



# Empirical Measure

## 1 Why

There is a natural probability measure on a measurable space to associate with a dataset from the base set of that space.

## 2 Definition

The *empirical measure* for a dataset in some measurable space is the measure which associates to each event the proportion of the records which are elements of that event.

### 2.1 Notation

Let  $(a^1, \dots, a^n)$  be a dataset in a measurable space  $(A, \mathcal{A})$ . Let  $P : A^* \rightarrow [0, 1]$  be the probability measure that assigns to each set  $B \subset A$  the number

$$P(B) = \frac{1}{n} |\{k \in \{1, \dots, n\} \mid a^k \in B\}|.$$

Then  $P$  is the empirical measure.