Projecting Your Data

In this assignment, we will use Pytorch to implement a Convolutional Neural Network (CNN) classifier for the MNIST datasets and discusses how to use Pytorch to build a custom dataset and design the model. After finishing the classifier, we will build an embedding projector based on the model to observe the behavior of the model on the dataset. This assignment will combine the concepts including classification, convolution neural network, and working with embeddings.

Different hyperparameters or model architectures can lead to different outputs on the same dataset, and different dimensionality reduction algorithms can change the way we project the embeddings into a 2D or 3D space, which in turn affects the way we interpret the model. After building the embedding projector, we will explore how the projection of the embeddings changes under different settings and analyze the behavior of the model.

This assignment is organized as follows:

- Part A. Data exploration
- Part B. Building the classifier
- Part C. Building the embedding projector
- Part D. Analyzing the embeddings

Much of this assignment is inspired by Google's embedding projector [1], and we will explore how to make and improve our own embedding projector based on our needs.

[1] D. Smilkov, N. Thorat, C. Nicholson, E. Reif, F. B. Viégas, and M. Wattenberg, "Embedding Projector: Interactive Visualization and Interpretation of Embeddings," arXiv:1611.05469 [cs, stat], Nov. 2016, Accessed: Sep. 09, 2021.