runtime -> change runtime -> t4 GPU

```
from google.colab import drive
drive.mount('/content/drive')
```

⤷ Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).

```
!nvidia-smi
```

⤷ Sun Jul 27 05:41:44 2025
```
+-----------------------------------------------------------------------------------------+
| NVIDIA-SMI 550.54.15              Driver Version: 550.54.15      CUDA Version: 12.4      |
|-----------------------------------------+------------------------+----------------------+
| GPU  Name                 Persistence-M | Bus-Id          Disp.A | Volatile Uncorr. ECC |
| Fan  Temp    Perf          Pwr:Usage/Cap |          Memory-Usage | GPU-Util  Compute M. |
|                                          |                        |               MIG M. |
|=========================================+========================+======================|
|   0  Tesla T4                       Off  | 00000000:00:04.0 Off  |                    0 |
| N/A   51C    P8            10W /   70W  |     0MiB /  15360MiB  |      0%      Default |
|                                          |                        |                  N/A |
+-----------------------------------------+------------------------+----------------------+

+-----------------------------------------------------------------------------------------+
| Processes:                                                                              |
|  GPU   GI   CI          PID   Type   Process name                          GPU Memory  |
|        ID   ID                                                              Usage       |
|=========================================================================================|
|  No running processes found                                                             |
+-----------------------------------------------------------------------------------------+
```

⌄ Text Generation

```
generator = pipeline("text-generation", model = 'gpt2')
response = generator('What is Hugging Face', max_length = 40, num_return_sequences = 1)
print(response[0]['generated_text'])
```

⤷ Device set to use cuda:0
Truncation was not explicitly activated but `max_length` is provided a specific value, please use `truncation=True` to explicitly
Setting `pad_token_id` to `eos_token_id`:50256 for open-end generation.
Both `max_new_tokens` (=256) and `max_length`(=40) seem to have been set. `max_new_tokens` will take precedence. Please refer to t
What is Hugging Face?

Hugging Face is a form of facial communication.

It is something you do with your other friends.

You do it with the same person.

This is a normal human interaction.

But not all people are like this.

The Hugging Face is not your normal interaction.

It is something that happens while you are in public.

It is something that you make friends with.

You are on your own.

You are loved.

You are known.

You are loved.

You are loved.

You are loved.

You are loved.

You are loved.

You are loved.

You are loved.

You are loved.

You are loved.

You are loved.

```
    You are loved.

    You are loved.

    You are loved.

    You are loved.

    You are loved.

    You are loved
```

NER(Named Entity Recognition)

```python
from transformers import pipeline
ner = pipeline('ner', grouped_entities = True)
ner('Hugging face is based on NYC and partner with Google with $200 doller price')
```

```
⇥   No model was supplied, defaulted to dbmdz/bert-large-cased-finetuned-conll03-english and revision 4c53496 (https://huggingface.co/db
    Using a pipeline without specifying a model name and revision in production is not recommended.
    Some weights of the model checkpoint at dbmdz/bert-large-cased-finetuned-conll03-english were not used when initializing BertForToke
    - This IS expected if you are initializing BertForTokenClassification from the checkpoint of a model trained on another task or with
    - This IS NOT expected if you are initializing BertForTokenClassification from the checkpoint of a model that you expect to be exact
    Device set to use cuda:0
    /usr/local/lib/python3.11/dist-packages/transformers/pipelines/token_classification.py:181: UserWarning: `grouped_entities` is depre
      warnings.warn(
    [{'entity_group': 'LOC',
      'score': np.float32(0.9934869),
      'word': 'NYC',
      'start': 25,
      'end': 28},
     {'entity_group': 'ORG',
      'score': np.float32(0.9987251),
      'word': 'Google',
      'start': 46,
      'end': 52}]
```

```python
ner('Hello, I am Vaishnavi. A data science, AI, GenAI enthusiast')
```

```
⇥   [{'entity_group': 'PER',
      'score': np.float32(0.93323547),
      'word': 'Vaishnavi',
      'start': 12,
      'end': 21},
     {'entity_group': 'MISC',
      'score': np.float32(0.8791859),
      'word': 'AI',
      'start': 39,
      'end': 41},
     {'entity_group': 'MISC',
      'score': np.float32(0.9244859),
      'word': 'GenAI',
      'start': 43,
      'end': 48}]
```

Sentiment Analysis

```python
#!pip install transformers datasets
```

```
⇥   Requirement already satisfied: transformers in /usr/local/lib/python3.11/dist-packages (4.53.3)
    Requirement already satisfied: datasets in /usr/local/lib/python3.11/dist-packages (4.0.0)
    Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from transformers) (3.18.0)
    Requirement already satisfied: huggingface-hub<1.0,>=0.30.0 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.33.4)
    Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.11/dist-packages (from transformers) (2.0.2)
    Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.11/dist-packages (from transformers) (25.0)
    Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.11/dist-packages (from transformers) (6.0.2)
    Requirement already satisfied: regex!=2019.12.17 in /usr/local/lib/python3.11/dist-packages (from transformers) (2024.11.6)
    Requirement already satisfied: requests in /usr/local/lib/python3.11/dist-packages (from transformers) (2.32.3)
    Requirement already satisfied: tokenizers<0.22,>=0.21 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.21.2)
    Requirement already satisfied: safetensors>=0.4.3 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.5.3)
    Requirement already satisfied: tqdm>=4.27 in /usr/local/lib/python3.11/dist-packages (from transformers) (4.67.1)
    Requirement already satisfied: pyarrow>=15.0.0 in /usr/local/lib/python3.11/dist-packages (from datasets) (18.1.0)
    Requirement already satisfied: dill<0.3.9,>=0.3.0 in /usr/local/lib/python3.11/dist-packages (from datasets) (0.3.8)
    Requirement already satisfied: pandas in /usr/local/lib/python3.11/dist-packages (from datasets) (2.2.2)
    Requirement already satisfied: xxhash in /usr/local/lib/python3.11/dist-packages (from datasets) (3.5.0)
    Requirement already satisfied: multiprocess<0.70.17 in /usr/local/lib/python3.11/dist-packages (from datasets) (0.70.16)
    Requirement already satisfied: fsspec<=2025.3.0,>=2023.1.0 in /usr/local/lib/python3.11/dist-packages (from fsspec[http]<=2025.3.0,:
    Requirement already satisfied: aiohttp!=4.0.0a0,!=4.0.0a1 in /usr/local/lib/python3.11/dist-packages (from fsspec[http]<=2025.3.0,>=
    Requirement already satisfied: typing-extensions>=3.7.4.3 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub<1.0,>=0.:
    Requirement already satisfied: hf-xet<2.0.0,>=1.1.2 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub<1.0,>=0.30.0->1
    Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests->transformers) (3
```

```
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests->transformers) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests->transformers) (2.5.0)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests->transformers) (2025.7.1
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.11/dist-packages (from pandas->datasets) (2.9.0.post
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.11/dist-packages (from pandas->datasets) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.11/dist-packages (from pandas->datasets) (2025.2)
Requirement already satisfied: aiohappyeyeballs>=2.5.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp!=4.0.0a0,!=4.0.0a1->
Requirement already satisfied: aiosignal>=1.4.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp!=4.0.0a0,!=4.0.0a1->fsspec
Requirement already satisfied: attrs>=17.3.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp!=4.0.0a0,!=4.0.0a1->fsspec[htt
Requirement already satisfied: frozenlist>=1.1.1 in /usr/local/lib/python3.11/dist-packages (from aiohttp!=4.0.0a0,!=4.0.0a1->fsspec
Requirement already satisfied: multidict<7.0,>=4.5 in /usr/local/lib/python3.11/dist-packages (from aiohttp!=4.0.0a0,!=4.0.0a1->fssp
Requirement already satisfied: propcache>=0.2.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp!=4.0.0a0,!=4.0.0a1->fsspec
Requirement already satisfied: yarl<2.0,>=1.17.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp!=4.0.0a0,!=4.0.0a1->fsspec
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-packages (from python-dateutil>=2.8.2->pandas->datasets)
```

```python
#from transformers import pipeline

classifier = pipeline('sentiment-analysis')
result = classifier('I love eating an apple. Apple is my favorite fruit')
print(result)
```

```
No model was supplied, defaulted to distilbert/distilbert-base-uncased-finetuned-sst-2-english and revision 714eb0f (https://huggin
Using a pipeline without specifying a model name and revision in production is not recommended.
config.json: 100%                                             629/629 [00:00<00:00, 34.7kB/s]

model.safetensors: 100%                                       268M/268M [00:13<00:00, 23.1MB/s]

tokenizer_config.json: 100%                                   48.0/48.0 [00:00<00:00, 4.22kB/s]

vocab.txt:        232k/? [00:00<00:00, 13.0MB/s]

Device set to use cuda:0
[{'label': 'POSITIVE', 'score': 0.9994361996650696}]
```

```python
result1 = classifier('I did not like that act. It could have been bette.')
print(result1)
```

```
[{'label': 'NEGATIVE', 'score': 0.9916947484016418}]
```

⌄ Frontend

```python
#!pip install gradio
```

```
Requirement already satisfied: gradio in /usr/local/lib/python3.11/dist-packages (5.38.1)
Requirement already satisfied: aiofiles<25.0,>=22.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (24.1.0)
Requirement already satisfied: anyio<5.0,>=3.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (4.9.0)
Requirement already satisfied: brotli>=1.1.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (1.1.0)
Requirement already satisfied: fastapi<1.0,>=0.115.2 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.116.1)
Requirement already satisfied: ffmpy in /usr/local/lib/python3.11/dist-packages (from gradio) (0.6.1)
Requirement already satisfied: gradio-client==1.11.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (1.11.0)
Requirement already satisfied: groovy~=0.1 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.1.2)
Requirement already satisfied: httpx<1.0,>=0.24.1 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.28.1)
Requirement already satisfied: huggingface-hub>=0.28.1 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.33.4)
Requirement already satisfied: jinja2<4.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (3.1.6)
Requirement already satisfied: markupsafe<4.0,>=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (3.0.2)
Requirement already satisfied: numpy<3.0,>=1.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.0.2)
Requirement already satisfied: orjson~=3.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (3.11.0)
Requirement already satisfied: packaging in /usr/local/lib/python3.11/dist-packages (from gradio) (25.0)
Requirement already satisfied: pandas<3.0,>=1.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.2.2)
Requirement already satisfied: pillow<12.0,>=8.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (11.3.0)
Requirement already satisfied: pydantic<2.12,>=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.11.7)
Requirement already satisfied: pydub in /usr/local/lib/python3.11/dist-packages (from gradio) (0.25.1)
Requirement already satisfied: python-multipart>=0.0.18 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.0.20)
Requirement already satisfied: pyyaml<7.0,>=5.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (6.0.2)
Requirement already satisfied: ruff>=0.9.3 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.12.4)
Requirement already satisfied: safehttpx<0.2.0,>=0.1.6 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.1.6)
Requirement already satisfied: semantic-version~=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.10.0)
Requirement already satisfied: starlette<1.0,>=0.40.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.47.2)
Requirement already satisfied: tomlkit<0.14.0,>=0.12.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.13.3)
Requirement already satisfied: typer<1.0,>=0.12 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.16.0)
Requirement already satisfied: typing-extensions~=4.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (4.14.1)
Requirement already satisfied: uvicorn>=0.14.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.35.0)
Requirement already satisfied: fsspec in /usr/local/lib/python3.11/dist-packages (from gradio-client==1.11.0->gradio) (2025.3.0)
Requirement already satisfied: websockets<16.0,>=10.0 in /usr/local/lib/python3.11/dist-packages (from gradio-client==1.11.0->gradio
Requirement already satisfied: idna>=2.8 in /usr/local/lib/python3.11/dist-packages (from anyio<5.0,>=3.0->gradio) (3.10)
Requirement already satisfied: sniffio>=1.1 in /usr/local/lib/python3.11/dist-packages (from anyio<5.0,>=3.0->gradio) (1.3.1)
Requirement already satisfied: certifi in /usr/local/lib/python3.11/dist-packages (from httpx<1.0,>=0.24.1->gradio) (2025.7.14)
Requirement already satisfied: httpcore==1.* in /usr/local/lib/python3.11/dist-packages (from httpx<1.0,>=0.24.1->gradio) (1.0.9)
Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.11/dist-packages (from httpcore==1.*->httpx<1.0,>=0.24.1->gradio
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from huggingface-hub>=0.28.1->gradio) (3.18.0)
Requirement already satisfied: requests in /usr/local/lib/python3.11/dist-packages (from huggingface-hub>=0.28.1->gradio) (2.32.3)
Requirement already satisfied: tqdm>=4.42.1 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub>=0.28.1->gradio) (4.67
Requirement already satisfied: hf-xet<2.0.0,>=1.1.2 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub>=0.28.1->gradio
```

```
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.11/dist-packages (from pandas<3.0,>=1.0->gradio) (2
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.11/dist-packages (from pandas<3.0,>=1.0->gradio) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.11/dist-packages (from pandas<3.0,>=1.0->gradio) (2025.2)
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.11/dist-packages (from pydantic<2.12,>=2.0->gradio)
Requirement already satisfied: pydantic-core==2.33.2 in /usr/local/lib/python3.11/dist-packages (from pydantic<2.12,>=2.0->gradio)
Requirement already satisfied: typing-inspection>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from pydantic<2.12,>=2.0->gradic
Requirement already satisfied: click>=8.0.0 in /usr/local/lib/python3.11/dist-packages (from typer<1.0,>=0.12->gradio) (8.2.1)
Requirement already satisfied: shellingham>=1.3.0 in /usr/local/lib/python3.11/dist-packages (from typer<1.0,>=0.12->gradio) (1.5.4
Requirement already satisfied: rich>=10.11.0 in /usr/local/lib/python3.11/dist-packages (from typer<1.0,>=0.12->gradio) (13.9.4)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-packages (from python-dateutil>=2.8.2->pandas<3.0,>=1.0->g
Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.11/dist-packages (from rich>=10.11.0->typer<1.0,>=0.1
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.11/dist-packages (from rich>=10.11.0->typer<1.0,>=€
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests->huggingface-hub>=
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests->huggingface-hub>=0.28.1
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.11/dist-packages (from markdown-it-py>=2.2.0->rich>=10.11.0->typ
```

```python
import gradio as gr
#from transformer import pipeline

classifier = pipeline('sentiment-analysis')

def analyze_sentiment (text):
  return classifier(text)[0]['label']

gr.Interface(fn = analyze_sentiment, inputs ='text', outputs = 'text').launch()
```

```
No model was supplied, defaulted to distilbert/distilbert-base-uncased-finetuned-sst-2-english and revision 714eb0f (https://hugging
Using a pipeline without specifying a model name and revision in production is not recommended.
Device set to use cuda:0
It looks like you are running Gradio on a hosted Jupyter notebook, which requires `share=True`. Automatically setting `share=True`

Colab notebook detected. To show errors in colab notebook, set debug=True in launch()
* Running on public URL: https://578c2b693de3e2ec61.gradio.live

This share link expires in 1 week. For free permanent hosting and GPU upgrades, run `gradio deploy` from the terminal in the working
```

---

text

I love dancing and reading books.

Clear   **Submit**

---

output

POSITIVE

Flag

Use via API 🚀 · Built with Gradio 🟧 · Settings ⚙

˅ Text to Image using Diffusion Pipeline

```python
from diffusers import StableDiffusionPipeline
import torch

model_id = "sd-legacy/stable-diffusion-v1-5"
pipe = StableDiffusionPipeline.from_pretrained(model_id, torch_dtype=torch.float16)
pipe = pipe.to("cuda")

prompt = "innocent child playing with a ball in gardon. A cute puppy adorably looking towards her."
image = pipe(prompt).images[0]

image.save("child_puppy_ball.png")
```

Loading pipeline components...: 100% 7/7 [00:20<00:00, 2.11s/it]

100% 50/50 [00:07<00:00, 7.31it/s]

to download the image: file(in colab) -> click image name -> more(three dot) -> download

```python
#import gradio as gr
from diffusers import StableDiffusionPipeline
import torch

model_id = "sd-legacy/stable-diffusion-v1-5"
pipe = StableDiffusionPipeline.from_pretrained(model_id, torch_dtype=torch.float16)
pipe = pipe.to("cuda")

def generate_image(prompt):
  image = pipe(prompt).images[0]
  image.save(f'{prompt}.png')
  return image

# UI

gr.Interface(
    fn = generate_image,
    inputs = gr.Textbox(label ='Enter your prompt',placeholder = 'e.g.innocent child'),
    outputs = gr.Image(type = 'pil', label ='Generated Image'),
    title = 'Text to Image Generator using Stable Diffusion',
    description = 'Enter your promt to see your imagination gets visualized.'
    ).launch()
```

Loading pipeline components...: 100% 7/7 [00:21<00:00, 2.19s/it]

It looks like you are running Gradio on a hosted Jupyter notebook, which requires `share=True`. Automatically setting `share=True`

Colab notebook detected. To show errors in colab notebook, set debug=True in launch()
* Running on public URL: https://d35f8a028b5d39fd83.gradio.live

This share link expires in 1 week. For free permanent hosting and GPU upgrades, run `gradio deploy` from the terminal in the working

Enter your promt to see your imagination gets visualized.

Enter your prompt

beautiful child dancing in the rain with a cute
puppy

Clear Submit

Generated Image
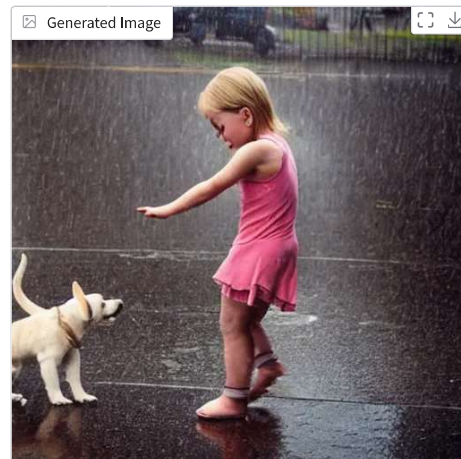
Flag

```python
!nvidia-smi
```

```
Sun Jul 27 07:46:07 2025
+-----------------------------------------------------------------------------------------+
| NVIDIA-SMI 550.54.15              Driver Version: 550.54.15      CUDA Version: 12.4      |
|-----------------------------------------+------------------------+----------------------+
| GPU  Name                 Persistence-M | Bus-Id          Disp.A | Volatile Uncorr. ECC |
| Fan  Temp   Perf          Pwr:Usage/Cap |           Memory-Usage | GPU-Util  Compute M. |
|                                         |                        |               MIG M. |
|=========================================+========================+======================|
|   0  Tesla T4                       Off | 00000000:00:04.0 Off   |                    0 |
| N/A   48C    P0               26W /  70W |    4122MiB /  15360MiB |      0%      Default |
|                                         |                        |                  N/A |
+-----------------------------------------+------------------------+----------------------+
```

```
+-----------------------------------------------------------------------------------------+
| Processes:                                                                              |
|  GPU   GI   CI        PID   Type   Process name                              GPU Memory |
|        ID   ID                                                               Usage      |
|=========================================================================================|
+-----------------------------------------------------------------------------------------+
```

Start coding or _generate_ with AI.

```
+-----------------------------------------------------------------------------------------+
| Processes:                                                                              |
|  GPU   GI   CI        PID   Type   Process name                              GPU Memory |
|        ID   ID                                                               Usage      |
|=========================================================================================|
+-----------------------------------------------------------------------------------------+
```

Start coding or _generate_ with AI.