Assignment 1

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Problem Statement :

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

In [2]:

```
import numpy as np
```

1. Tensorflow

In [3]:

```
import tensorflow as tf
```

In [4]:

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

```
2.10.0
```

2. Keras

In [5]:

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

In [6]:

```
train_images.shape
```

Out[6]:

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

In [7]:

```
test_images.shape
```

Out[7]:

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

3. Theano

In [14]:

```
conda install Theano
```

```
Collecting package metadata (current_repodata.json): ...working... d
one
Solving environment: ...working... done

## Package Plan ##

  environment location: D:\anaconda

  added / updated specs:
    - theano


The following packages will be downloaded:

    package                    |            build
    ---------------------------|-----------------
    anaconda-2022.10           |          py310_0          13 KB
    ca-certificates-2022.10.11 |       haa95532_0         125 KB
    certifi-2022.9.24          |   py39haa95532_0         154 KB
```

In [8]:

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

In [10]:

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

In [11]:

```
# Summing up the 2 numbers
z = x + y
```

In [12]:

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

In [13]:

```
f(5, 7)
```

Out[13]:

```
array(12.)
```

4. PyTorch

In [14]:

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

```
Looking in indexes: https://pypi.org/simple, (https://pypi.org/simpl
e,) https://download.pytorch.org/whl/cu115 (https://download.pytorch.o
rg/whl/cu115)
Requirement already satisfied: torch in d:\anaconda\lib\site-packages
 (1.13.0)
Requirement already satisfied: torchvision in d:\anaconda\lib\site-pac
kages (0.14.0)
Requirement already satisfied: torchaudio in d:\anaconda\lib\site-pack
ages (0.13.0)
Requirement already satisfied: typing_extensions in d:\anaconda\lib\si
te-packages (from torch) (4.3.0)
Requirement already satisfied: numpy in d:\anaconda\lib\site-packages
 (from torchvision) (1.21.5)
Requirement already satisfied: requests in d:\anaconda\lib\site-packag
es (from torchvision) (2.28.1)
Requirement already satisfied: pillow!=8.3.*,>=5.3.0 in d:\anaconda\li
b\site-packages (from torchvision) (9.2.0)
Requirement already satisfied: idna<4,>=2.5 in d:\anaconda\lib\site-pa
ckages (from requests->torchvision) (3.3)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in d:\anaconda\li
b\site-packages (from requests->torchvision) (1.26.11)
Requirement already satisfied: certifi>=2017.4.17 in d:\anaconda\lib\s
ite-packages (from requests->torchvision) (2022.9.24)
Requirement already satisfied: charset-normalizer<3,>=2 in d:\anaconda
\lib\site-packages (from requests->torchvision) (2.0.4)
```

In [15]:

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

In [16]:

```
print(torch.__version__)
```

```
1.13.0
```

In [17]:

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

Out[17]:

```
False
```

In [ ]: