Simple Diffusion
5/4/2025

3 Möjliga Poäng

| Försök 1 ⌄ | ◯ 4/18/2025 **NÄSTA: Feedback från granskning** | Poäng för försök 1: Ej tillämpbart | 🗨 Lägg till kommentar |

Obegränsat antal försök tillåts
5/5/2025

⌄ **Information**

In this exercise, you will implement a diffusion network from scratch for the simplest possible case of a one-pixel image, i.e., just a single value. This value follows the following distribution given by a mixture of two Gaussians with means -4 and 4 and a standard deviation of 1 as shown in the figure below.
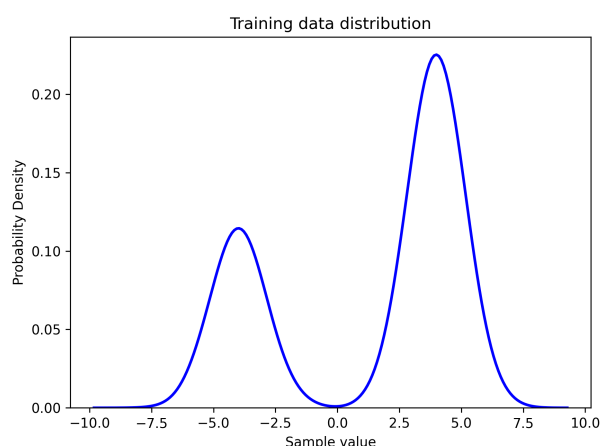
The diffusion network is supposed to transform random Gaussian noise into this distribution.

Hint: The underlying neural network that predicts the amount of noise added to the data in each step can be a simple MLP with two input parameters (the current sample value and the time step) and one output parameter (the amount of noise added in timestep t).

Hint: You can use a fixed beta value of 0.02.

Hint: You can start from this template, which already generates the data distribution and specifies working hyperparameters:
A03simple_example_template.py (https://uppsala.instructure.com/courses/102453/files/8436169?wrap=1) ↓
(https://uppsala.instructure.com/courses/102453/files/8436169/download?download_frd=1)

Please visualize how samples are transformed with increasing diffusion steps.

Remember always to include:

▸ A **written summary** (0.5–1 A4 page) covering (submitted either as PDF or directly as text):
  ○ What you did and how
  ○ What results you obtained
  ○ What challenges you encountered and what could be improved
- A **PDF (or similar format)** with all **result plots**, each with a short explanation
- Your **code**, preferably as a link (e.g., GitHub, Google Colab, etc.) so we can view it easily.

Filnamn	Storlek	
🔗 Simple diffusion.py	8,27 kB	✅
📄 Exercise_...usion.pdf	2,01 MB	✅