EX.NO:01
30.07.25

EXPLORING THE DEEP LEARNING PLATFORMS

Various deep learning platforms

Google colab:

Free online jupyter Notebook with GPU/TPU.
Ideal for students, researches, hobbyists
Accessible with google Account.

Jupyter Notebook.

Not a framework, but an interactive coding environment.

Combines codes, markdown, outputs.
popular for exploration visualization tutorials.

Key difference between gogle colab and Jupyter Notebook.

Google Colab	Jupyter Notebook
colab based platform.	local/browser-based
Built in free GPU/ TPU	GPU Manual setup
Runs in browser.	Anaconda + Jupyter installation.
Easy sharing.	Manual file sharing.
Saves to google drive.	Saves to local system.

Key Frameworks of pytorch, Tensorflow, Keras

Tensorflow

Creator /organization : Google (2015)

Main features : Scalable across CPUs, GPUs

High-performance model training integrated

Keras API for simplicity visualization via Tensorboard.

popular use cases : computer vision, NLP, ML

PyTorch

Organization : Facebook AI Research [FAIR] 2016

Main features : Dynamic computational graph

Native pythonic syntax strong GPU accelerating

Supports.

popular use cases :

- Research and Academic projects
- NLP Models
- Fast model prototyping
- Dynamic

Graph type : Dynamic

Keras

organization : Initially developed by Francois Chollet, now part of Tensorflow (google) 2015

Main features : High level deep learning API,

Runs on Tensorflow, Theano or CNTK.

popular use cases :

- CNNS
- RNNS

Graph type

1. Tensorflow - static
2. pytorch - dynamic
3. Keras - Abstracted
4. google colab - N/A (platform not framework)
5. Jupyter Notebook - N/A (IDE interface)

conclusions:

Exploring different dl platforms helped understand their features. setup + usage. Running basic scripts in Tensorflow & pytorch gave hands on experience with model building.

31/7/25

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Untitled.ipy...	next year
Untitled1.ip...	6 days ago

L1.ipynb | L3.ipynb | L1.1.ipynb | L2.ipynb

Code

Notebook | Python 3 (ipykernel)

[1]:
```
pip install tensorflow
```

```
Defaulting to user installation because normal site-packages is not writeable
Collecting tensorflow
  Downloading tensorflow-2.19.0-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (4.1 kB)
Collecting absl-py>=1.0.0 (from tensorflow)
  Downloading absl_py-2.3.1-py3-none-any.whl.metadata (3.3 kB)
Collecting astunparse>=1.6.0 (from tensorflow)
  Downloading astunparse-1.6.3-py2.py3-none-any.whl.metadata (4.4 kB)
Collecting flatbuffers>=24.3.25 (from tensorflow)
  Downloading flatbuffers-25.2.10-py2.py3-none-any.whl.metadata (875 bytes)
Collecting gast!=0.5.0,!=0.5.1,!=0.5.2,>=0.2.1 (from tensorflow)
  Downloading gast-0.6.0-py3-none-any.whl.metadata (1.3 kB)
Collecting google-pasta>=0.1.1 (from tensorflow)
  Downloading google_pasta-0.2.0-py3-none-any.whl.metadata (814 bytes)
Collecting libclang>=13.0.0 (from tensorflow)
  Downloading libclang-18.1.1-py2.py3-none-manylinux2010_x86_64.whl.metadata (5.2 kB)
Collecting opt-einsum>=2.3.2 (from tensorflow)
  Downloading opt_einsum-3.4.0-py3-none-any.whl.metadata (6.3 kB)
Requirement already satisfied: packaging in /opt/tljh/user/lib/python3.10/site-packages (from tensorflow) (24.0)
Collecting protobuf!=4.21.0,!=4.21.1,!=4.21.2,!=4.21.3,!=4.21.4,!=4.21.5,<6.0.0dev,>=3.20.3 (from tensorflow)
  Downloading protobuf-5.29.5-cp38-abi3-manylinux2014_x86_64.whl.metadata (592 bytes)
Requirement already satisfied: requests<3,>=2.21.0 in /opt/tljh/user/lib/python3.10/site-packages (from tensorflow) (2.31.0)
Requirement already satisfied: setuptools in /opt/tljh/user/lib/python3.10/site-packages (from tensorflow) (65.6.3)
Requirement already satisfied: six>=1.12.0 in /opt/tljh/user/lib/python3.10/site-packages (from tensorflow) (1.16.0)
Collecting termcolor>=1.1.0 (from tensorflow)
  Downloading termcolor-3.1.0-py3-none-any.whl.metadata (6.4 kB)
Requirement already satisfied: typing-extensions>=3.6.6 in /opt/tljh/user/lib/python3.10/site-packages (from tensorflow) (4.11.0)
Collecting wrapt>=1.11.0 (from tensorflow)
  Downloading wrapt-1.17.2-cp310-cp310-manylinux_2_5_x86_64.manylinux1_x86_64.manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (6.4 kB)
Collecting grpcio<2.0,>=1.24.3 (from tensorflow)
  Downloading grpcio-1.74.0-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (3.8 kB)
Collecting tensorboard~=2.19.0 (from tensorflow)
  Downloading tensorboard-2.19.0-py3-none-any.whl.metadata (1.8 kB)
Collecting keras>=3.5.0 (from tensorflow)
  Downloading keras-3.11.1-py3-none-any.whl.metadata (5.9 kB)
Collecting numpy<2.2.0,>=1.26.0 (from tensorflow)
  Downloading numpy-2.1.3-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (62 kB)
Collecting h5py>=3.11.0 (from tensorflow)
  Downloading h5py-3.14.0-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (2.7 kB)
Collecting ml-dtypes<1.0.0,>=0.5.1 (from tensorflow)
  Downloading ml_dtypes-0.5.3-cp310-cp310-manylinux_2_27_x86_64.manylinux_2_28_x86_64.whl.metadata (8.9 kB)
```

Simple | 0 | 7 | Python 3 (ipykernel) | Idle | Mem: 1.31 GB

Mode: Command | Ln 1, Col 1 | L1.ipynb | 1

Not secure 10.1.38.19/user/ra2311047010011/lab/workspaces/auto-b/tree/DEEP%20LEARNING/L1.ipynb

Verify that it's you

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L3.ipynb	next year
Untitled.ipy...	next year
Untitled1.ip...	6 days ago

L1.ipynb | L3.ipynb | L1.1.ipynb | L2.ipynb

Code

Notebook Python 3 (ipykernel)

```
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  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 26/26 [tensorflow]6 [tensorflow]
Successfully installed absl-py-2.3.1 astunparse-1.6.3 flatbuffers-25.2.10 gast-0.6.0 google-pasta-0.2.0 grpcio-1.74.0 h5py-3.14.0 keras-3.11.1 libclang-18.1.1 markdown-3.8.2 markdown-it-py-3.0.0 mdurl-0.1.2 ml-dtypes-0.5.3 namex-0.1.0 numpy-2.1.3 opt-einsum-3.4.0 optree-0.17.0 protobuf-5.29.5 rich-14.1.0 tensorboard-2.19.0 tensorboard-data-server-0.7.2 tensorflow-2.19.0 tensorflow-io-gcs-filesystem-0.37.1 termcolor-3.1.0 werkzeug-3.1.3 wrapt-1.17.2
Note: you may need to restart the kernel to use updated packages.
```

[2]
```
import tensorflow as tf
```

```
2025-08-07 20:58:13.344904: I external/local_xla/xla/tsl/cuda/cudart_stub.cc:32] Could not find cuda drivers on your machine, GPU will not be used.
2025-08-07 20:58:13.350405: I external/local_xla/xla/tsl/cuda/cudart_stub.cc:32] Could not find cuda drivers on your machine, GPU will not be used.
2025-08-07 20:58:13.367576: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:467] Unable to register cuFFT factory: Attempting to register factory for plugin cuFFT when one has already been registered
WARNING: All log messages before absl::InitializeLog() is called are written to STDERR
E0000 00:00:1754580493.396763  104619 cuda_dnn.cc:8579] Unable to register cuDNN factory: Attempting to register factory for plugin cuDNN when one has already been registered
E0000 00:00:1754580493.405518  104619 cuda_blas.cc:1407] Unable to register cuBLAS factory: Attempting to register factory for plugin cuBLAS when one has already been registered
W0000 00:00:1754580493.428251  104619 computation_placer.cc:177] computation placer already registered. Please check linkage and avoid linking the same target more than once.
W0000 00:00:1754580493.428282  104619 computation_placer.cc:177] computation placer already registered. Please check linkage and avoid linking the same target more than once.
W0000 00:00:1754580493.428285  104619 computation_placer.cc:177] computation placer already registered. Please check linkage and avoid linking the same target more than once.
W0000 00:00:1754580493.428288  104619 computation_placer.cc:177] computation placer already registered. Please check linkage and avoid linking the same target more than once.
2025-08-07 20:58:13.435749: I tensorflow/core/platform/cpu_feature_guard.cc:210] This TensorFlow binary is optimized to use available CPU instructions in performance-critical operations.
To enable the following instructions: AVX2 FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.
```

[3]
```
print(tf.__version__)
```

```
2.19.0
```

[4]
```
import tensorflow as tf
a = tf.constant([[1, 2], [3, 4]])
b = tf.constant([[5, 6], [7, 8]])
c = tf.add(a, b)
print(c)
```

```
tf.Tensor(
[[ 6  8]
 [10 12]], shape=(2, 2), dtype=int32)
2025-08-07 20:58:24.805453: E external/local_xla/xla/stream_executor/cuda/cuda_platform.cc:51] failed call to cuInit: INTERNAL: CUDA error: Failed call to cuInit: UNKNOWN ERROR (303)
```

[ ]: