Homework 4

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Overview

1. Exercise 1: Fashion Classifier
2. Exercise 2: Autoencoder for Denoising
3. Submission

Exercise 1: Fashion Classifier

Task

Build a classifier that can recognize different kind of clothing.

- Dataset provided
- Define Neural Network
- Define training routine
- Define testing routine
- Evaluate model

Classification loss

Classification describes a discrete assignment problem. How can we make it differentiable?

1-Hot-Encoding

Let's assume our problem has N classes. We define a mapping for each class i:

$$i \mapsto (0, 0, \cdots, \underbrace{1}_{i\text{th position}}, \cdots, 0, 0)$$

We can now define a neural network with N output neurons and use a metric.

Metrics for classification

Not all error functions are equally useful. 1-Hot-encoding describes a discrete distribution. It is better to use error functions that compare distribution.

- Cross-entropy
- Kullback-Leibler divergence
- Negative log likelihood

Exercise 2: Autoencoder for Denoising

Task

Build an autoencoder that can remove noise from images.

- Dataset provided
- Define Neural Network
- Define training routine
- Define testing routine
- Evaluate model

Submission

How to submit solution

- Use jupyter notebook to implement and document solution
- Compile notebook to PDF
- Submit on ISIS