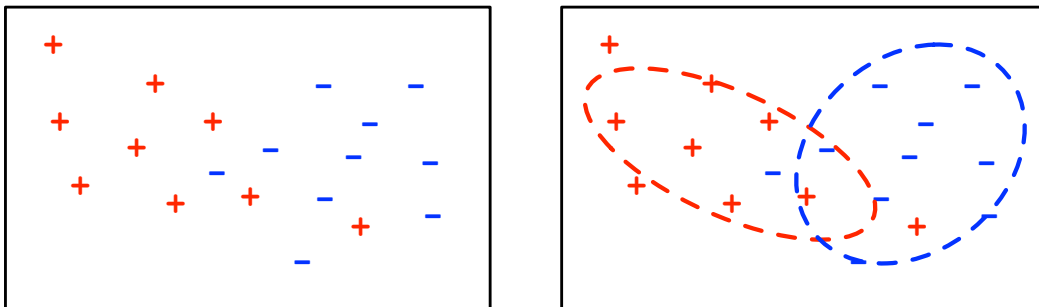# Recap: The generative approach to classification

DSE 220

The generative approach to classification

The learning process:

- Fit a probability distribution to each class, individually
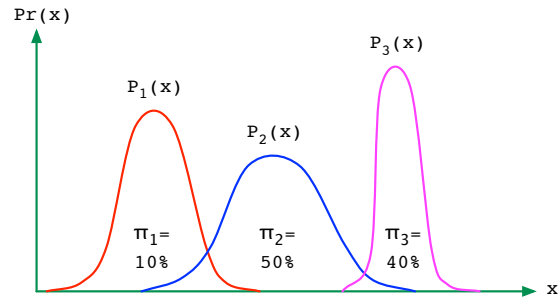
To classify a new point:

- Which of these distributions was it most likely to have come from?

Generative models

Example:
Data space $\mathcal{X} = \mathbb{R}$
Classes/labels $\mathcal{Y} = \{1, 2, 3\}$

For each class j, we have:
- the probability of that class, $\pi_j = \Pr(y = j)$
- the distribution of data in that class, $P_j(x)$

Overall **joint distribution**: $\Pr(x, y) = \Pr(y)\Pr(x|y) = \pi_y P_y(x)$.

To classify a new x: pick the label y with largest $\Pr(x, y)$