

# Google CoLab에서 Pytorch 사용하기

Eunhui Kim/KISTI

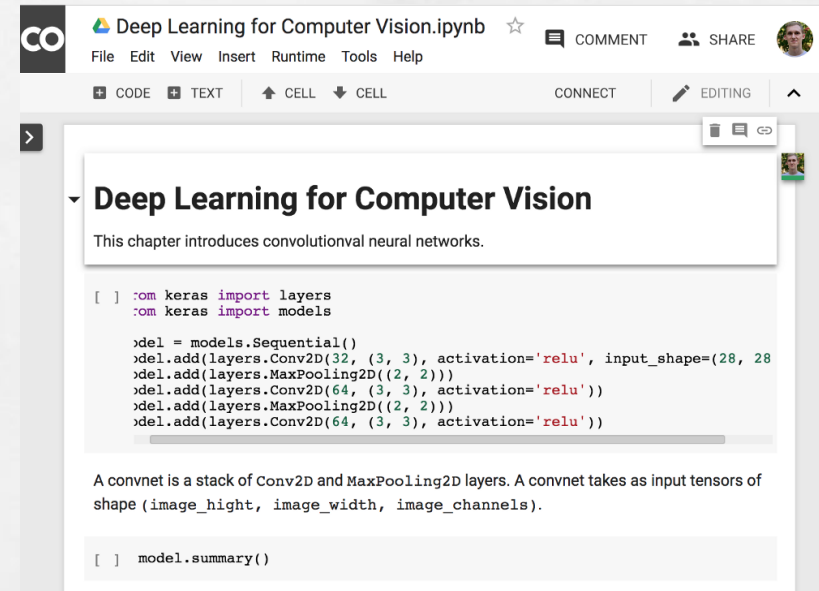
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# 1) Google Colab은?

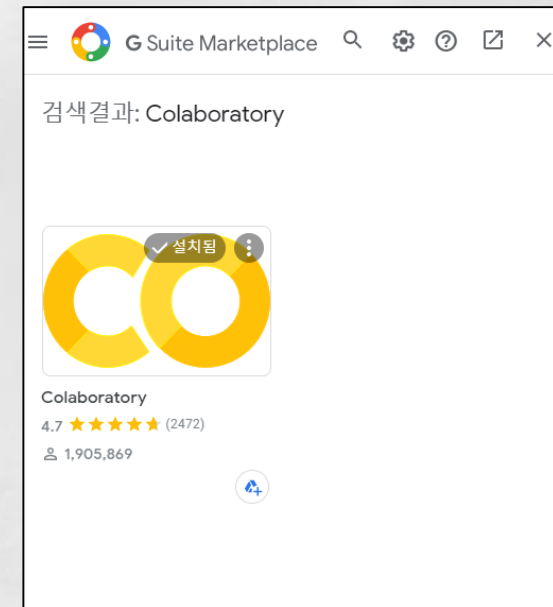
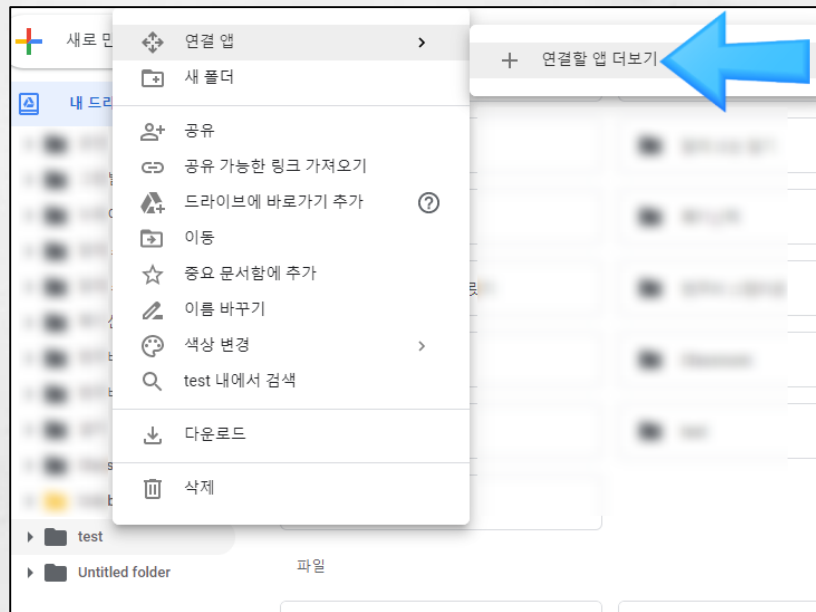
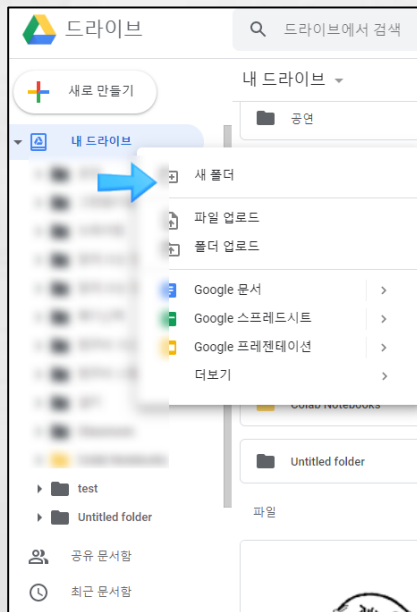
- 구글 클라우드 기반의 Jupyter 노트북 개발환경
- 내부적으로는  
코랩 + 구글드라이브 + 도커 + 리눅스 + 구글클라우드의 기술 스택으로 이루어짐.
- 사용해야 하는 이유
  - 무료
  - 쉽고 환경설정 및 구동 준비가 간단함
  - 클라우드 기반 (여러명이 작업 가능, 브라우저만 있으면 작업 가능(모바일 OK))
  - 구글 드라이브와 데이터 연동
  - 개인 PC보다 좋은 성능 (어떤이: 개인 PC 1시간 학습 - 코랩 2분 학습)
  - 학습 및 공유가 편리함
  - CPU, GPU, TPU 선택 가능
- 주의할 점
  - 최대 세션 유지시간 : 12시간
  - 세션이 끝나면 작업중이던 데이터는 날아감 (소스코드 : 구글드라이브에 저장)



## 2) Google Colab 접근



1. 접속 : <https://drive.google.com/drive/my-drive>
2. 내 드라이브에 오른쪽 클릭 → ML\_Test 폴더 생성
3. ML\_Test 폴더 → 우클릭 → 연결 앱 → 연결할 앱 더보기
4. 팝업창 → 검색창에서 Colab 검색 → 설치 진행



## 2) Google Colab 접근

4. ML\_Test 폴더 → 설정버튼 클릭 → 설정
5. 앱관리 → Google Colaboratory를 기본 값 체크
6. ML\_Test 폴더 → 빈화면 우클릭 → 더보기 → Google Colaboratory 선택
7. Python 코드 입력

A collage of four screenshots illustrating the steps to access Google Colab from Google Drive:

- Top-left:** The Google Drive '설정' (Settings) page. The '앱 관리' (App Management) tab is selected, showing a list of apps. 'Google Colaboratory' is highlighted.
- Top-right:** The Google Drive 'test' folder view. A right-click context menu is open, and '더보기' (More) is selected.
- Bottom-left:** The Google Drive 'test' folder view. The '더보기' (More) menu is open, and 'Google Colaboratory' is selected.
- Bottom-right:** The Google Colaboratory interface. The file is named 'Untitled0.ipynb'. The code editor shows the Python code `print('hello world!')`, and the output area shows the result `hello world!`.

### 3) Google Colab 에서 하드웨어 가속기 설정

8. 수정 → 노트 설정 → 하드웨어 가속기 → V 버튼 선택 → (None, GPU, TPU) 선택

9. Tensorflow는 새로운 설정 없이 실행 가능

The screenshot displays the Google Colab interface. On the left, the 'LearnPytorch.ipynb' notebook is open. A dropdown menu is visible, showing the '노트 설정' (Notebook Settings) option. The main area shows a code cell with the following Python code:

```
import tensorflow as tf
import numpy as np

input1 = tf.constant(1.0, shape=[2, 3])
input2 = tf.constant(np.reshape(np.arange(1.0, 7.0, dtype=np.float32), (2,3)))
output = tf.add(input1, input2)

print('input1: {}'.format(input1))
print('input2: {}'.format(input2))
print('output: {}'.format(output))
```

The output of the code execution is displayed below the code cell:

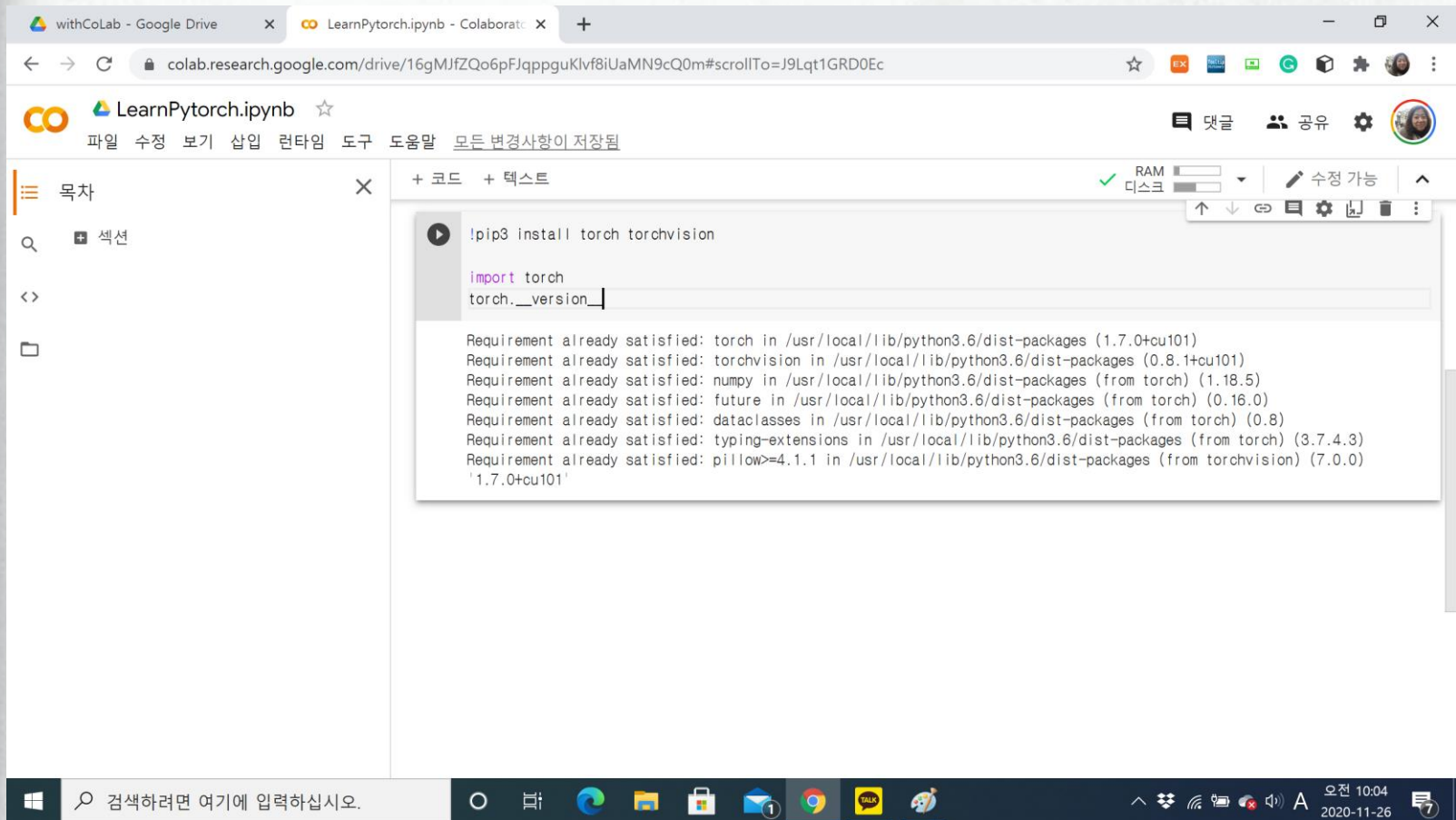
```
input1: [[1. 1. 1.]
[1. 1. 1.]]
input2: [[1. 2. 3.]
[4. 5. 6.]]
output: [[2. 3. 4.]
[5. 6. 7.]]
```



## 4) Google Colab 에서 Pytorch 설치 및 확인

10. Pytorch install 명령어 입력 > !pip3 install torch torchvision

11. Install된 torch\_version 확인 >> torch.\_\_version\_\_



The screenshot shows the Google Colab interface for a notebook named 'LearnPytorch.ipynb'. The code cell contains the following commands:

```
!pip3 install torch torchvision

import torch
torch.__version__
```

The output of the code cell shows the following messages:

```
Requirement already satisfied: torch in /usr/local/lib/python3.6/dist-packages (1.7.0+cu101)
Requirement already satisfied: torchvision in /usr/local/lib/python3.6/dist-packages (0.8.1+cu101)
Requirement already satisfied: numpy in /usr/local/lib/python3.6/dist-packages (from torch) (1.18.5)
Requirement already satisfied: future in /usr/local/lib/python3.6/dist-packages (from torch) (0.16.0)
Requirement already satisfied: dataclasses in /usr/local/lib/python3.6/dist-packages (from torch) (0.8)
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.6/dist-packages (from torch) (3.7.4.3)
Requirement already satisfied: pillow>=4.1.1 in /usr/local/lib/python3.6/dist-packages (from torchvision) (7.0.0)
'1.7.0+cu101'
```

The interface also shows a file explorer on the left, a search bar, and a taskbar at the bottom with various application icons and the system clock showing 10:04 on 2020-11-26.

# 5) Google Drive SDK 설치 및 연동



## 12. Google Drive SDK 설치 및 인증 >> 인증 두 번 진행 (인증 키 입력)

withCoLab - Google Drive x LearnPytorch.ipynb - Colaborat x Success code=4/1AY0e-g5SeTd x Success code=4/1AY0e-g6Qa87 x +

```
!apt-get install -y -qq software-properties-common python-software-properties module-init-tools
!add-apt-repository -y ppa:alessandro-strada/ppa 2>&1 > /dev/null
!apt-get update -qq 2>&1 > /dev/null
!apt-get -y install -qq google-drive-ocamlfuse fuse
from google.colab import auth auth.authenticate_user()
from oauth2client.client import GoogleCredentials
creds = GoogleCredentials.get_application_default()
import getpass
!google-drive-ocamlfuse -headless -id={creds.client_id} -secret={creds.client_secret} < /dev/null 2>&1 | grep URL
vcode = getpass.getpass()
!echo {vcode} | google-drive-ocamlfuse -headless -s={creds.client_id} -secret={creds.client_secret}
```

E: Package 'python-software-properties' has no installation candidate  
Please, open the following URL in a web browser: [https://accounts.google.com/o/oauth2/auth?client\\_id=32555940559.apps.googleusercontent.com&redirect\\_uri=urn%3Aietf%3F32555940559.apps.googleusercontent.com&response\\_type=code](https://accounts.google.com/o/oauth2/auth?client_id=32555940559.apps.googleusercontent.com&redirect_uri=urn%3Aietf%3F32555940559.apps.googleusercontent.com&response_type=code)  
Please, open the following URL in a web browser: [https://accounts.google.com/o/oauth2/auth?client\\_id=32555940559.apps.googleusercontent.com&redirect\\_uri=urn%3Aietf%3F32555940559.apps.googleusercontent.com&response\\_type=code](https://accounts.google.com/o/oauth2/auth?client_id=32555940559.apps.googleusercontent.com&redirect_uri=urn%3Aietf%3F32555940559.apps.googleusercontent.com&response_type=code)  
Please enter the verification code: Access token retrieved correctly.

경고: GPU 런타임에 연결되어 있지만 GPU를 활용하고 있지 않습니다. [표준 런타임으로 변경](#) ✕

검색하려면 여기에 입력하십시오.

오전 11:32  
2020-11-26



# 5) Google Drive SDK 설치 및 연동



## 13. Google Drive 연동 및 directory 내용 확인

The screenshot shows a Google Colab notebook titled 'LearnPytorch.ipynb'. The notebook interface includes a left sidebar with icons for file explorer, search, code editor, and output. The main area displays the following code cells:

```
!ls
!mkdir -p drive
!ls
!google-drive-ocamlfuse drive
!ls drive
```

The output of the final command shows the contents of the 'drive' directory:

```
adc.json drive sample_data
adc.json drive sample_data
fuse: mountpoint is not empty
fuse: if you are sure this is safe, use the 'nonempty' mount option
LearnPytorch.ipynb
```

The bottom of the image shows a Windows taskbar with various application icons and a system clock indicating 1:13 PM on 2020-11-26.

## 6) Google 지원 Google Drive 연동



### 14. Google Drive 연동 및 directory 내용 확인 >> 인증 후 허용 후 코드 복사

withCoLab - Google Drive | LearnPytorch.ipynb - Colaboratory | Success code=4/1AY0e-g7Txc6r | 7.1.0 — Pillow (PIL Fork) 8.0.1 d | +

colab.research.google.com/drive/16gMJfZQo6pFJqppguKlvf8iUaMN9cQ0m#scrollTo=4OTtuMa2-d0K


LearnPytorch.ipynb ☆

파일 수정 보기 삽입 런타임 도구 도움말

댓글 공유

```
from google.colab import drive
drive.mount('/content/gdrive')
# 확인하기 -withCoLab directory 하위에 dataset directory를 만들고 제공 dog.jpg를 업로드
From PIL import Image
Img = Image.open('/content/gdrive/My Drive/withCoLab/dataset/dog.jpg') #실행 확인
```

Drive already mounted at /content/gdrive; to attempt to forcibly remount, call drive.mount("/content/gdrive", force\_remount=True).



검색하려면 여기에 입력하십시오.

오후 2:46 2020-11-26

# 7) Pytorch 실습 on Google CoLab



```
from torchvision import models
import torch
dir(models)

# 1. load pre-trained models
alexnet = models.alexnet(pretrained=True)
print(alexnet)

# 2. specify image transformations
from torchvision import transforms
transform = transforms.Compose([
    transforms.Resize(256),
    transforms.CenterCrop(224),
    transforms.ToTensor(),
    transforms.Normalize(
        mean = [0.485, 0.456, 0.406],
        std = [0.229, 0.224, 0.225]
    )
])

#3. Load the input image and pre-process it
from google.colab import drive
drive.mount('/content/gdrive')

from PIL import Image
path = '/content/gdrive/My Drive/withCoLab/dataset/'
img = Image.open(path+'dog.jpg')

img_t = transform(img)
batch_t = torch.unsqueeze(img_t, 0)

#4. module inference
alexnet.eval() #set model in evaluation mode
out = alexnet(batch_t)
print(out.shape) #check 1000 class

with open(path+'imagenet_classes.txt') as f:
    classes = [line.strip() for line in f.readlines()]
```

```
#5. get maximum score in the output score
_, index = torch.max(out, 1)
percentage = torch.nn.functional.softmax(out, dim=1)[0] * 100
print(classes[index[0]], percentage[index[0]].item())

#6. desend high probable results
_, indices = torch.sort(out, descending = True)
[(classes[idx], percentage[idx].item()) for idx in indices[0][:5]]
```

```
[40] #7. test with resnet model
#load the model
resnet = models.wide_resnet101_2(pretrained=True)

#put the network in eval model
resnet.eval()

#execute model inference
out = resnet(batch_t)

#preint top5 classes predicted by the model
_, indices = torch.sort(out, descending = True)
percentage = torch.nn.functional.softmax(out, dim=1)[0] * 100
[(classes[idx], percentage[idx].item()) for idx in indices[0][:5]]

[('208, Labrador_retriever', 50.3850212097168),
 ('227, kelpie', 5.715785980224609),
 ('225, malinois', 5.678887844085693),
 ('235, German_shepherd', 2.747952461242676),
 ('207, golden_retriever', 2.676299571990967)]
```

감사합니다.

