AI → ML

данные

$D \sim [\ ] \rightarrow p(\bar\theta | D)$ — learning

результат обучения

$\bar\theta$ — параметры

training / learning

Supervised learning

$\bar x$ — f — $f(\bar x, \bar\theta) = p(\text{cat} | \bar x, \bar\theta) \approx y$

$\bar\theta$

inference

$\hat y$ [. 1 . . .]

правильный ответ

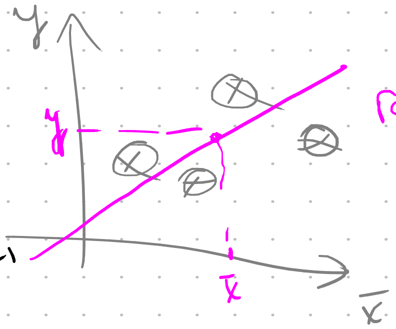
one-hot → [0 . . 1 . . 0]

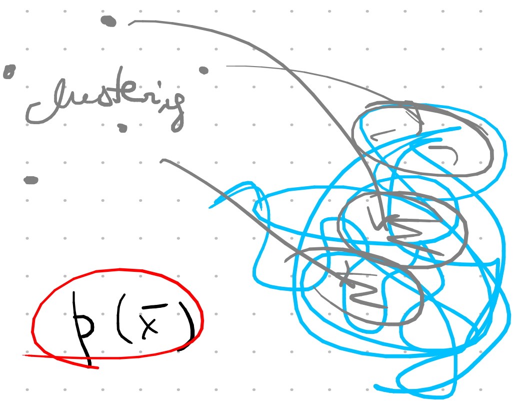
$y \in \mathbb{R}$ regression

y^* classification

Обучаем $p(y|\bar x)$

$D = \{(\bar x_n, y_n)\}_{n=1}^N$





Unsupervised learning

$\in \mathbb{R}^{3 \cdot 10^6}$

$D = \{\bar x_n\}_{n=1}^N$

Обучаем $p(\bar x)$

$\bar x$ — [ ] — $f(\bar x, \bar\theta) \approx p(\bar x)$

$\bar\theta$

density estimation

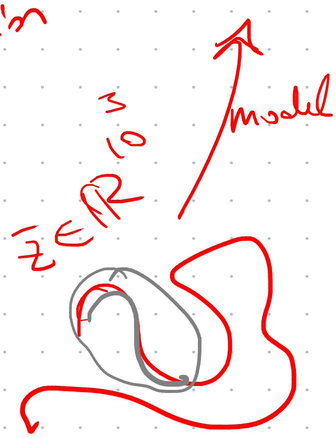
generative AI

$\bar z \in \text{Unif}$ — [ ] — $\bar x \sim p(\bar x)$

$\bar\theta$

sampling

$\bar z \in \mathbb{R}^{10^3}$



Reinforcement learning

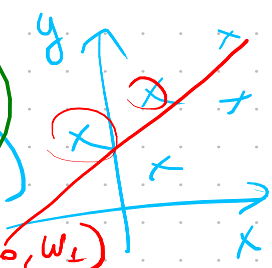
Agent — Actions → Environment

Environment — Rewards, States → Agent

coin

$\theta = p(\text{heads})$

Lin. Regr.



$\bar\theta = (w_0, w_1)$

prior distribution

likelihood

(model)

$$\underbrace{p(\bar{\theta}|D)}_{\text{posterior distribution}} = \frac{p(\bar{\theta})\,p(D|\bar{\theta})}{\underbrace{p(D)}_{\text{evidence probability}}} \propto p(\bar{\theta})\,p(D|\bar{\theta})$$