Labeled data $\mathcal{D} = \{(x_i, y_i)\} \subset \mathbb{X} \times \mathbb{Y} \\ x_i \in \mathcal{D}_x \text{ data samples} \\ y_i \in \mathcal{D}_y \text{ labels} \\ \mathbf{x} = \begin{bmatrix} x_i \end{bmatrix} \\ \mathbf{y} = \begin{bmatrix} y_i \end{bmatrix}$ Supervised Machine Learning $\mathbf{y} = f(x; w)$ Performance metric, hypothesis on f

Model purpose - Classification

- ▶ The model f shall map $x \mapsto y$ and approximate an unknown function $\hat{f} \cdot \mathbb{X} \to \mathbb{Y}$
- $ightharpoonup v_i \in \mathbb{Y} \subset \mathbb{N}^{n_y}$
- Examples: spam filter, fraud detection, fault detection, ...