**Computer Vision**
**Assignment 2**

**Due date: 12th November 2023**
**Due time: 23:59**

**General guidelines:** This is a group assignment (Maximum 2 students). You are allowed to use any previously written source for your research on the topic. However, any source other than the textbook and the class notes should be cited and the bibliographic information should be given.

For this assignment you will use agricultural crops image classification dataset: https://www.kaggle.com/datasets/mdwaquarazam/agricultural-crops-image-classification/code.

**Tasks to do:**

1. Load and preprocess the given dataset.
2. Implement a CNN with proper architecture (Fully Connected Layers, Convolution Layers, Pooling Layers etc.). Describe your implementation and explain why you choose such architecture.
3. Implement chosen architecture above with Sigmoid and ReLU activations functions. Describe your implementation for each activation function.
4. Initialize your weights with two methods (Small random numbers and Xavier). Describe your implementation for each method.
5. Apply two regularization methods (Dropout, Batch normalization). Describe your implementation for each method.
6. Describe, compare, and visualize your results.

**Useful links:**

- https://medium.com/analytics-vidhya/creating-your-own-dataloader-in-pytorch-for-combining-images-and-tabular-data-cc2231119939;
- https://medium.com/swlh/fully-connected-vs-convolutional-neural-networks-813ca7bc6ee5#:~:text=A%20fully%20connected%20neural%20network%20consists%2 0of%20a%20series%20of,be%20made%20about%20the%20input.