



## MAXIMUM LIKELIHOOD DISTRIBUTIONS

### Why

We want to summarize a dataset with a distribution.

### Overview

The *likelihood* (or *distribution likelihood*) of a probability distribution  $p : A \rightarrow \mathbf{R}$  on a dataset  $a^1, \dots, a^n \in A$  is  $\prod_{i=1}^n p(a^i)$ . A *maximum likelihood distribution*  $p^* : A \rightarrow \mathbf{R}$  is one which maximizes the likelihood over all distributions on  $A$ .

We call the correspondence between datasets and distributions the *maximum likelihood algorithm*. We say that we are selecting the distribution according to the *maximum likelihood principle*. In general, we call any function from datasets to distributions a *distribution selector*.



