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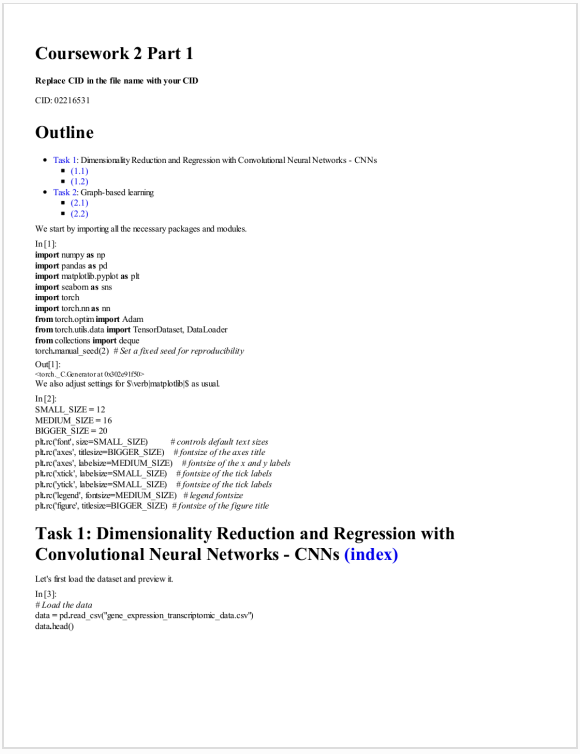

Coursework 2 Part 1

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Outline

- Task 1: Dimensionality Reduction and Regression with Convolutional Neural Networks - CNNs
  - (1.1)
  - (1.2)
- Task 2: Graph-based learning
  - (2.1)
  - (2.2)

We start by importing all the necessary packages and modules.

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import torch
import torch.nn as nn
from torch.optim import Adam
from torch.utils.data import TensorDataset, DataLoader
from collections import deque
torch.manual_seed(2)  # Set a fixed seed for reproducibility
```

Out[1]:
```
<torch._C.Generator at 0x302e91f50>
```

We also adjust settings for $\verb|matplotlib|$ as usual.

In [2]:
```
SMALL_SIZE = 12
MEDIUM_SIZE = 16
BIGGER_SIZE = 20
plt.rc('font', size=SMALL_SIZE)          # controls default text sizes
plt.rc('axes', titlesize=BIGGER_SIZE)    # fontsize of the axes title
plt.rc('axes', labelsize=MEDIUM_SIZE)    # fontsize of the x and y labels
plt.rc('xtick', labelsize=SMALL_SIZE)    # fontsize of the tick labels
plt.rc('ytick', labelsize=SMALL_SIZE)    # fontsize of the tick labels
plt.rc('legend', fontsize=MEDIUM_SIZE)   # legend fontsize
plt.rc('figure', titlesize=BIGGER_SIZE)  # fontsize of the figure title
```

Task 1: Dimensionality Reduction and Regression with Convolutional Neural Networks - CNNs (index)

Let's first load the dataset and preview it.

In [3]:
```
# Load the data
data = pd.read_csv("gene_expression_transcriptomic_data.csv")
data.head()
```