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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.**

```
import numpy as np
```

1. Tensorflow

```
import tensorflow as tf
```

```
print(tf.__version__)
```

```
    2.9.2
```

2. Keras

```
from keras import datasets
# Load MNIST datasets from keras
(train_images, train_labels), (test_images, test_labels) = datasets.mnist.load_data()
```

```
train_images.shape
```

```
    (60000, 28, 28)
```

```
test_images.shape
```

```
    (10000, 28, 28)
```

3. Theano

```
!pip install Theano
from warnings import filterwarnings
filterwarnings('ignore')
```

```
    Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/p
    Collecting Theano
      Downloading Theano-1.0.5.tar.gz (2.8 MB)
         |████████████████████████████████| 2.8 MB 4.7 MB/s
    Requirement already satisfied: numpy>=1.9.1 in /usr/local/lib/python3.7/dist-packages
    Requirement already satisfied: scipy>=0.14 in /usr/local/lib/python3.7/dist-packages
```

```
Requirement already satisfied: six>=1.9.0 in /usr/local/lib/python3.7/dist-packages (
Building wheels for collected packages: Theano
  Building wheel for Theano (setup.py) ... done
  Created wheel for Theano: filename=Theano-1.0.5-py3-none-any.whl size=2668111 sha25
  Stored in directory: /root/.cache/pip/wheels/26/68/6f/745330367ce7822fe0cd86371285E
Successfully built Theano
Installing collected packages: Theano
Successfully installed Theano-1.0.5
```

```python
import theano.tensor as T
from theano import function


# Declaring 2 variables
x = T.dscalar('x')
y = T.dscalar('y')


# Summing up the 2 numbers
z = x + y


# Converting it to a callable object so that it takes matrix as parameters
f = function([x, y], z)


f(5, 7)
```

```
array(12.)
```

4. PyTorch

```
!pip3 install torch torchvision torchaudio --extra-index-url https://download.pytorch.org/
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/p
Requirement already satisfied: torch in /usr/local/lib/python3.7/dist-packages (1.12
Requirement already satisfied: torchvision in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: torchaudio in /usr/local/lib/python3.7/dist-packages (
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.7/dist-pac
Requirement already satisfied: numpy in /usr/local/lib/python3.7/dist-packages (from
Requirement already satisfied: pillow!=8.3.*,>=5.3.0 in /usr/local/lib/python3.7/dist
Requirement already satisfied: requests in /usr/local/lib/python3.7/dist-packages (fr
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /usr/local/
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/dist-pa
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/dist-pac
```

```python
import torch
import torch.nn as nn


print(torch.__version__)
```

```
1.12.1+cu113
```

```
torch.cuda.is_available()
```

```
False
```