

Machine Learning

K-Means

1. model

input:

$$\{x^{(1)}, \dots, x^{(m)}\}, x^{(i)} \in \mathbb{R}^n$$

initialize:

$$\text{cluster centroid: } \mu_1, \mu_2, \dots, \mu_k \in \mathbb{R}^n$$

repeat until convergence:

$$c^{(i)} = \underset{j}{\operatorname{argmin}} \|x^{(i)} - \mu_j\|^2$$
$$\mu_j = \frac{\sum_{i=1}^m 1\{c^{(i)} = j\} x^{(i)}}{\sum_{i=1}^m 1\{c^{(i)} = j\}}$$

output:

$$y^{(i)} = \underset{j}{\operatorname{argmin}} \|x^{(i)} - \mu_j\|^2$$