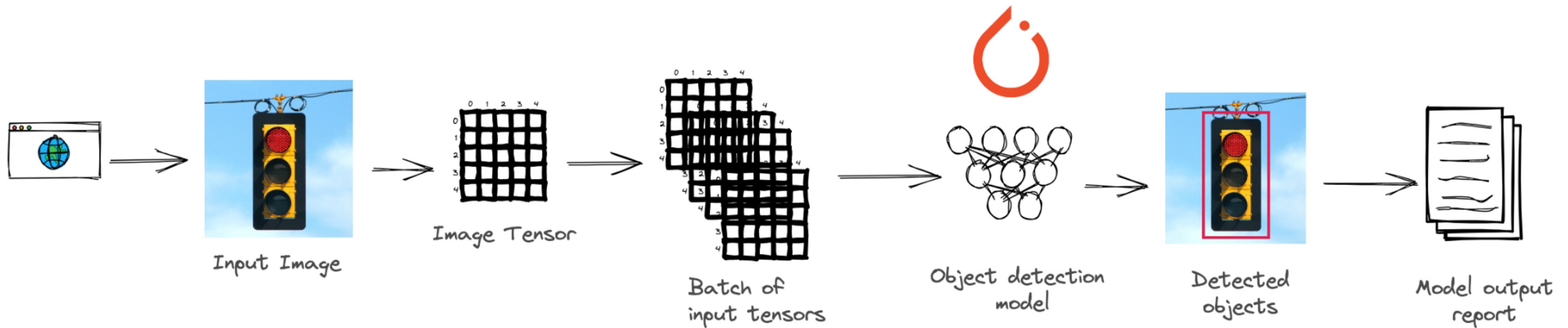
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Typical pipeline for object detection

Identifying objects in images with TorchVision



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How do computers see images?

Do Androids Dream of Electric Sheep?



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Workshop key concepts

Tensors: Multi-dimensional data structures

Scalar

$$\begin{bmatrix} 1 \end{bmatrix}$$

Vector

$$\begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

Matrix

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

Tensor

$$\begin{bmatrix} \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \end{bmatrix}$$

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Workshop key concepts

Tensors: Multi-dimensional data structures

Scalar
Rank 0 Tensor

$$\begin{bmatrix} 1 \end{bmatrix}$$

Vector
Rank 1 Tensor

$$\begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

Matrix
Rank 2 Tensor

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

Tensor
Rank 3 Tensor

$$\begin{bmatrix} \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \end{bmatrix}$$

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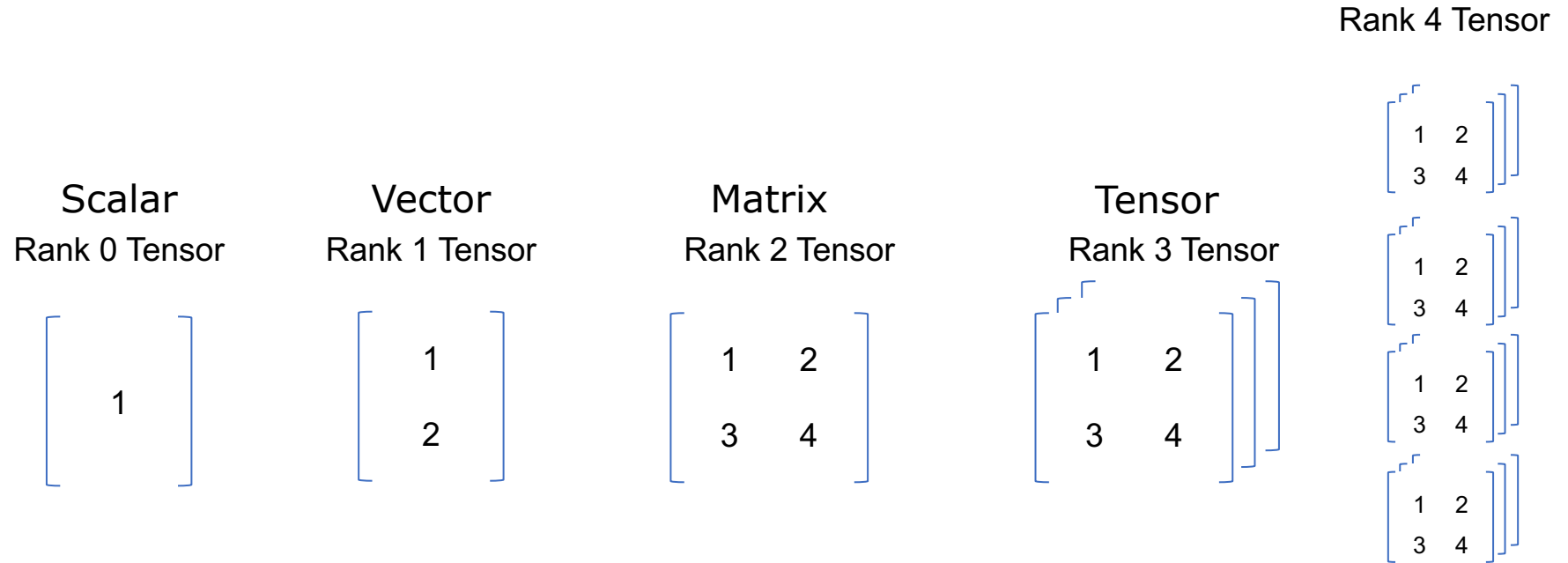
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Tensors: Multi-dimensional data structures



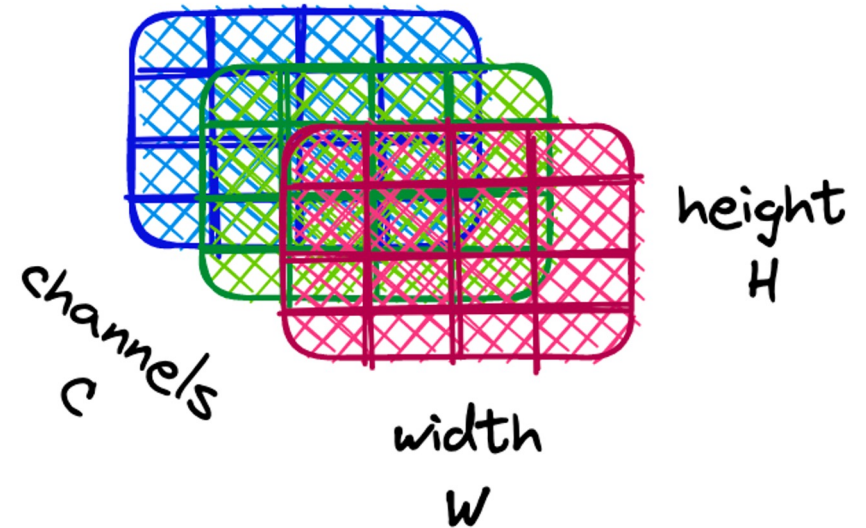
https://pytorch.org/tutorials/beginner/basics/tensorqs_tutorial.html

https://pytorch.org/tutorials/beginner/introyt/tensors_deeper_tutorial.html

Workshop key concepts

Image Tensors

- Image tensors are typically rank 3 tensors
 - dim0: *number of channels* (3 for an RGB image)
 - dim1: *height of the image*
 - dim2: *width of the image*



https://pytorch.org/tutorials/beginner/basics/tensorqs_tutorial.html

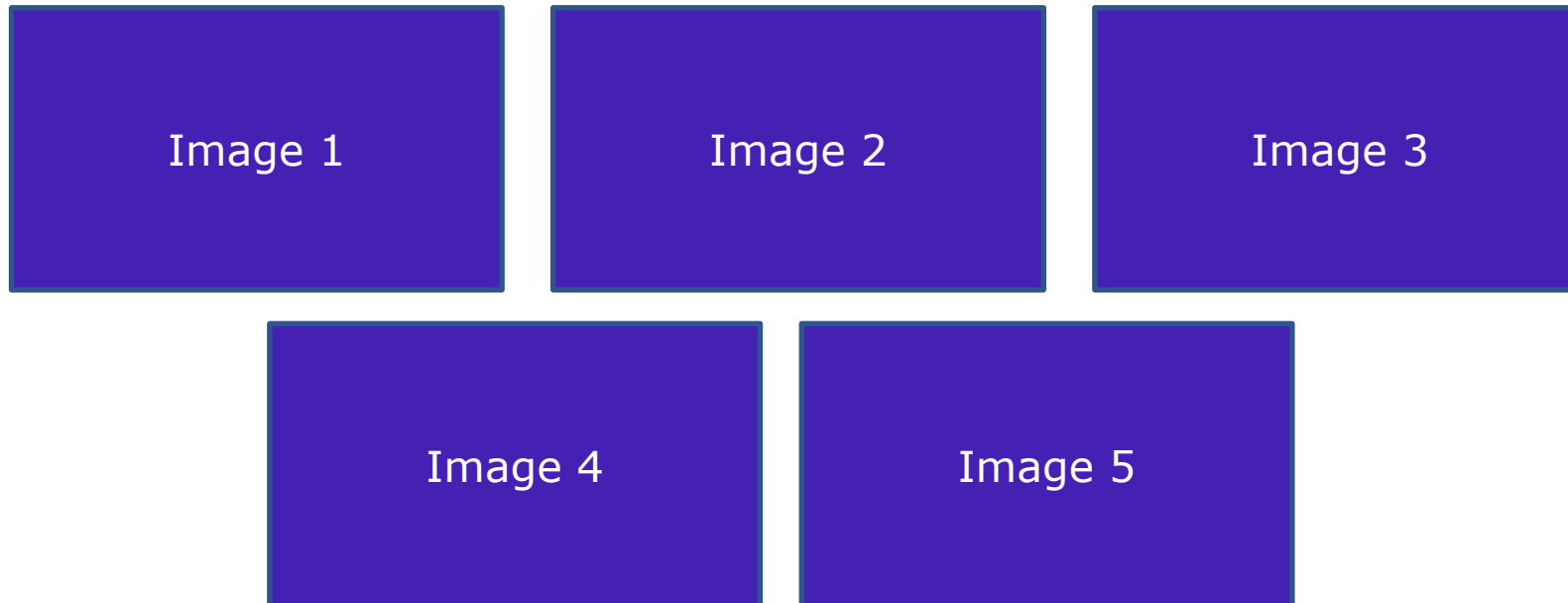
Workshop key concepts

Torchvision

- <https://pytorch.org/vision/stable/index.html>
- Library for Image and Video:
 - datasets
 - models (pretrained and untrained)
 - transformations

Workshop key concepts

Batching



Introduction

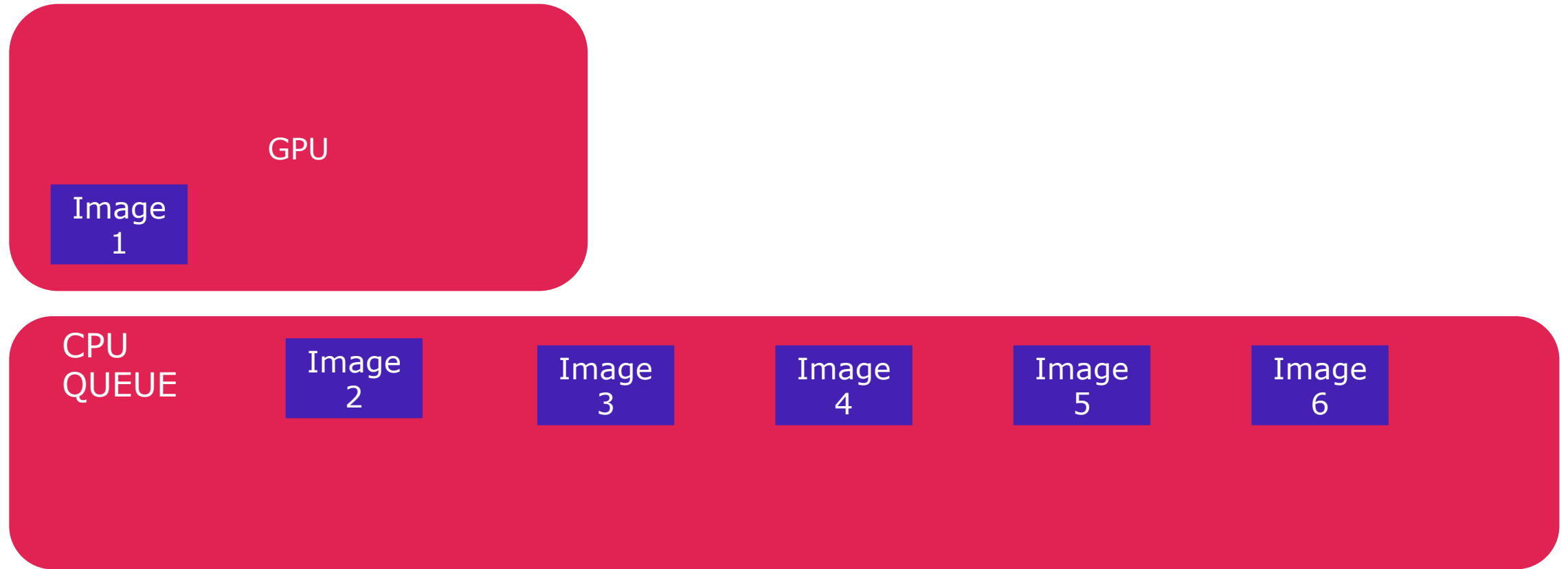
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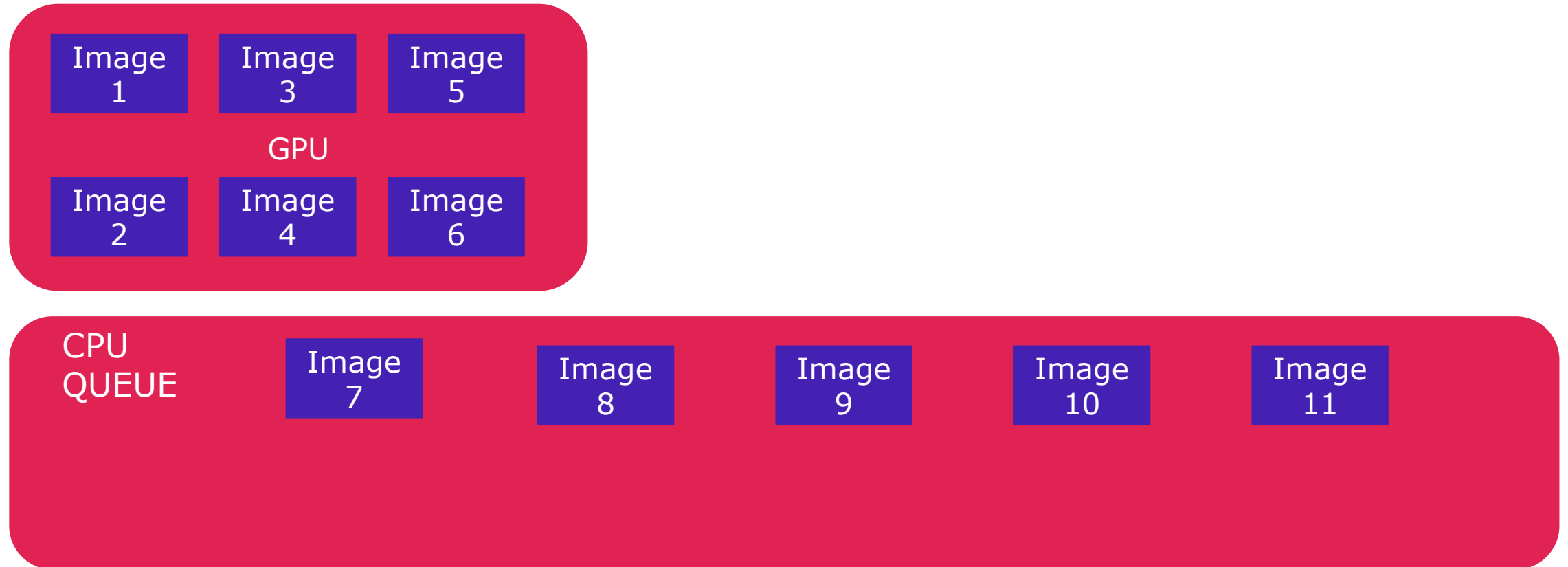
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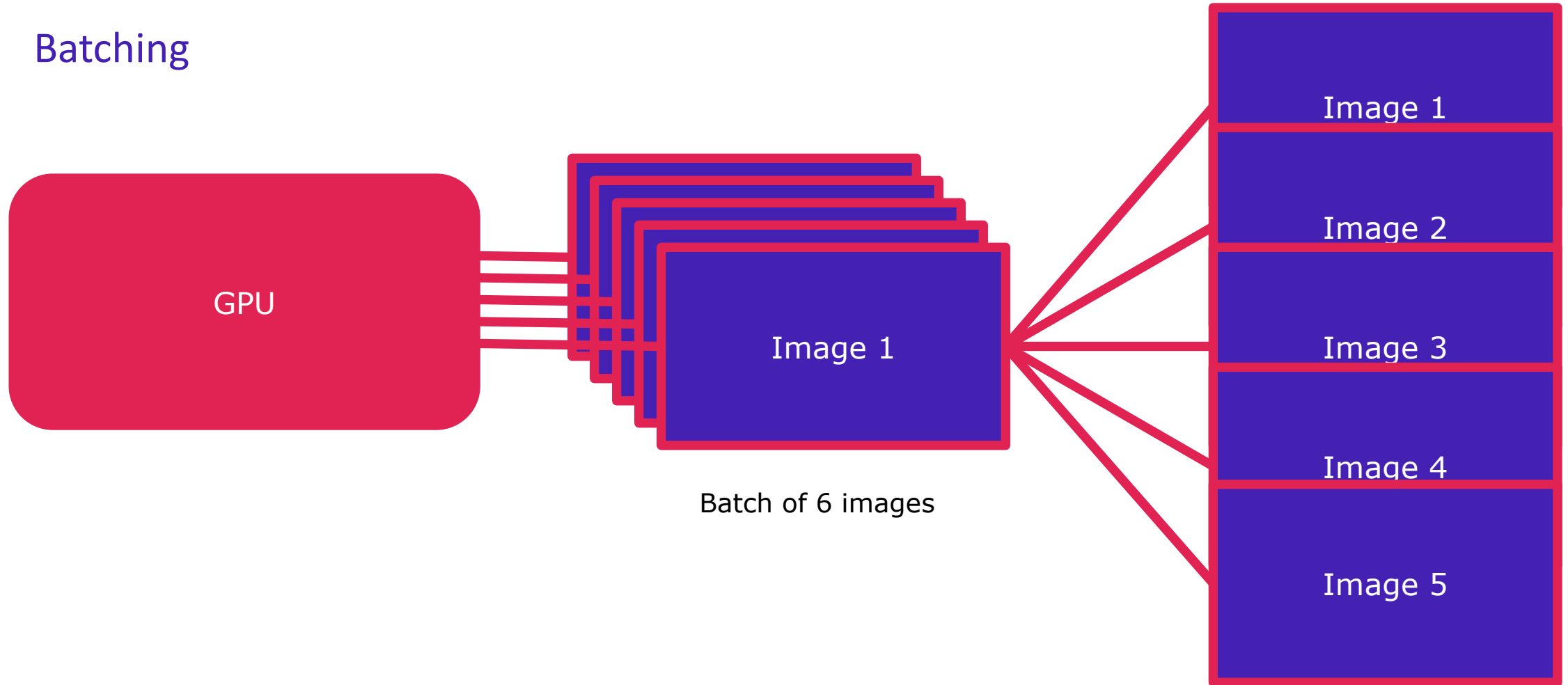
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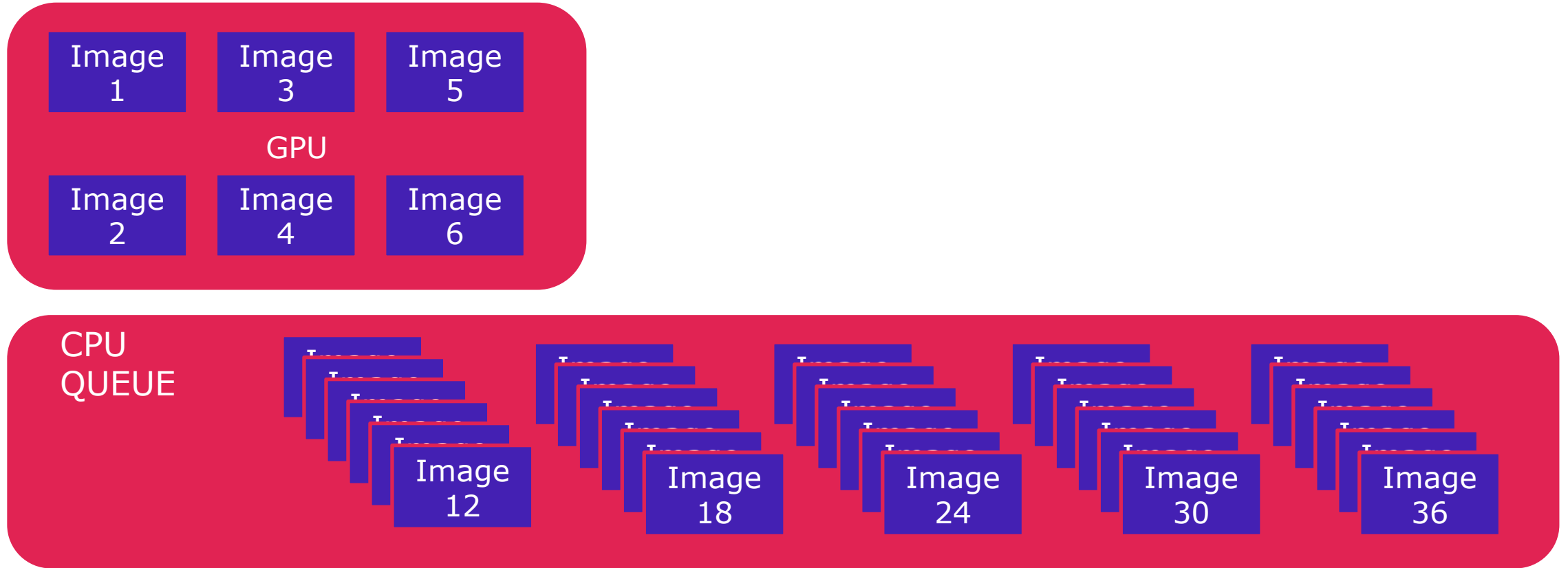
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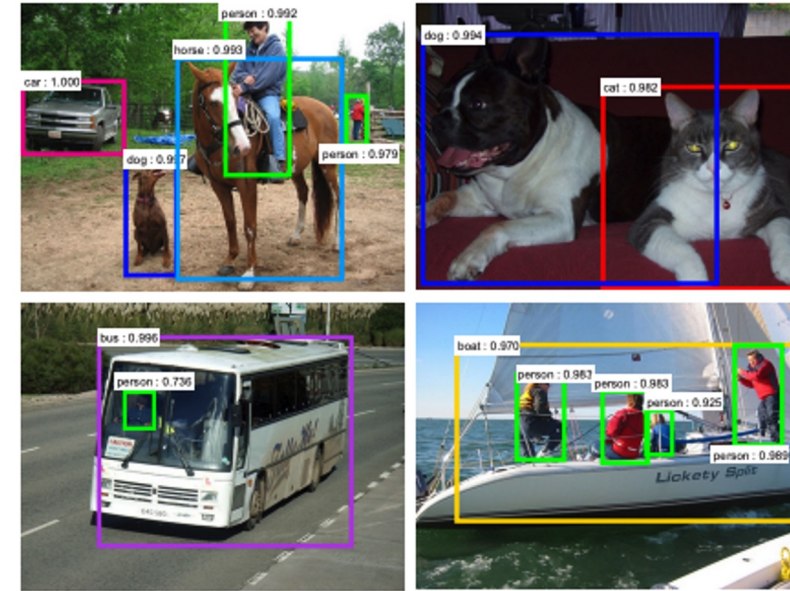
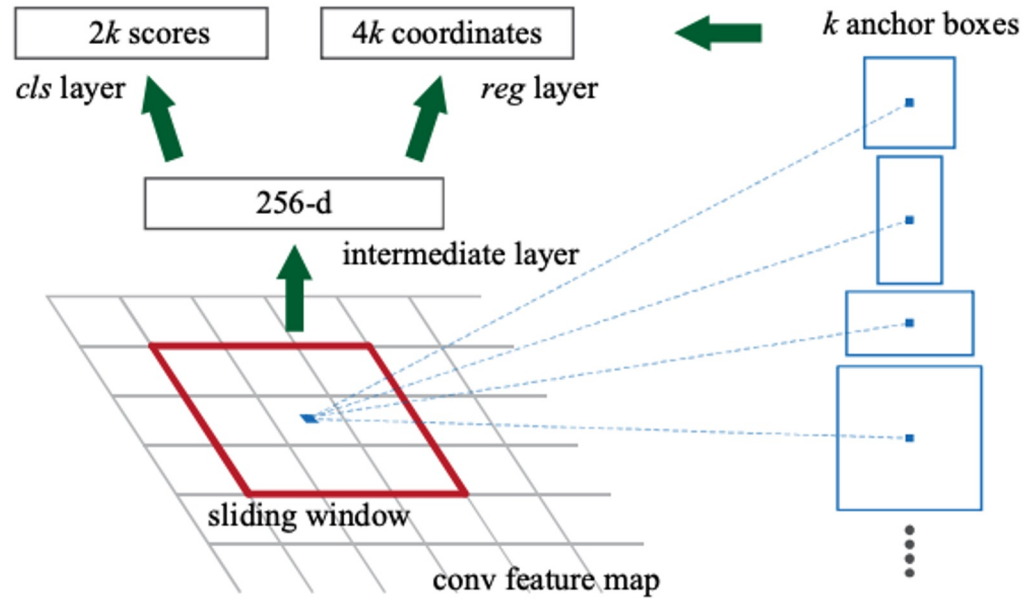
Workshop key concepts

Pretrained Models

- You will use `fasterrcnn_resnet50_fpn` for the lab
- The name refers to the neural architectures used in the model.
 - Resnet50 is a popular model that extracts useful information from an image tensor
 - Faster RCNN is an object-detection architecture that uses Resnet's extracted features to identify objects in an image
- The model has been trained on the COCO academic dataset
- Torchvision contains several more pretrained models for different use cases

Workshop key concepts

Fast R-CNN



<https://arxiv.org/pdf/1506.01497.pdf>

Workshop key concepts

COCO dataset

- COCO dataset contains many common objects.
- Models trained on COCO predict the class of the object as an integer.
- We then look up the integer to find out the object it represents

```
{  
  "0": "__background__",  
  "1": "person",  
  "2": "bicycle",  
  "3": "car",  
  ...  
  "88": "teddy bear",  
  "89": "hair drier",  
  "90": "toothbrush"  
}
```

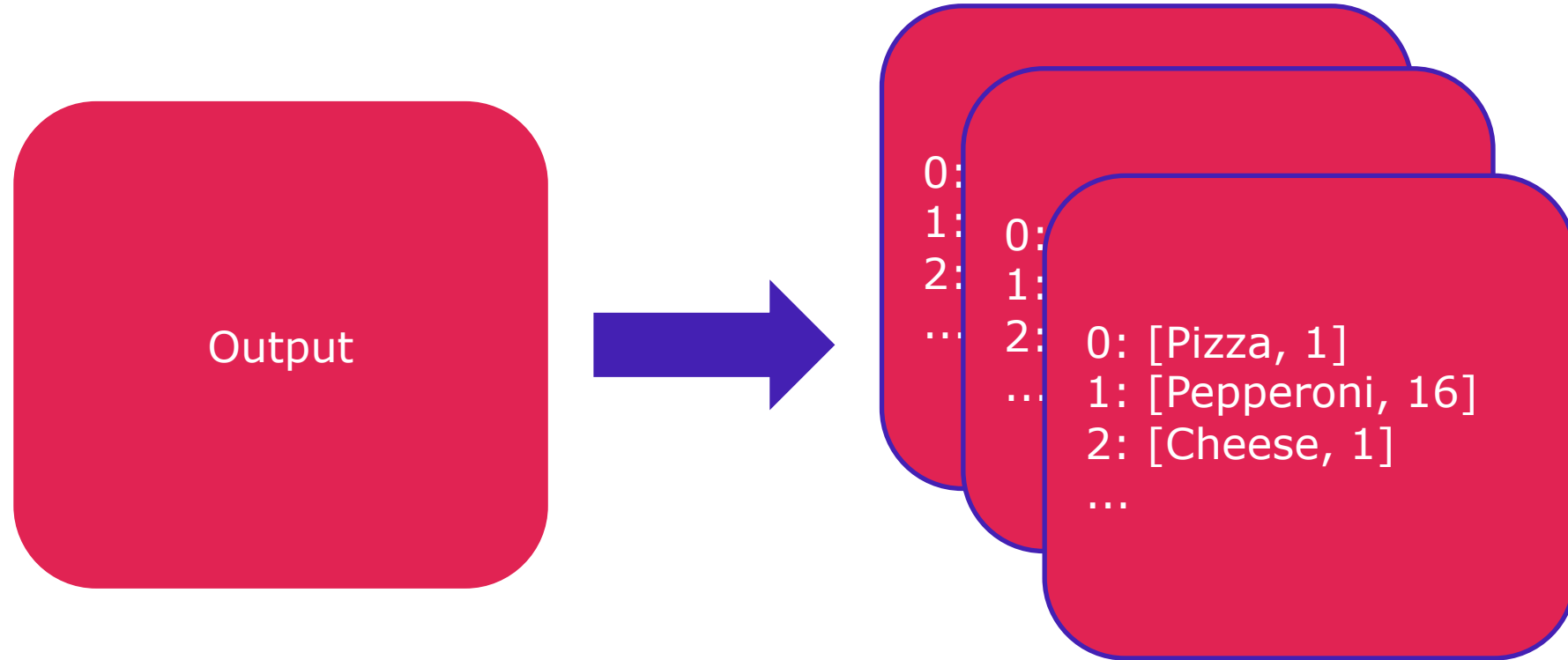
Workshop key concepts

Model Inference

- Process of generating a prediction from inputs
- In PyTorch, as simple as
prediction = model(input)
- If input is a batch of N samples, output is a batch of N predictions
- Each prediction is a list of the objects detected in the image, and how confident the model is about the detected object

Workshop key concepts

Post processing



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Use TorchVision to identify objects

Follow the steps at your own pace

45 MIN

11:15AM

<https://github.com/fbsamples/mit-dl-workshop>

<https://discord.gg/uNRcgFVW>

Workshop wrap-up

We learnt

- Image loading and manipulation in Python and PyTorch
- Loading pretrained models with Torchvision
- Batch processing in deep learning models
- Inference and post-processing with object detection models

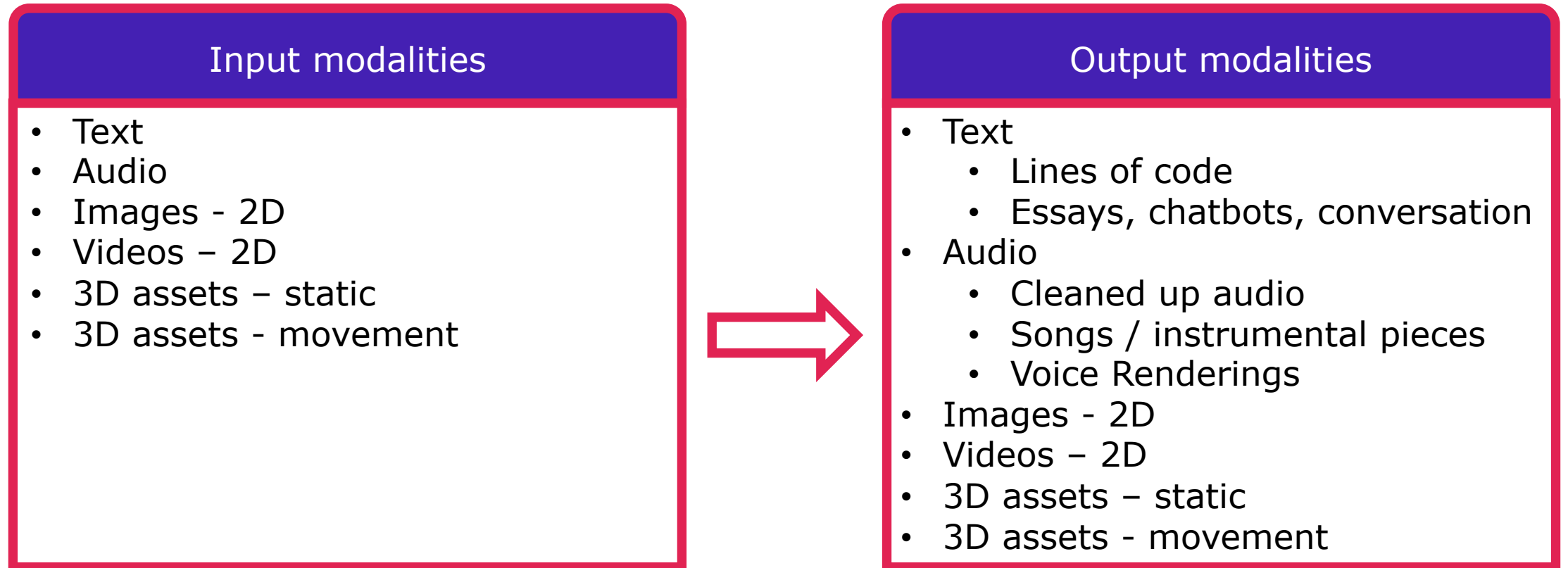
Generative AI

What is Generative AI?

What is a modality?

Input vs Output Modalities

Generative AI can be segmented by modality



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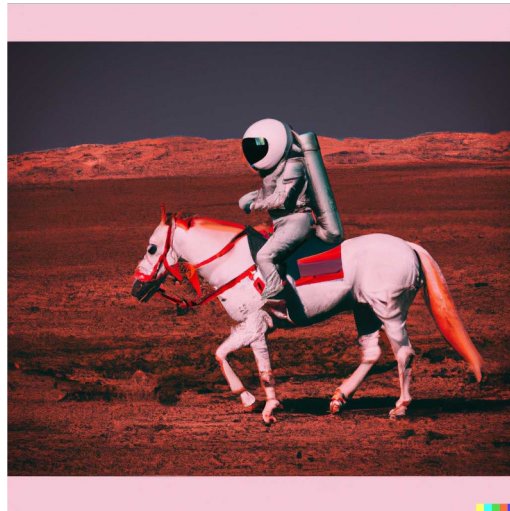
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Notable Players

Innovators in the generative AI space



DALL-E2



Stable Diffusion

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Refik Anadol Studios

Using data as pigments to generate a new artform



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Refik Anadol Studios

Check out the interview



<https://www.youtube.com/watch?v=yjPv2ltMt-E>

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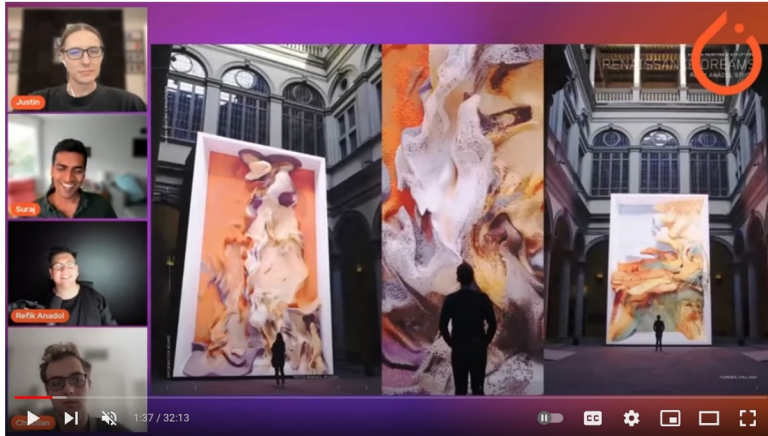
Intro to PyTorch

Generative AI

Workshop: Video Synopsis Generator

Create a text summary of a video

Easily create cliff's notes for videos!



Art & AI/ML collaborate in creative ways, like how the Refik Anadol Studio is powered by PyTorch. Watch Refik and Christian B. talk with Developer Advocates Suraj Subramanian and Justin Jeffress about how the Studio uses PyTorch to turn data into pigments...

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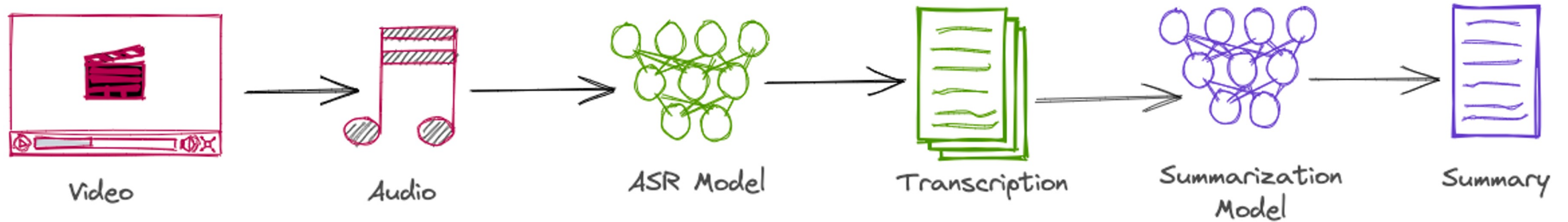
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Anatomy of the video summarizer

From video to text summary



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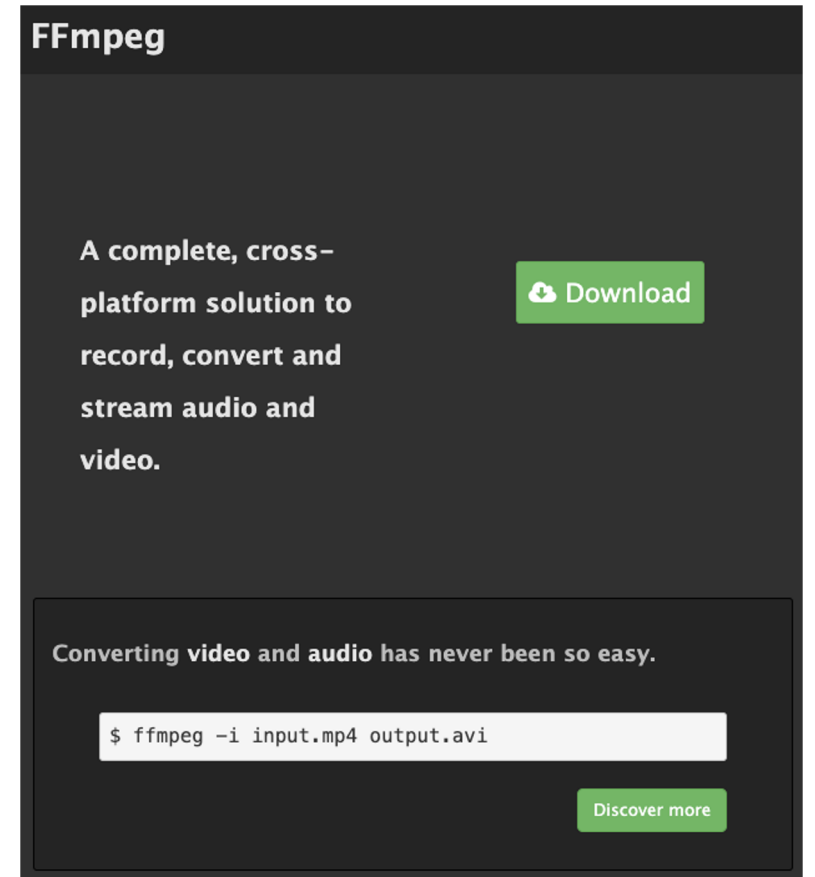
Generative AI

Workshop key concepts

Extract audio from video

- FFMPEG is a suite of libraries and programs for handling video, audio, other multimedia files, and streams.
- It is a command-line tool, but can also be called from python notebooks by prefixing an exclamation mark (!)

```
!ffmpeg -i input.mp4 output.avi
```



FFmpeg

A complete, cross-platform solution to record, convert and stream audio and video.

[Download](#)

Converting video and audio has never been so easy.

```
$ ffmpeg -i input.mp4 output.avi
```

[Discover more](#)

Workshop key concepts

Automatic Speech Recognition



Building models
with PyTorch is
fun!



Building models
with PyTorch is fun!

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Workshop key concepts

Text Summarization

- Produce a concise and accurate summary of the input text
- Earlier NLP architectures used recurrent neural networks (RNNs). Modern NLP models are transformer-based
- Summarization models are general language models that have been fine-tuned for summary generation using [datasets](#) like CNN Dailymail, Amazon reviews etc.
- Typically, models have limits on the input length i.e. the number of *tokens* constituting the input fed to the model

Workshop key concepts

Tokenization

- Splitting a large body of text into smaller pieces (*tokens*)
- Tokens can be words, phrases or even whole sentences
- Tokenization helps to make the text more manageable and easier to process.

"Build ing model s with Py Torch"

Build your video synopsis generator

Follow the steps at your own pace

60 MIN

<https://github.com/fbsamples/mit-dl-workshop/blob/main/video-summarizer/exercise.ipynb>

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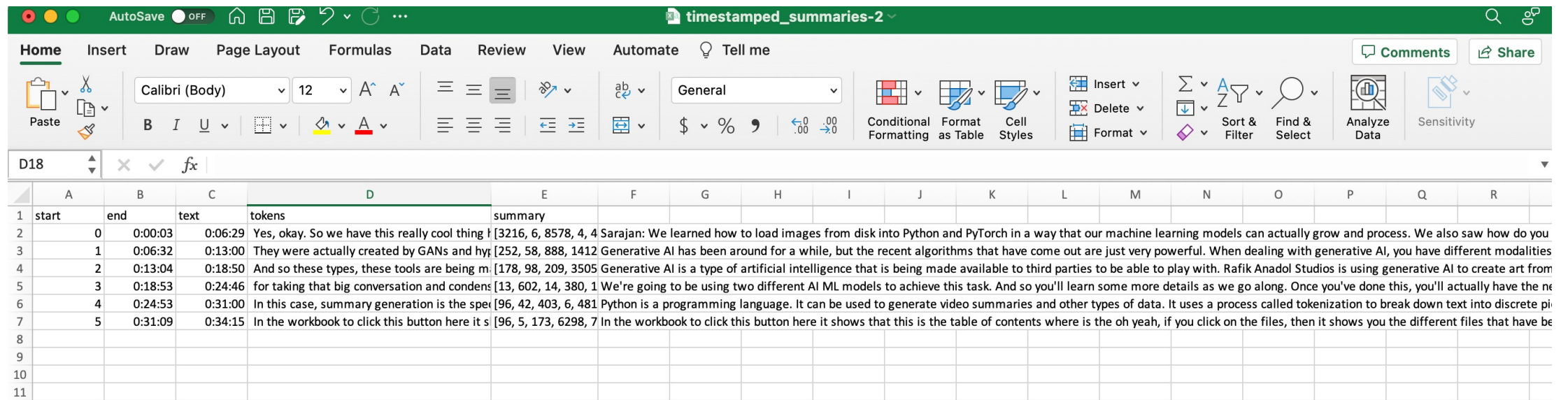
Workshop wrap-up

We learnt

- FFMPEG for audio extraction
- Automatic speech recognition
- NLP concepts (tokenization, summarization)
- Whisper and Huggingface APIs
- Pandas DataFrames

How might you use the summarizer?

We used it on the recording of this workshop!



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	start	end	text	tokens	summary													
2	0	0:00:03	0:06:29	Yes, okay. So we have this really cool thing	[3216, 6, 8578, 4, 4	Sarajan: We learned how to load images from disk into Python and PyTorch in a way that our machine learning models can actually grow and process. We also saw how do you												
3	1	0:06:32	0:13:00	They were actually created by GANs and hyp	[252, 58, 888, 1412	Generative AI has been around for a while, but the recent algorithms that have come out are just very powerful. When dealing with generative AI, you have different modalities												
4	2	0:13:04	0:18:50	And so these types, these tools are being m	[178, 98, 209, 3505	Generative AI is a type of artificial intelligence that is being made available to third parties to be able to play with. Rafik Anadol Studios is using generative AI to create art from												
5	3	0:18:53	0:24:46	for taking that big conversation and condens	[13, 602, 14, 380, 1	We're going to be using two different AI ML models to achieve this task. And so you'll learn some more details as we go along. Once you've done this, you'll actually have the ne												
6	4	0:24:53	0:31:00	In this case, summary generation is the spe	[96, 42, 403, 6, 481	Python is a programming language. It can be used to generate video summaries and other types of data. It uses a process called tokenization to break down text into discrete pi												
7	5	0:31:09	0:34:15	In the workbook to click this button here it s	[96, 5, 173, 6298, 7	In the workbook to click this button here it shows that this is the table of contents where is the oh yeah, if you click on the files, then it shows you the different files that have be												
8																		
9																		
10																		
11																		

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How might you use the summarizer?

We used it on the recording of this workshop!

When dealing with generative AI, you have different modalities. An input modality could be text, it could be audio. It could be images, videos, 3D assets. Generative AI is a type of artificial intelligence that is being made available to third parties to be able to play with. Rafik Anadol Studios is using generative AI to create art from people's brainwaves. We're going to go through a workshop on how to create a video synopsis generator with AI. We're going to be using two different AI ML models to achieve this task. And so you'll learn some more details as we go along. Once you've done this, you'll actually have the necessary components to be able to do whatever video you want to. Python is a programming language. It can be used to generate video summaries and other types of data.

Feedback

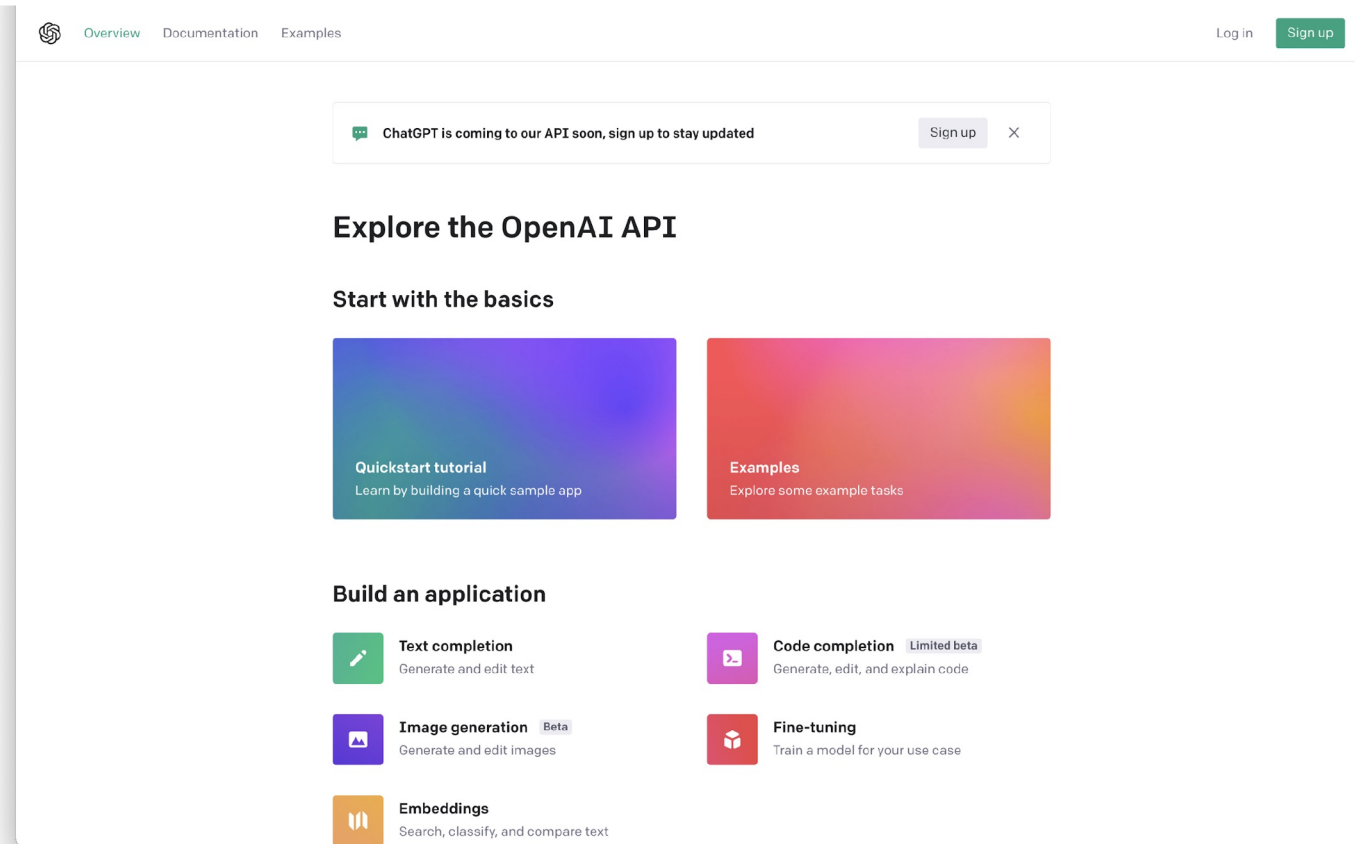
It helps us improve our content

<https://forms.gle/fYp6LdCcdufTRczc7>

Generative AI (cont.)

OpenAI

Text completion, image and code generation; Oh my!



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chatGPT

Virtual writing assistant



Welcome our generative AI workshop guests.



Welcome, everyone, to the generative AI workshop! I'm excited to be a part of this learning experience with all of you. Let's dive into the world of generative AI and explore the possibilities it has to offer. Get ready to engage in hands-on activities and create amazing AI models. Let's get started!





chatGPT

You can change the writing style with a simple prompt!

SL

Welcome our generative AI workshop guests in the spirit of a pirate.



Ahoy mateys! Ye be heartily welcomed to this here generative AI workshop. I be a pirate of the seven neural nets and I'll be yer guide on this voyage. So hoist the black flag, grab yer laptops and let's set sail to the high seas of artificial intelligence. Arrr!  

Not trained on anything post 2021

Don't worry you can fill in the gaps

SL

Please write an abstract for a talk at an open-source summit. The topic is about PyTorch 2.0 and will highlight PyTorch 2.0 is fully backwards compatible, speeds up model training speedup of approximately 43 percent, and will provide an overview of the technology stack that powers the new torch compile API.

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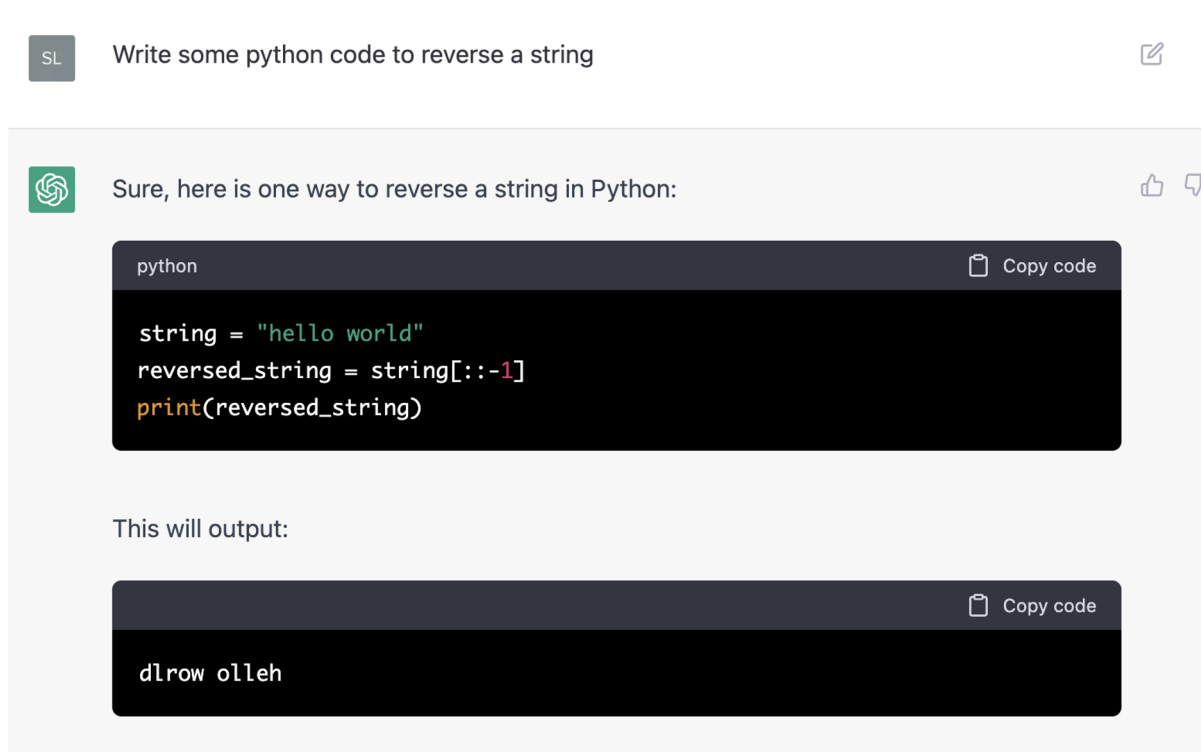
In this talk, we will delve into the exciting world of PyTorch 2.0, the latest version of the widely-used open-source deep learning framework. Attendees will learn about the key features of PyTorch 2.0, including its full backwards compatibility and the speedup of model training by 43%. Additionally, we will provide a comprehensive overview of the technology stack that powers the new torch compile API, showcasing how it helps streamline the model development process and make it easier for users to take advantage of PyTorch's capabilities. Whether you are a seasoned PyTorch user or new to the framework, this talk will provide valuable insights into the future of PyTorch and how it is shaping the deep learning landscape.



Title: "PyTorch 2.0: Unlocking the Power of Deep Learning with Backwards Compatibility and the Torch Compile API"

Need help coding?

Should I go to Stack Overflow or chatGPT?



The screenshot shows a chat interface. At the top, a user with the initials 'SL' asks, "Write some python code to reverse a string". Below this, the ChatGPT logo is followed by the response: "Sure, here is one way to reverse a string in Python:". The response includes a code block with the following Python code:

```
python
string = "hello world"
reversed_string = string[::-1]
print(reversed_string)
```

 Below the code block, it says "This will output:" followed by another code block showing the output:

```
d!row olleh
```

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Need help coding?

Do it manually using recursion



Sure! Here's how you can manually reverse a string using recursion in Python:



python

Copy code

```
def reverse_string(string):  
    # Base case: return empty string or string of length 1  
    if len(string) == 0 or len(string) == 1:  
        return string  
  
    # Recursive case: concatenate the last character with the reversed substring  
    return string[-1] + reverse_string(string[:-1])  
  
# Example usage  
string = "hello world"  
reversed_string = reverse_string(string)  
print(reversed_string)
```

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Other things to try

Poetry

SL write a haiku about cats in the style of a jimmi hendrix song



Alright, here's a haiku about cats in the style of a Jimi Hendrix song:



Feline eyes aglow,
Purring riffs of love and soul,
Jazz cats, hear them roll.

Workshop: Generative AI as a creative partner

Get your OpenAI API Key

How do I get one?

The screenshot shows the OpenAI developer dashboard. At the top, there is a navigation bar with links for Overview, Documentation, Examples, and Playground. On the right side of the navigation bar, there are links for Upgrade, Help, and a Personal profile icon, which is highlighted with a red box. Below the navigation bar, there is a notification banner that says "ChatGPT is coming to our API soon, sign up to stay updated" with a "Sign up" button and a close icon. The main content area is titled "Welcome to OpenAI" and "Start with the basics". It features two large colored boxes: a blue/purple gradient box for "Quickstart tutorial" (Learn by building a quick sample app) and a red/pink gradient box for "Examples" (Explore some example tasks). Below these, there is a section titled "Build an application" with five service cards: "Text completion" (Generate and edit text), "Code completion" (Limited beta, Generate, edit, and explain code), "Image generation" (Beta, Generate and edit images), "Fine-tuning" (Train a model for your use case), and "Embeddings" (Search, classify, and compare text).

Introduction

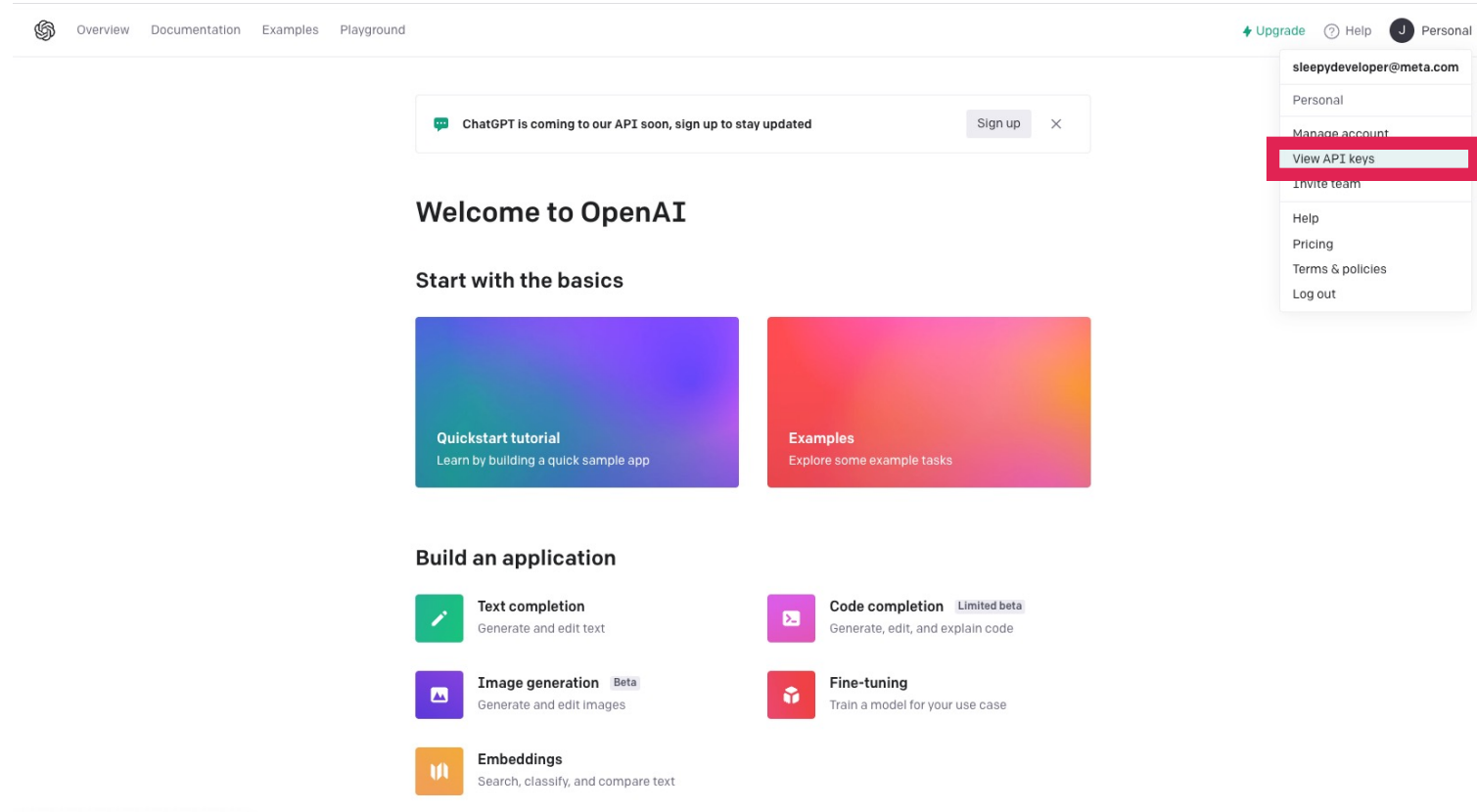
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The screenshot shows the OpenAI developer dashboard. At the top, there is a navigation bar with links for Overview, Documentation, Examples, and Playground. On the right, there are links for Upgrade, Help, and Personal. A notification banner at the top center states "ChatGPT is coming to our API soon, sign up to stay updated" with a "Sign up" button. The main content area is titled "Welcome to OpenAI" and includes a "Start with the basics" section with links for "Quickstart tutorial" and "Examples". Below this is a "Build an application" section with five options: Text completion, Image generation (Beta), Embeddings, Code completion (Limited beta), and Fine-tuning. On the right side, a user menu is open for the account "sleepydeveloper@meta.com", and the "View API keys" option is highlighted with a red box.

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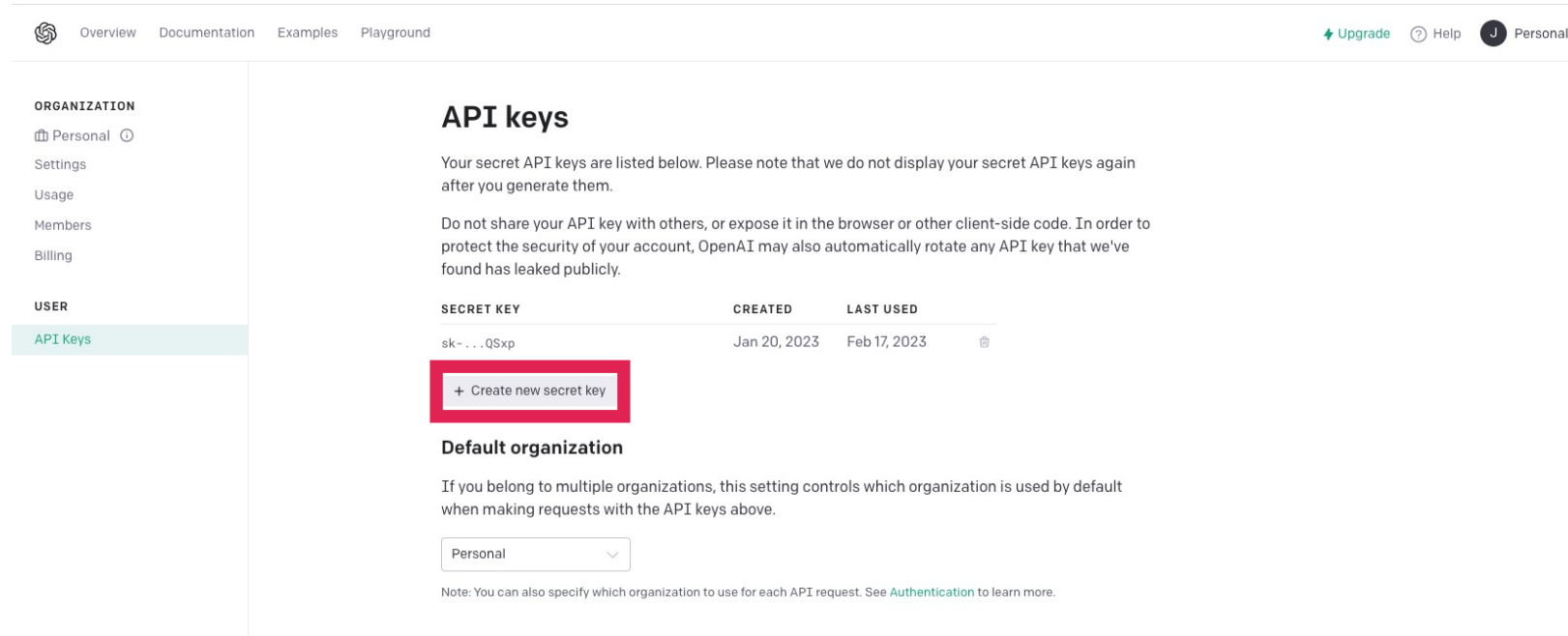
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How do I get one?



Overview Documentation Examples Playground Upgrade Help Personal

ORGANIZATION

- Personal
- Settings
- Usage
- Members
- Billing

USER

- API Keys

API keys

Your secret API keys are listed below. Please note that we do not display your secret API keys again after you generate them.

Do not share your API key with others, or expose it in the browser or other client-side code. In order to protect the security of your account, OpenAI may also automatically rotate any API key that we've found has leaked publicly.

SECRET KEY	CREATED	LAST USED
sk-...0Sxp	Jan 20, 2023	Feb 17, 2023

[+ Create new secret key](#)

Default organization

If you belong to multiple organizations, this setting controls which organization is used by default when making requests with the API keys above.

Personal

Note: You can also specify which organization to use for each API request. See [Authentication](#) to learn more.

Introduction

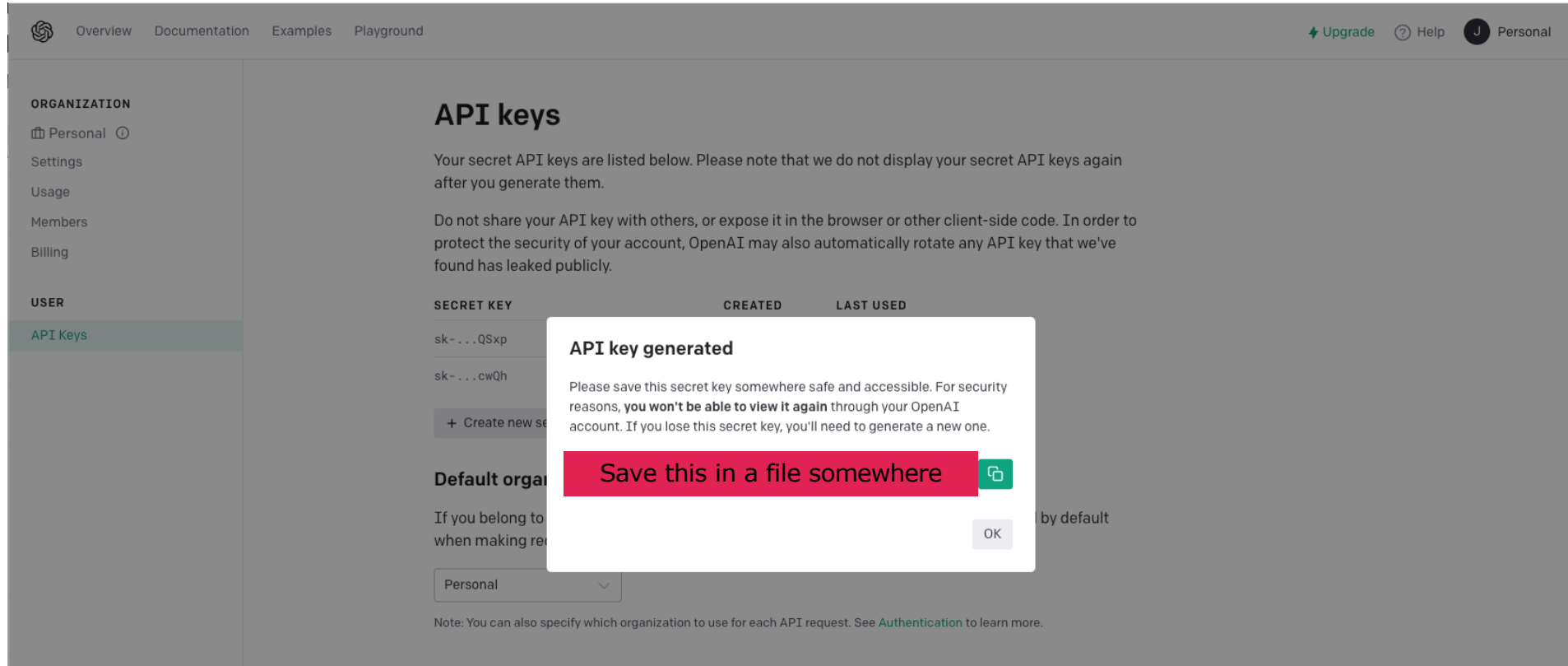
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Get your OpenAI API Key

How do I get one?



The screenshot shows the OpenAI API keys management interface. The page title is "API keys". A warning message states: "Your secret API keys are listed below. Please note that we do not display your secret API keys again after you generate them. Do not share your API key with others, or expose it in the browser or other client-side code. In order to protect the security of your account, OpenAI may also automatically rotate any API key that we've found has leaked publicly." Below this is a table with columns "SECRET KEY", "CREATED", and "LAST USED". Two keys are visible: "sk-...QSxp" and "sk-...cwQh". A "+ Create new secret key" button is present. A modal dialog titled "API key generated" is open, displaying the key "sk-...cwQh" and the instruction: "Please save this secret key somewhere safe and accessible. For security reasons, you won't be able to view it again through your OpenAI account. If you lose this secret key, you'll need to generate a new one." A red box highlights the text "Save this in a file somewhere" with a copy icon. An "OK" button is at the bottom of the modal. The background shows the "Default organization" dropdown set to "Personal".

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Part 1: Create your Open AI Key

Create an account, save your API key, and write a story

5 MIN

<https://openai.com/api/>

<https://discord.gg/uNRcgFVW>

Part 2: Personal Assistant with openAI

```
? What do you want to do? (Use arrow keys)
  freetext
  rewrite
  write_passage
  write_essay
  write_segue
» advertise
  mixologist
  pytorch_help
  chef
```

Part 2: Personal Assistant with openAI

? What do you want to do? **advertise**

Prompt template: Create a campaign to promote {product}. You will choose a target audience, develop key messages and slogans, select the media channels for promotion, and decide on any additional activities needed to reach your goals.

? product: █

Part 2: Personal Assistant with openAI

? What do you want to do? **advertise**

Prompt template: Create a campaign to promote {product}. You will choose a target audience, develop key messages and slogans, select the media channels for promotion, and decide on any additional activities needed to reach your goals.

? product: **a device that translates dog barks to english**

Generating response....

Additional Activities:

1. Host a virtual launch party for the device and invite influencers, pet owners, and pet industry professionals.
2. Create a series of videos with owners using the device and sharing their experiences.
3. Offer discounts to pet owners who purchase the product.
4. Create a user-generated content campaign to encourage pet owners to share how the device helps them understand their pets.

Media Channels:

1. Social Media Ads: Facebook, Instagram, and Twitter
2. Digital Video Ads
3. Online Pet Communities
4. Influencer Marketing
5. Blogs, Websites, and Forums

Target Audience: Dog owners, age 25–45

Key Messages:

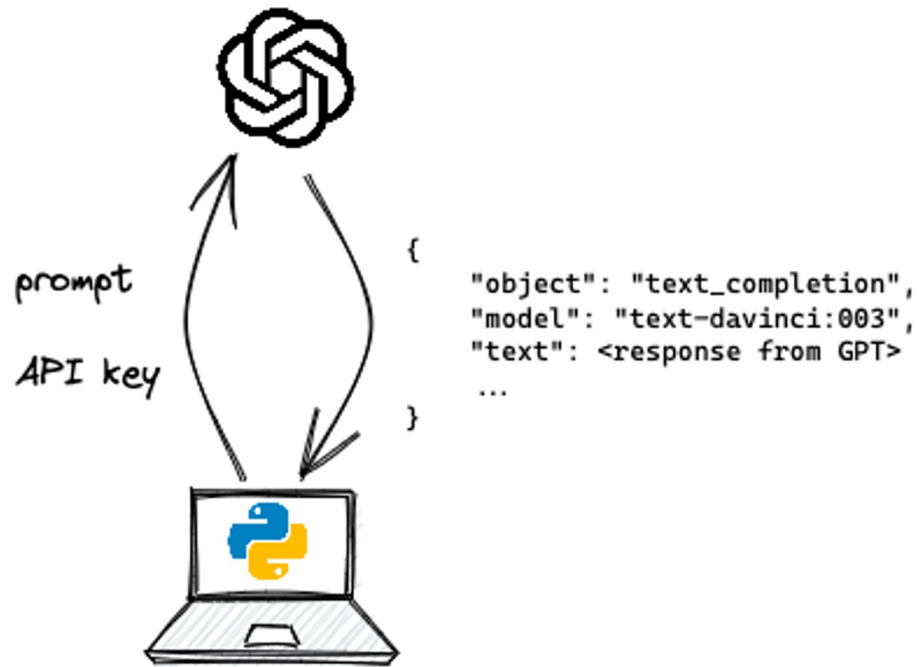
1. Know what your dog is saying with [Product Name].
2. Unlock the secret conversations between you and your dog with [Product Name].
3. Nurture a deeper understanding of your dog with [Product Name].

Slogans:

1. A New Way to Talk to Your Dog.
2. Unlock the Barkcode.
3. Don't Miss the Bark.

Workshop key concepts

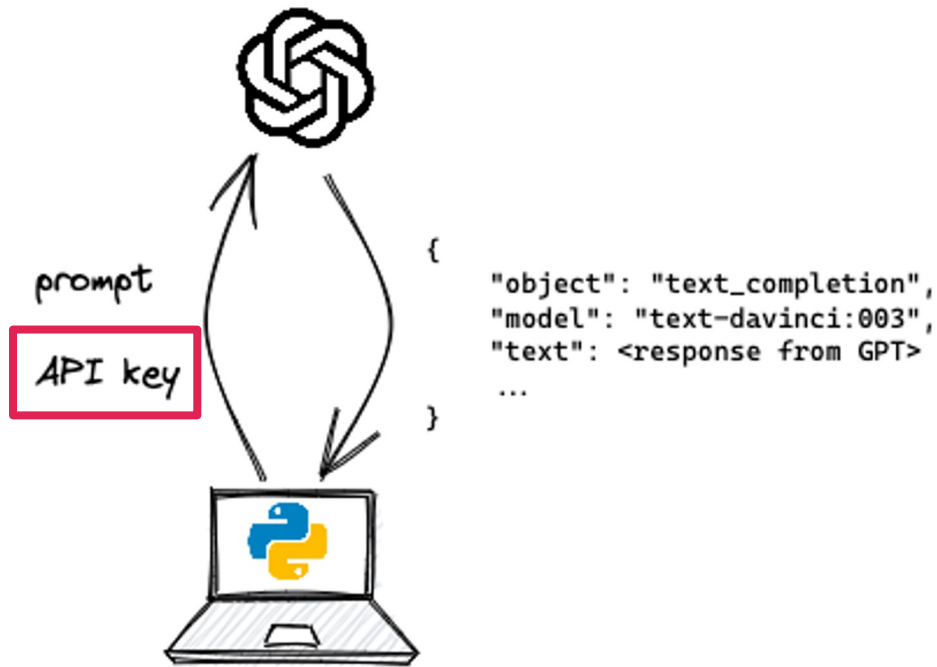
Calling GPT from Python



```
1  import openai  
2  
3  openai.api_key_path = 'apikey'  
4  
5  my_prompt = "Write python code... "  
6  response = openai.Completion.create(  
7      model="text-davinci-003",  
8      temperature=0.75,  
9      max_tokens=650,  
10     top_p=1,  
11     frequency_penalty=0,  
12     presence_penalty=0,  
13     prompt=my_prompt  
14 )  
15  
16 gpt_answer = response['choices'][0]['text']
```

Workshop key concepts

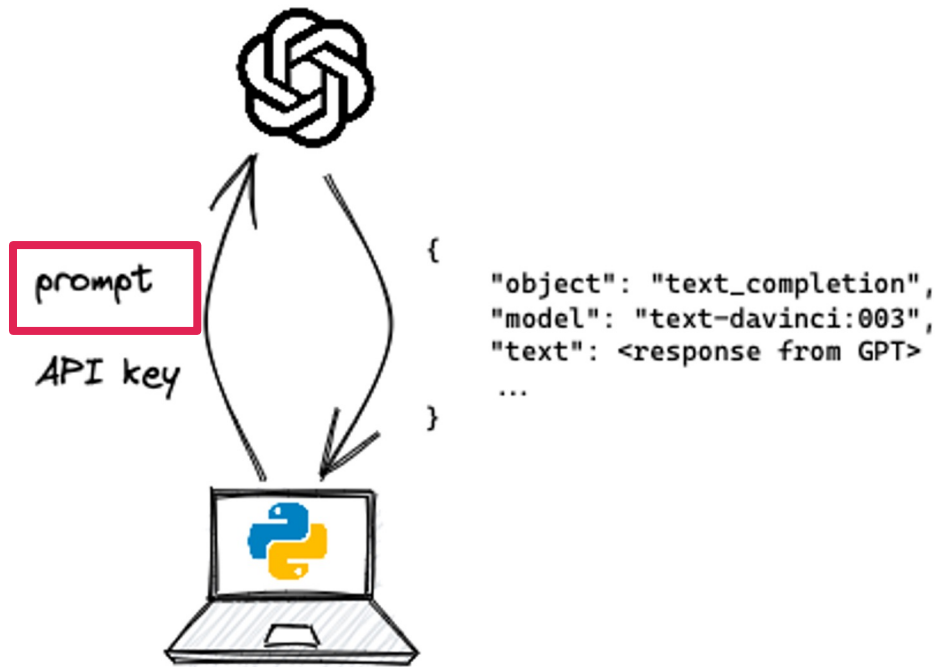
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Workshop key concepts

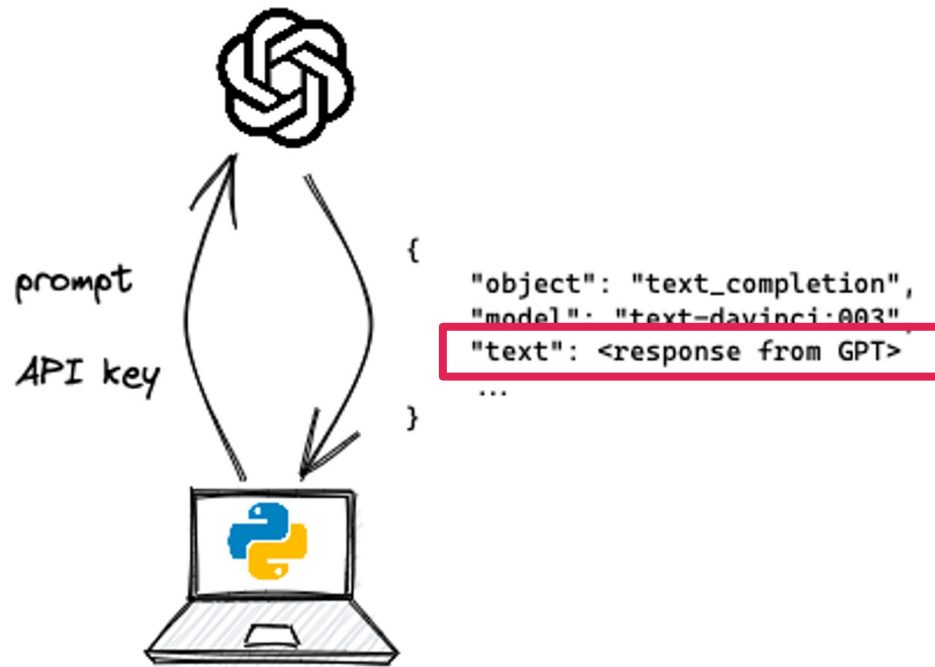
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Workshop key concepts

Calling GPT from Python



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15  
16 gpt_answer = response['choices'][0]['text']
```

Workshop key concepts

Prompt dictionary

- YAML file containing tasks and their prompt templates
- Prompt templates contain placeholders for user inputs

```
advertise: "Create a campaign to promote {product}. You will choose a target audience, develop key messages and slogans, select the media channels for promotion, and decide on any additional activities needed to reach your goals."
```

```
mixologist: "Create 2 imaginative and inspiring cocktails using the following ingredients: {ingredients}. Include as many different ingredients as necessary, The cocktails must be delicious."
```

```
pytorch_help: "Write pytorch code to {task}"
```

```
chef: "Create a michelin starred dish that I can cook in 20 minutes using the following ingredients: {ingredients}. Include as many different or exotic ingredients as you can."
```

Call OpenAPI from your own code

Follow the steps at your own pace

30 MIN

<https://replit.com/@sus118/AskGPT-CLI-Tool#INSTRUCTIONS-README.MD>

<https://discord.gg/uNRcgFVW>

Workshop wrap-up

We learnt

- How to create your own personal customizable tool to interact with GPT
- Calling the GPT API from Python
- Building pretty command-line tools with questionary
- Running Python on the cloud

Follow PyTorch!

For news, tutorials, and sample code

Social Networks

- @PyTorch
- www.linkedin.com/company/pytorch/
- www.facebook.com/pytorch/

GitHub

- <http://github.com/pytorch>

Check the events page!

- <http://pytorch.org/events>

Follow Meta Open Source

For news about all Meta's other open source projects

Social Networks

- @MetaOpenSource
- www.facebook.com/pytorch/
- Instagram

Feedback

It helps us improve our content

<https://forms.gle/fYp6LdCcdufTRczc7>

Thank You!

Introduction to AI/ML Concepts



Justin Jeffress

Developer Advocate

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Suraj Subramanian

Developer Advocate

@subramen