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Title: **Assignment 1: Study of Deep learning Packages: Tensorflow, Keras, Theano and PyTorch. Document the distinct features and functionality of the packages.**

In [1]:
```python
import numpy as np
```

1. Tensorflow

In [3]:
```python
!pip install tensorflow
```

```
Collecting tensorflow
  Downloading tensorflow-2.13.1-cp38-cp38-win_amd64.whl (1.9 kB)
  Downloading tensorflow-2.13.0-cp38-cp38-win_amd64.whl (1.9 kB)
Collecting tensorflow-intel==2.13.0
  Downloading tensorflow_intel-2.13.0-cp38-cp38-win_amd64.whl (276.5 MB)
Collecting astunparse>=1.6.0
  Downloading astunparse-1.6.3-py2.py3-none-any.whl (12 kB)
Requirement already satisfied: h5py>=2.9.0 in c:\users\mange\anaconda3\lib\site-packages (from tensorflow-intel=
=2.13.0->tensorflow) (2.10.0)
Collecting numpy<=1.24.3,>=1.22
  Downloading numpy-1.24.3-cp38-cp38-win_amd64.whl (14.9 MB)
Collecting tensorflow-io-gcs-filesystem>=0.23.1
  Downloading tensorflow_io_gcs_filesystem-0.31.0-cp38-cp38-win_amd64.whl (1.5 MB)
Collecting termcolor>=1.1.0
  Downloading termcolor-2.4.0-py3-none-any.whl (7.7 kB)
Requirement already satisfied: wrapt>=1.11.0 in c:\users\mange\anaconda3\lib\site-packages (from tensorflow-inte
l==2.13.0->tensorflow) (1.12.1)
Collecting libclang>=13.0.0
  Downloading libclang-18.1.1-py2.py3-none-win_amd64.whl (26.4 MB)
Requirement already satisfied: setuptools in c:\users\mange\anaconda3\lib\site-packages (from tensorflow-intel==
2.13.0->tensorflow) (52.0.0.post20210125)
Requirement already satisfied: six>=1.12.0 in c:\users\mange\anaconda3\lib\site-packages (from tensorflow-intel=
=2.13.0->tensorflow) (1.15.0)
Collecting gast<=0.4.0,>=0.2.1
  Downloading gast-0.4.0-py3-none-any.whl (9.8 kB)
Collecting grpcio<2.0,>=1.24.3
  Downloading grpcio-1.65.0-cp38-cp38-win_amd64.whl (4.1 MB)
Collecting flatbuffers>=23.1.21
  Downloading flatbuffers-24.3.25-py2.py3-none-any.whl (26 kB)
Collecting tensorboard<2.14,>=2.13
  Downloading tensorboard-2.13.0-py3-none-any.whl (5.6 MB)
Requirement already satisfied: packaging in c:\users\mange\anaconda3\lib\site-packages (from tensorflow-intel==2
.13.0->tensorflow) (20.9)
Collecting keras<2.14,>=2.13.1
  Downloading keras-2.13.1-py3-none-any.whl (1.7 MB)
Collecting protobuf!=4.21.0,!=4.21.1,!=4.21.2,!=4.21.3,!=4.21.4,!=4.21.5,<5.0.0dev,>=3.20.3
  Downloading protobuf-4.25.3-cp38-cp38-win_amd64.whl (413 kB)
Collecting tensorflow-estimator<2.14,>=2.13.0
  Downloading tensorflow_estimator-2.13.0-py2.py3-none-any.whl (440 kB)
Collecting opt-einsum>=2.3.2
  Downloading opt_einsum-3.3.0-py3-none-any.whl (65 kB)
Collecting absl-py>=1.0.0
  Downloading absl_py-2.1.0-py3-none-any.whl (133 kB)
Requirement already satisfied: typing-extensions<4.6.0,>=3.6.6 in c:\users\mange\anaconda3\lib\site-packages (fr
om tensorflow-intel==2.13.0->tensorflow) (3.7.4.3)
Collecting google-pasta>=0.1.1
```

```
ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This
behaviour is the source of the following dependency conflicts.
scipy 1.6.2 requires numpy<1.23.0,>=1.16.5, but you have numpy 1.24.3 which is incompatible.
```

2. Keras

```python
In [5]: from keras import datasets
        # Load MNIST datasets from keras
        (train_images, train_labels), (test_images, test_labels) = datasets.mnist.load_data()
```

```python
In [6]: train_images.shape
```

```
Out[6]: (60000, 28, 28)
```

```python
In [7]: test_images.shape
```

```
Out[7]: (10000, 28, 28)
```

3. Theano

```python
In [7]: !pip install Theano
```

```
Requirement already satisfied: Theano in c:\users\prave\appdata\local\programs\python\python310\lib\site-package
s (1.0.5)
Requirement already satisfied: numpy>=1.9.1 in c:\users\prave\appdata\local\programs\python\python310\lib\site-p
ackages (from Theano) (1.25.2)
Requirement already satisfied: scipy>=0.14 in c:\users\prave\appdata\local\programs\python\python310\lib\site-pa
ckages (from Theano) (1.9.3)
Requirement already satisfied: six>=1.9.0 in c:\users\prave\appdata\local\programs\python\python310\lib\site-pac
kages (from Theano) (1.16.0)
```

4. PyTorch

```
In [1]:  !pip3 install torch torchvision torchaudio --extra-index-url https://download.pytorch.org/whl/cu115
```

```
Looking in indexes: https://pypi.org/simple, https://download.pytorch.org/whl/cu115
Requirement already satisfied: torch in c:\users\prave\appdata\local\programs\python\python310\lib\site-packages
(2.1.0)
Requirement already satisfied: torchvision in c:\users\prave\appdata\local\programs\python\python310\lib\site-pa
ckages (0.16.0)
Collecting torchaudio
  Obtaining dependency information for torchaudio from https://files.pythonhosted.org/packages/6b/ba/0e26883fd90
f280452bed7edc7906ef9253255f395702751f65fa02afb5c/torchaudio-2.1.0-cp310-cp310-win_amd64.whl.metadata
  Downloading torchaudio-2.1.0-cp310-cp310-win_amd64.whl.metadata (5.7 kB)
Requirement already satisfied: filelock in c:\users\prave\appdata\local\programs\python\python310\lib\site-packa
ges (from torch) (3.12.4)
Requirement already satisfied: typing-extensions in c:\users\prave\appdata\local\programs\python\python310\lib\s
ite-packages (from torch) (4.4.0)
Requirement already satisfied: sympy in c:\users\prave\appdata\local\programs\python\python310\lib\site-packages
(from torch) (1.12)
Requirement already satisfied: networkx in c:\users\prave\appdata\local\programs\python\python310\lib\site-packa
ges (from torch) (2.8.8)
Requirement already satisfied: jinja2 in c:\users\prave\appdata\local\programs\python\python310\lib\site-package
s (from torch) (3.1.2)
Requirement already satisfied: fsspec in c:\users\prave\appdata\local\programs\python\python310\lib\site-package
s (from torch) (2023.9.2)
Requirement already satisfied: numpy in c:\users\prave\appdata\local\programs\python\python310\lib\site-packages
(from torchvision) (1.25.2)
Requirement already satisfied: requests in c:\users\prave\appdata\local\programs\python\python310\lib\site-packa
ges (from torchvision) (2.28.1)
Requirement already satisfied: pillow!=8.3.*,>=5.3.0 in c:\users\prave\appdata\local\programs\python\python310\l
ib\site-packages (from torchvision) (9.3.0)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\prave\appdata\local\programs\python\python310\lib\sit
e-packages (from jinja2->torch) (2.1.3)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\prave\appdata\local\programs\python\python31
0\lib\site-packages (from requests->torchvision) (2.1.1)
Requirement already satisfied: idna<4,>=2.5 in c:\users\prave\appdata\local\programs\python\python310\lib\site-p
ackages (from requests->torchvision) (3.4)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\prave\appdata\local\programs\python\python310\l
ib\site-packages (from requests->torchvision) (1.26.12)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\prave\appdata\local\programs\python\python310\lib\
site-packages (from requests->torchvision) (2022.9.24)
Requirement already satisfied: mpmath>=0.19 in c:\users\prave\appdata\local\programs\python\python310\lib\site-p
ackages (from sympy->torch) (1.3.0)
Downloading torchaudio-2.1.0-cp310-cp310-win_amd64.whl (2.3 MB)
   ---------------------------------------- 2.3/2.3 MB 6.2 MB/s eta 0:00:00
Installing collected packages: torchaudio
Successfully installed torchaudio-2.1.0
```

```
In [2]:  import torch
         import torch.nn as nn
```

```
In [3]:  print(torch.__version__)
```

```
2.1.0+cpu
```

```
In [4]:  torch.cuda.is_available()
```

```
Out[4]:  False
```

```
In [ ]:
```

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