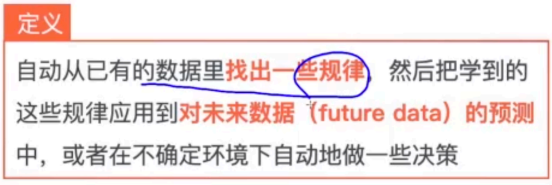
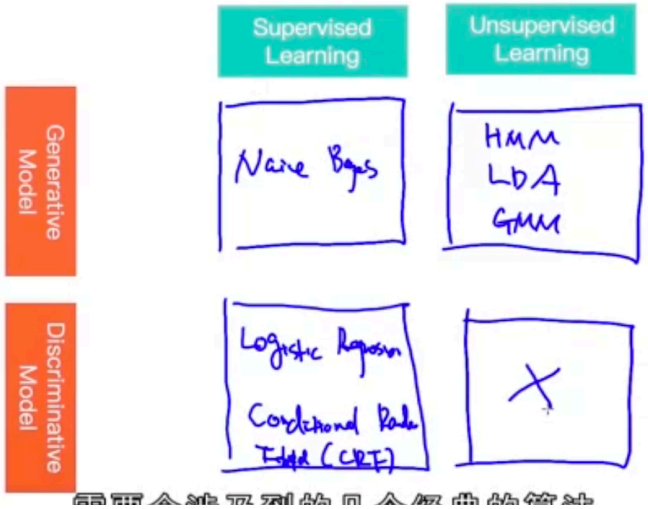
1. machine learning

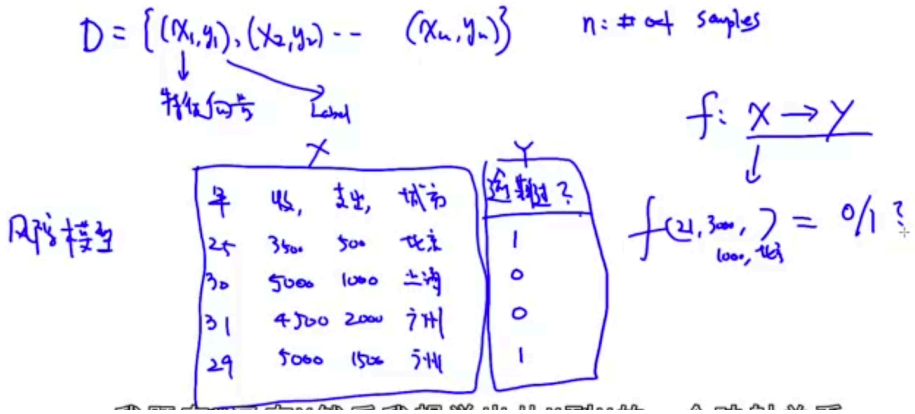


核心：自动

（区别于，专家系统：人工



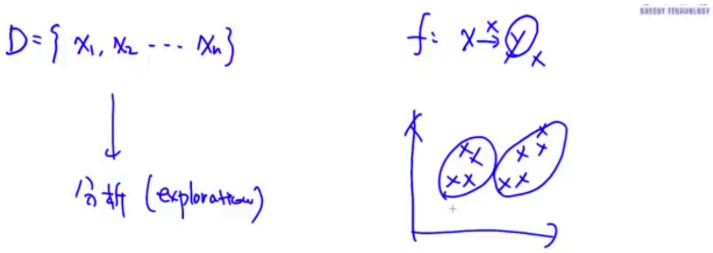
1.1 supervised learning



e.g. sentiment classification
e.g. algorithms

- 线性回归（Linear Regression）
- 逻辑回归（Logistic Regression）
- 朴素贝叶斯（Naïve Bayes）
- 神经网络（Neural Network）
- SVM（Support Vector Machine）
- 随机森林（Random Forest）
- Adaboost
- CNN（Convolutional Neural Network）

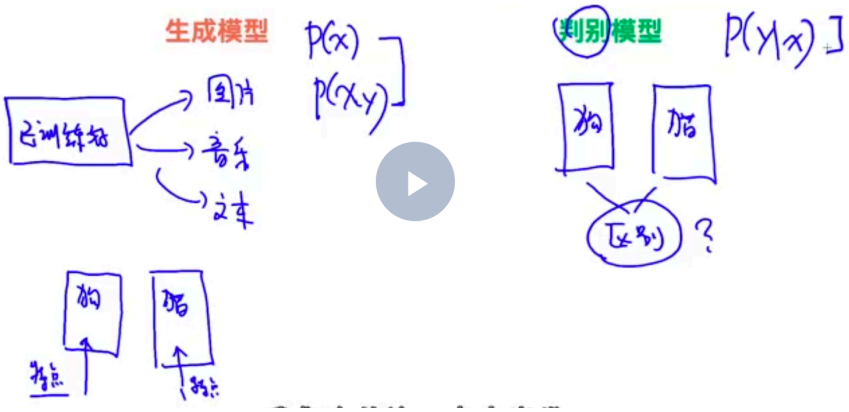
1.2 unsupervised learning



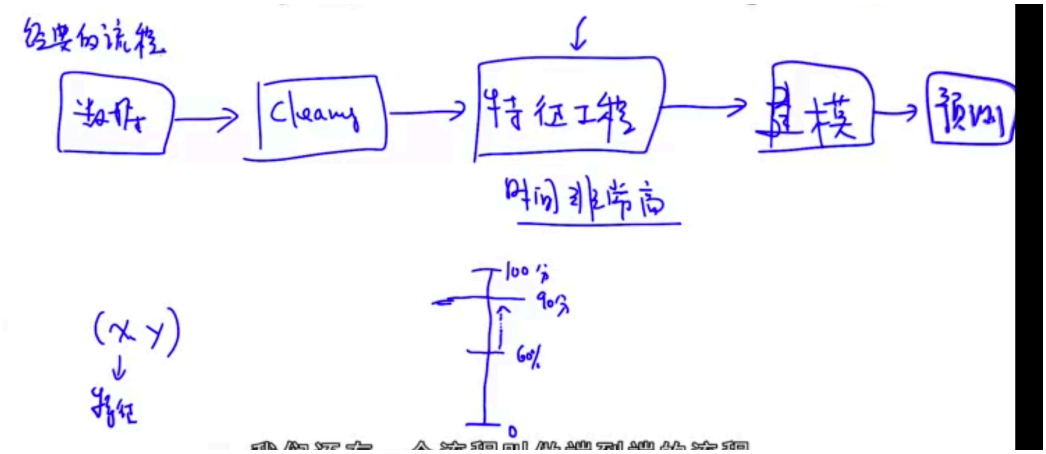
- K-means clustering
- PCA（Principal Component Analysis）
- ICA（Independent Component Analysis）
- MF（Matrix Factorization）
- LSA（Latent Semantic Analysis）
- LDA（Latent Dirichlet Allocation）

MF：推荐系统
LSA、LDA：文本分析

1.3 generative vs discriminative models



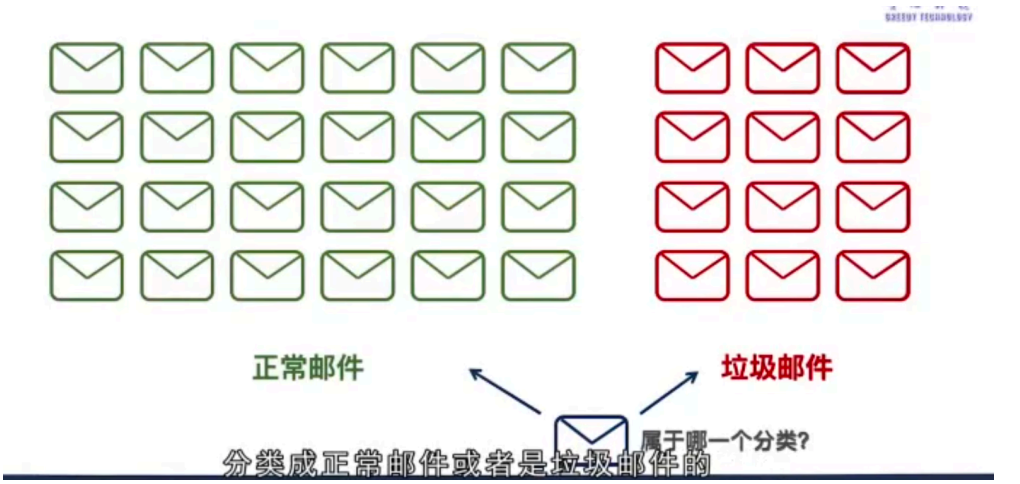
1.4 working pipelines

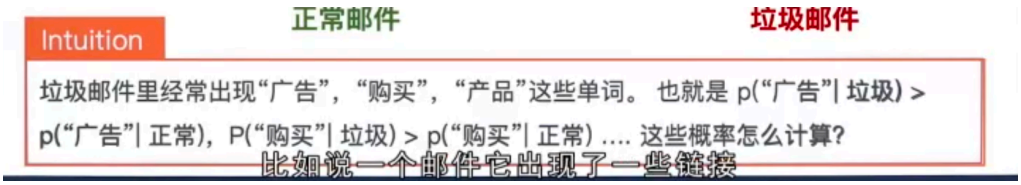


端到端：模型上集成了特征工程，所以节省了人力去选择特征。（多用于图像处理）

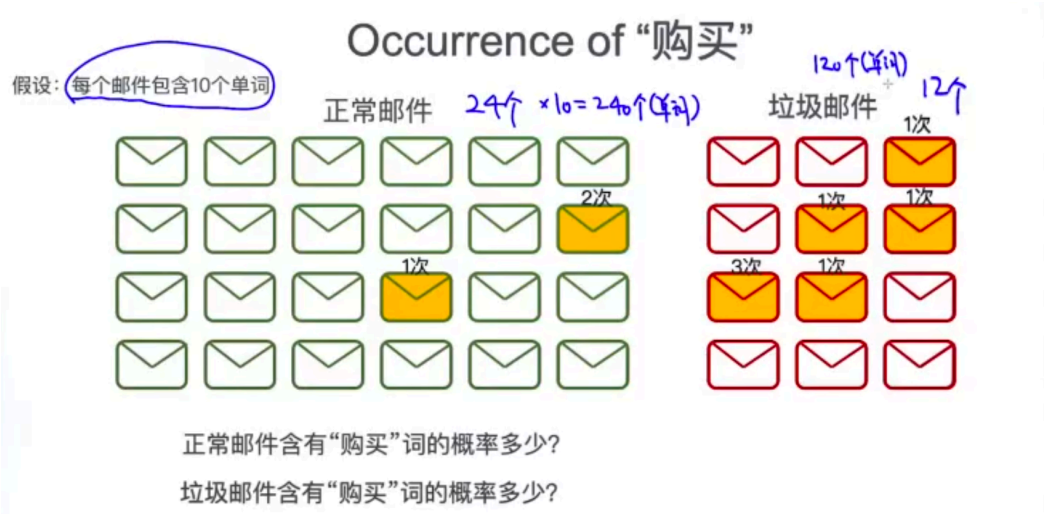
2. naïve Bayes

重点：文本分类、垃圾邮件分类





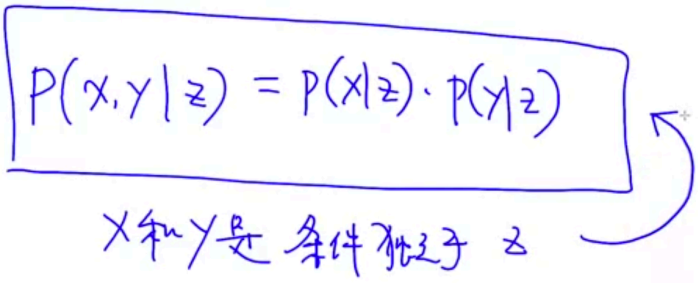
核心：统计一些敏感词，在正常邮件或垃圾邮件中，出现的概率。



2.1 prior information

我们需要一定的先验信息。例如，正常邮件在所有邮件中的概率。

2.2 条件独立 conditional independence



2.3 predictions

新邮件

$$P(\text{正常}\mid\text{内容}) \gtrless P(\text{垃圾}\mid\text{内容})$$

$$= \frac{P(\text{内容}\mid\text{正常})\cdot P(\text{正常})}{P(\text{内容})} \gtrless \frac{P(\text{内容}\mid\text{垃圾})\,P(\text{垃圾})}{P(\text{内容})}$$

$$P(\text{内容}\mid\text{正常})\,P(\text{正常}) \gtrless P(\text{内容}\mid\text{垃圾})\,P(\text{垃圾})$$

$P(\text{正常})$ $P(\text{垃圾})$