

```
!pip install ibm-watson
```

```
Collecting ibm-watson
  Downloading ibm_watson-9.0.0.tar.gz (342 kB)
    342.8/342.8 kB 6.6 MB/s eta 0:00:00
  Installing build dependencies ... done
  Getting requirements to build wheel ... done
  Preparing metadata (pyproject.toml) ... done
Requirement already satisfied: requests<3.0,>=2.0 in /usr/local/lib/python3.11/dist-packages (from ibm-watson) (2.32.3)
Requirement already satisfied: python_dateutil>=2.5.3 in /usr/local/lib/python3.11/dist-packages (from ibm-watson) (2.8.2)
Requirement already satisfied: websocket-client>=1.1.0 in /usr/local/lib/python3.11/dist-packages (from ibm-watson) (1.8.0)
Collecting ibm_cloud_sdk_core==3.*,>=3.3.6 (from ibm-watson)
  Downloading ibm_cloud_sdk_core-3.23.0-py3-none-any.whl.metadata (8.7 kB)
Requirement already satisfied: urllib3<3.0.0,>=2.1.0 in /usr/local/lib/python3.11/dist-packages (from ibm_cloud_sdk_core==3.*,>=3.3.6)
Requirement already satisfied: PyJWT<3.0.0,>=2.8.0 in /usr/local/lib/python3.11/dist-packages (from ibm_cloud_sdk_core==3.*,>=3.3.6)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-packages (from python_dateutil>=2.5.3->ibm-watson) (1.17.0)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests<3.0,>=2.0->ibm-watson) (3.10)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests<3.0,>=2.0->ibm-watson) (3.10)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests<3.0,>=2.0->ibm-watson) (2025.1.1)
  Downloading ibm_cloud_sdk_core-3.23.0-py3-none-any.whl (69 kB)
    69.5/69.5 kB 6.3 MB/s eta 0:00:00
Building wheels for collected packages: ibm-watson
  Building wheel for ibm-watson (pyproject.toml) ... done
  Created wheel for ibm-watson: filename=ibm_watson-9.0.0-py3-none-any.whl size=345070 sha256=addd4e8139b7fe7cbc01324f3c20d396416b6c
  Stored in directory: /root/.cache/pip/wheels/a1/ed/65/5abe3aa86c06331a8064910b7722d2ddfd0bd75fc322f6c48
Successfully built ibm-watson
Installing collected packages: ibm_cloud_sdk_core, ibm-watson
Successfully installed ibm-watson-9.0.0 ibm_cloud_sdk_core-3.23.0
```

```
!pip install google-cloud-vision
```

```
Collecting google-cloud-vision
  Downloading google_cloud_vision-3.10.1-py3-none-any.whl.metadata (9.5 kB)
Requirement already satisfied: google-api-core!=2.0.*,!=2.1.*,!=2.10.*,!=2.2.*,!=2.3.*,!=2.4.*,!=2.5.*,!=2.6.*,!=2.7.*,!=2.8.*,!=2.9.* in /usr/local/lib/python3.11/dist-packages (from google-cloud-vision) (2.19.1)
Requirement already satisfied: google-auth!=2.24.0,!=2.25.0,<3.0.0,>=2.14.1 in /usr/local/lib/python3.11/dist-packages (from google-cloud-vision) (2.32.3)
Requirement already satisfied: proto-plus<2.0.0,>=1.22.3 in /usr/local/lib/python3.11/dist-packages (from google-cloud-vision) (1.24.0)
Requirement already satisfied: protobuf!=4.21.0,!=4.21.1,!=4.21.2,!=4.21.3,!=4.21.4,!=4.21.5,<7.0.0,>=3.20.2 in /usr/local/lib/python3.11/dist-packages (from google-cloud-vision) (4.25.3)
Requirement already satisfied: googleapis-common-protos<2.0.0,>=1.56.2 in /usr/local/lib/python3.11/dist-packages (from google-api-core!=2.0.*,!=2.1.*,!=2.10.*,!=2.2.*,!=2.3.*,!=2.4.*,!=2.5.*,!=2.6.*,!=2.7.*,!=2.8.*,!=2.9.*->google-cloud-vision) (1.66.0)
Requirement already satisfied: requests<3.0.0,>=2.18.0 in /usr/local/lib/python3.11/dist-packages (from google-api-core!=2.0.*,!=2.1.*,!=2.10.*,!=2.2.*,!=2.3.*,!=2.4.*,!=2.5.*,!=2.6.*,!=2.7.*,!=2.8.*,!=2.9.*->google-cloud-vision) (2.32.3)
Requirement already satisfied: grpcio<2.0dev,>=1.33.2 in /usr/local/lib/python3.11/dist-packages (from google-api-core[grpc]!=2.0.*->google-cloud-vision) (1.67.0)
Requirement already satisfied: grpcio-status<2.0.dev0,>=1.33.2 in /usr/local/lib/python3.11/dist-packages (from google-api-core[grpc]!=2.0.*->google-cloud-vision) (1.67.0)
Requirement already satisfied: cachetools<6.0,>=2.0.0 in /usr/local/lib/python3.11/dist-packages (from google-auth!=2.24.0,!=2.25.0,<3.0.0,>=2.14.1->google-cloud-vision) (5.5.2)
Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.11/dist-packages (from google-auth!=2.24.0,!=2.25.0,<3.0.0,>=2.14.1->google-cloud-vision) (0.4.0)
Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.11/dist-packages (from google-auth!=2.24.0,!=2.25.0,<3.0.0,>=2.14.1->google-cloud-vision) (4.9.1)
Requirement already satisfied: pyasn1<0.7.0,>=0.4.6 in /usr/local/lib/python3.11/dist-packages (from pyasn1-modules>=0.2.1->google-auth!=2.24.0,!=2.25.0,<3.0.0,>=2.14.1->google-cloud-vision) (0.6.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests<3.0.0,>=2.18.0->google-cloud-vision) (3.10)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests<3.0.0,>=2.18.0->google-cloud-vision) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests<3.0.0,>=2.18.0->google-cloud-vision) (2.32.3)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests<3.0.0,>=2.18.0->google-cloud-vision) (2025.1.1)
  Downloading google_cloud_vision-3.10.1-py3-none-any.whl (526 kB)
    526.1/526.1 kB 10.7 MB/s eta 0:00:00
Installing collected packages: google-cloud-vision
Successfully installed google-cloud-vision-3.10.1
```

```
!pip install datasets
```

```
Collecting datasets
  Downloading dill-0.3.8-py3-none-any.whl.metadata (10 kB)
Requirement already satisfied: pandas in /usr/local/lib/python3.11/dist-packages (from datasets) (2.2.2)
Requirement already satisfied: requests>=2.32.2 in /usr/local/lib/python3.11/dist-packages (from datasets) (2.32.3)
Requirement already satisfied: tqdm>=4.66.3 in /usr/local/lib/python3.11/dist-packages (from datasets) (4.67.1)
Collecting xxhash (from datasets)
  Downloading xxhash-3.5.0-cp311-cp311-manylinux_2_17_x86_64_manylinux2014_x86_64.whl.metadata (12 kB)
Collecting multiprocess<0.70.17 (from datasets)
  Downloading multiprocess-0.70.16-py311-none-any.whl.metadata (7.2 kB)
Collecting fsspec<=2024.12.0,>=2023.1.0 (from fsspec[http]<=2024.12.0,>=2023.1.0->datasets)
  Downloading fsspec-2024.12.0-py3-none-any.whl.metadata (11 kB)
Requirement already satisfied: aiohttp in /usr/local/lib/python3.11/dist-packages (from datasets) (3.11.14)
Requirement already satisfied: huggingface-hub>=0.24.0 in /usr/local/lib/python3.11/dist-packages (from datasets) (0.29.3)
Requirement already satisfied: packaging in /usr/local/lib/python3.11/dist-packages (from datasets) (24.2)
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.11/dist-packages (from datasets) (6.0.2)
Requirement already satisfied: aiohappyeyeballs>=2.3.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (2.6.1)
Requirement already satisfied: aiosignal>=1.1.2 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (1.3.2)
Requirement already satisfied: attrs>=17.3.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (25.3.0)
Requirement already satisfied: frozenlist>=1.1.1 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (1.5.0)
Requirement already satisfied: multidict<7.0,>=4.5 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (6.2.0)
Requirement already satisfied: propcache>=0.2.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (0.3.0)
Requirement already satisfied: yarl<2.0,>=1.17.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (1.18.3)
Requirement already satisfied: typing-extensions>=3.7.4.3 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub>=0.24.0->datasets) (4.12.2)
```

```
Requirement already satisfied: tzdata>=2022.1 in /usr/local/lib/python3.11/dist-packages (from pandas->datasets) (2025.1)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-packages (from python-dateutil>=2.8.2->pandas->dataset:
Downloading datasets-3.5.0-py3-none-any.whl (491 kB)
491.2/491.2 kB 14.9 MB/s eta 0:00:00
Downloading dill-0.3.8-py3-none-any.whl (116 kB)
116.3/116.3 kB 11.1 MB/s eta 0:00:00
Downloading fsspec-2024.12.0-py3-none-any.whl (183 kB)
183.9/183.9 kB 17.2 MB/s eta 0:00:00
Downloading multiprocessing-0.70.16-py311-none-any.whl (143 kB)
143.5/143.5 kB 14.2 MB/s eta 0:00:00
Downloading xxhash-3.5.0-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (194 kB)
194.8/194.8 kB 19.5 MB/s eta 0:00:00
Installing collected packages: xxhash, fsspec, dill, multiprocessing, datasets
  Attempting uninstall: fsspec
    Found existing installation: fsspec 2025.3.0
    Uninstalling fsspec-2025.3.0:
      Successfully uninstalled fsspec-2025.3.0
ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This behaviour is the
gcsfs 2025.3.0 requires fsspec==2025.3.0, but you have fsspec 2024.12.0 which is incompatible.
torch 2.6.0+cu124 requires nvidia-cublas-cu12==12.4.5.8; platform_system == "Linux" and platform_machine == "x86_64", but you hav
torch 2.6.0+cu124 requires nvidia-cuda-cupti-cu12==12.4.127; platform_system == "Linux" and platform_machine == "x86_64", but you
torch 2.6.0+cu124 requires nvidia-cuda-nvrtc-cu12==12.4.127; platform_system == "Linux" and platform_machine == "x86_64", but you
torch 2.6.0+cu124 requires nvidia-cuda-runtime-cu12==12.4.127; platform_system == "Linux" and platform_machine == "x86_64", but y
torch 2.6.0+cu124 requires nvidia-cudnn-cu12==9.1.0.70; platform_system == "Linux" and platform_machine == "x86_64", but you have
torch 2.6.0+cu124 requires nvidia-cufft-cu12==11.2.1.3; platform_system == "Linux" and platform_machine == "x86_64", but you have
torch 2.6.0+cu124 requires nvidia-curand-cu12==10.3.5.147; platform_system == "Linux" and platform_machine == "x86_64", but you h
torch 2.6.0+cu124 requires nvidia-cusolver-cu12==11.6.1.9; platform_system == "Linux" and platform_machine == "x86_64", but you h
torch 2.6.0+cu124 requires nvidia-cuspars-cu12==12.3.1.170; platform_system == "Linux" and platform_machine == "x86_64", but you
torch 2.6.0+cu124 requires nvidia-nvjitlink-cu12==12.4.127; platform_system == "Linux" and platform_machine == "x86_64", but you

!pip install transformers datasets torch torchvision spacy keybert
!python -m spacy downloaden_core_web_sm

Requirement already satisfied: transformers in /usr/local/lib/python3.11/dist-packages (4.50.0)
Requirement already satisfied: datasets in /usr/local/lib/python3.11/dist-packages (3.5.0)
Requirement already satisfied: torch in /usr/local/lib/python3.11/dist-packages (2.6.0+cu124)
Requirement already satisfied: torchvision in /usr/local/lib/python3.11/dist-packages (0.21.0+cu124)
Requirement already satisfied: spacy in /usr/local/lib/python3.11/dist-packages (3.8.4)
Collecting keybert
  Downloading keybert-0.9.0-py3-none-any.whl.metadata (15 kB)
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from transformers) (3.18.0)
Requirement already satisfied: huggingface-hub<1.0, >=0.26.0 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.29
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) (24.2)
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) (0.21.1)
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: multiprocessing<0.70.17 in /usr/local/lib/python3.11/dist-packages (from datasets) (0.70.16)
Requirement already satisfied: fsspec<=2024.12.0, >=2023.1.0 in /usr/local/lib/python3.11/dist-packages (from fsspec[http]<=2024.1
Requirement already satisfied: aiohttp in /usr/local/lib/python3.11/dist-packages (from datasets) (3.11.14)
Requirement already satisfied: typing-extensions>=4.10.0 in /usr/local/lib/python3.11/dist-packages (from torch) (4.12.2)
Requirement already satisfied: networkx in /usr/local/lib/python3.11/dist-packages (from torch) (3.4.2)
Requirement already satisfied: jinja2 in /usr/local/lib/python3.11/dist-packages (from torch) (3.1.6)
Collecting nvidia-cuda-nvrtc-cu12==12.4.127 (from torch)
  Downloading nvidia_cuda_nvrtc_cu12-12.4.127-py3-none-manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-cuda-runtime-cu12==12.4.127 (from torch)
  Downloading nvidia_cuda_runtime_cu12-12.4.127-py3-none-manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-cuda-cupti-cu12==12.4.127 (from torch)
  Downloading nvidia_cuda_cupti_cu12-12.4.127-py3-none-manylinux2014_x86_64.whl.metadata (1.6 kB)
Collecting nvidia-cudnn-cu12==9.1.0.70 (from torch)
  Downloading nvidia_cudnn_cu12-9.1.0.70-py3-none-manylinux2014_x86_64.whl.metadata (1.6 kB)
Collecting nvidia-cublas-cu12==12.4.5.8 (from torch)
  Downloading nvidia_cublas_cu12-12.4.5.8-py3-none-manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-cufft-cu12==11.2.1.3 (from torch)
  Downloading nvidia_cufft_cu12-11.2.1.3-py3-none-manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-curand-cu12==10.3.5.147 (from torch)
  Downloading nvidia_curand_cu12-10.3.5.147-py3-none-manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-cusolver-cu12==11.6.1.9 (from torch)
  Downloading nvidia_cusolver_cu12-11.6.1.9-py3-none-manylinux2014_x86_64.whl.metadata (1.6 kB)
Collecting nvidia-cuspars-cu12==12.3.1.170 (from torch)
  Downloading nvidia_cuspars-cu12-12.3.1.170-py3-none-manylinux2014_x86_64.whl.metadata (1.6 kB)
Requirement already satisfied: nvidia-cusparselt-cu12==0.6.2 in /usr/local/lib/python3.11/dist-packages (from torch) (0.6.2)
Requirement already satisfied: nvidia-nccl-cu12==2.21.5 in /usr/local/lib/python3.11/dist-packages (from torch) (2.21.5)
Requirement already satisfied: nvidia-nvtx-cu12==12.4.127 in /usr/local/lib/python3.11/dist-packages (from torch) (12.4.127)
Collecting nvidia-nvjitlink-cu12==12.4.127 (from torch)
  Downloading nvidia_nvjitlink_cu12-12.4.127-py3-none-manylinux2014_x86_64.whl.metadata (1.5 kB)
Requirement already satisfied: triton==3.2.0 in /usr/local/lib/python3.11/dist-packages (from torch) (3.2.0)
Requirement already satisfied: sympy==1.13.1 in /usr/local/lib/python3.11/dist-packages (from torch) (1.13.1)
Requirement already satisfied: mpmath<1.4, >=1.1.0 in /usr/local/lib/python3.11/dist-packages (from sympy==1.13.1->torch) (1.3.0)
Requirement already satisfied: pillow!=8.3.*, >=5.3.0 in /usr/local/lib/python3.11/dist-packages (from torchvision) (11.1.0)
Requirement already satisfied: spacy-legacy<3.1.0, >=3.0.11 in /usr/local/lib/python3.11/dist-packages (from spacy) (3.0.12)
Requirement already satisfied: spacy-loggers<2.0.0, >=1.0.0 in /usr/local/lib/python3.11/dist-packages (from spacy) (1.0.5)
```

Requirement already satisfied: murmurhash<1.1.0, >=0.28.0 in /usr/local/lib/python3.11/dist-packages (from snarv) (1.0.12)

```
import torch
import spacy
import time
import requests
from PIL import Image
from io import BytesIO
from transformers import pipeline
from keybert import KeyBERT
from torchvision import models, transforms
from torchvision.models import ResNet50_Weights

# ===== TEXT DATA ANALYSIS =====
text_data = "IBM Watson is a powerful AI platform."
sentiment_pipeline = pipeline("sentiment-analysis")
nlp = spacy.load("en_core_web_sm")
kw_model = KeyBERT()
sentiment_result = sentiment_pipeline(text_data)[0]
keywords = kw_model.extract_keywords(text_data, keyphrase_ngram_range=(1, 2), stop_words="english")
entities = [ent.text for ent in nlp(text_data).ents]
print("\n==== NLP Analysis =====")
print(f"Sentiment: {sentiment_result['label']} (Score: {sentiment_result['score']:.2f})")
print(f"Keywords: {'', '.join([kw[0] for kw in keywords])}")
print(f"Entities: {'', '.join(entities)}")
# ===== IMAGE RECOGNITION =====
image_url = "https://cdn.pixabay.com/photo/2015/04/23/22/00/tree-736885_640.jpg"
try:
    response = requests.get(image_url, timeout=5)
    response.raise_for_status()
    image = Image.open(BytesIO(response.content))
except requests.RequestException as e:
    print(f"Error fetching image: {e}")
    exit()
model = models.resnet50(weights=ResNet50_Weights.DEFAULT)
model.eval()
transform = transforms.Compose([
    transforms.Resize((224, 224)),
    transforms.ToTensor(),
    transforms.Normalize(mean=[0.485, 0.456, 0.406], std=[0.229, 0.224, 0.225])
])
img_tensor = transform(image).unsqueeze(0)
start_time = time.time()
with torch.no_grad():
    output = model(img_tensor)
inference_time = time.time() - start_time
LABELS_URL = "https://raw.githubusercontent.com/pytorch/hub/master/imagenet_classes.txt"
try:
    labels = requests.get(LABELS_URL, timeout=5).text.split("\n")
except requests.RequestException as e:
    print(f"Error fetching labels: {e}")
    exit()
_, predicted_class = torch.max(output, 1)
predicted_label = labels[predicted_class.item()]
confidence = torch.nn.functional.softmax(output, dim=1)[0][predicted_class.item()] * 100
print("\n==== Image Recognition =====")
print(f"Image Label: {predicted_label}")
print(f"Confidence: {confidence:.2f}%")
print(f"Inference Time: {inference_time:.4f} seconds")
```

🔗 No model was supplied, defaulted to distilbert/distilbert-base-uncased-finetuned-sst-2-english and revision 714eb0f (<https://huggingface.co/distilbert/distilbert-base-uncased-finetuned-sst-2-english>)
 Using a pipeline without specifying a model name and revision in production is not recommended.
 /usr/local/lib/python3.11/dist-packages/huggingface_hub/utils/_auth.py:94: UserWarning:
 The secret `HF_TOKEN` does not exist in your Colab secrets.
 To authenticate with the Hugging Face Hub, create a token in your settings tab (<https://huggingface.co/settings/tokens>), set it as :
 You will be able to reuse this secret in all of your notebooks.
 Please note that authentication is recommended but still optional to access public models or datasets.
 warnings.warn(
 Device set to use cpu

```
==== NLP Analysis =====
Sentiment: POSITIVE (Score: 1.00)
Keywords: ibm watson, ai platform, watson powerful, ibm, watson
Entities: IBM Watson, AI

==== Image Recognition =====
Image Label: volcano
Confidence: 16.31%
Inference Time: 0.2041 seconds
```

