

CS-150 Generative Models – Homework 2

Name:

1. Instructions

This assignment has two writing questions and two coding questions. Question 3 and 4 are in the two jupyter notebooks in the same package. For all questions except Q1, you should check with an LLM first. You can use the content of an LLM in your answer, but 1) you should fully understand the answers/solutions you have provided; and 2) you are solely responsible for your answers/solutions.

- Deadline: 10pm, 10/20/2025
- Submission: please put all answers to a single pdf WITH THE QUESTION ORDER and submit it to GradeScope.

Q1 (5 points). *Please discuss the relationship between the following two methods of fitting a model. Which method do you prefer to use in your understanding? Please give the reason.*

- *assuming that there is a true distribution and minimizing the KL-divergence from the true distribution to the model distribution*
- *maximizing the log-likelihood of the data under the model*

Answer:

Q2. (5 points). *Suppose we have a set of observations $(x_i : i = 1, \dots, n)$, and each $x_i \in \mathbb{R}$. Please use a Gaussian distribution with a fixed variance σ^2 to fit the data with Maximum Likelihood Estimation (MLE).*

Answer: