

OpenCV图像分割实战课程

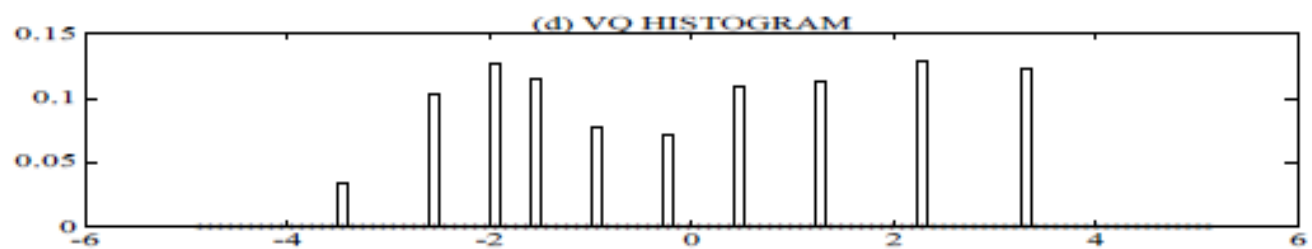
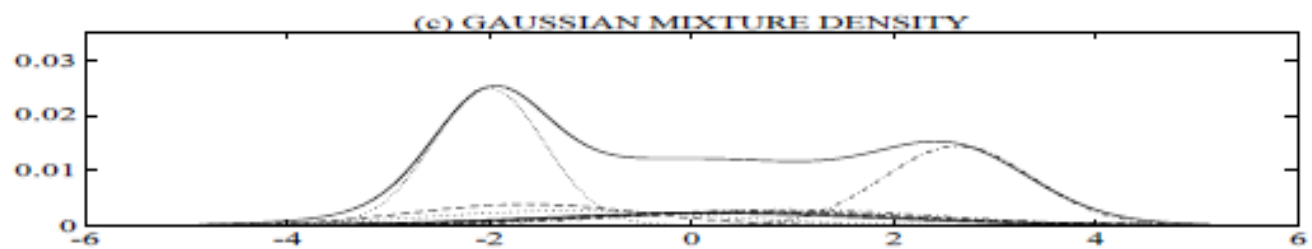
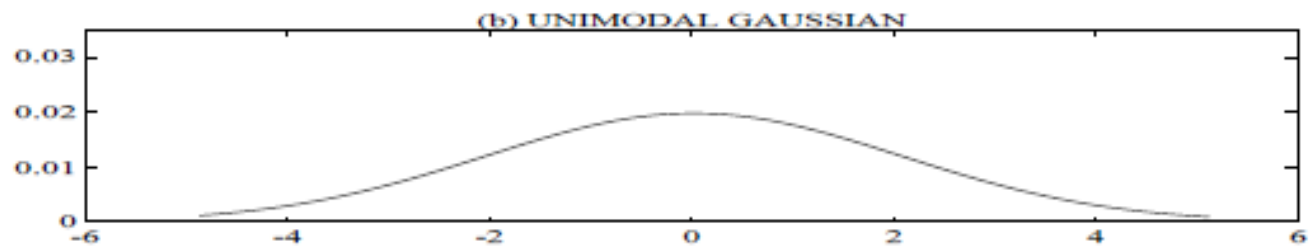
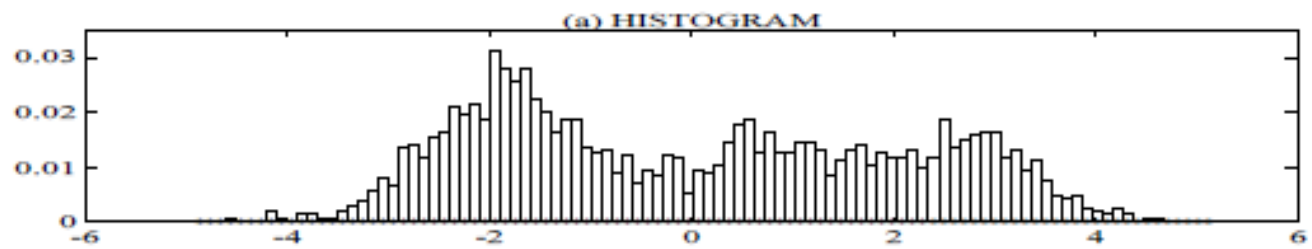
– 贾志刚

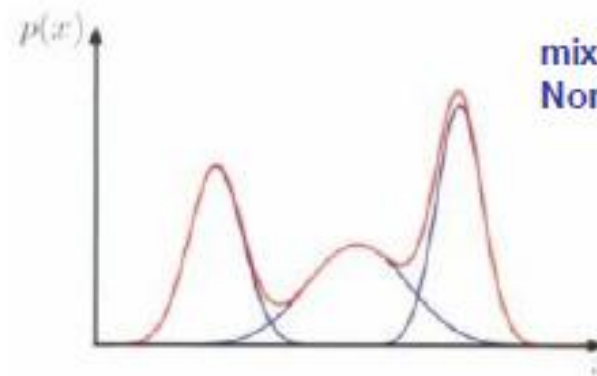
GMM(高斯混合模型)方法

- ▶ GMM方法概述
- ▶ OpenCV相关代码演示
 - 数据聚类
 - 图像分类

GMM方法概述

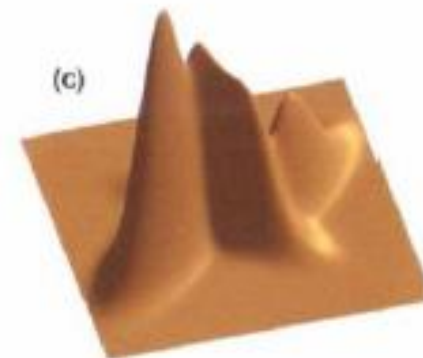
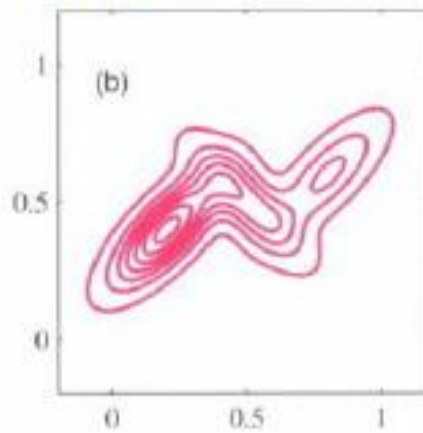
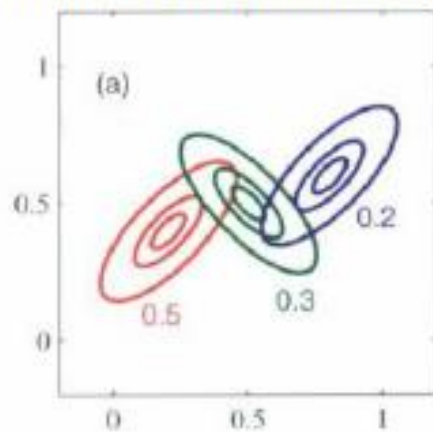
- ▶ 基什么是GMM
- ▶ GMM的数学模型





mixture of 3 one-dimensional
Normal distributions

mixture of 3 two-dimensional Gaussians

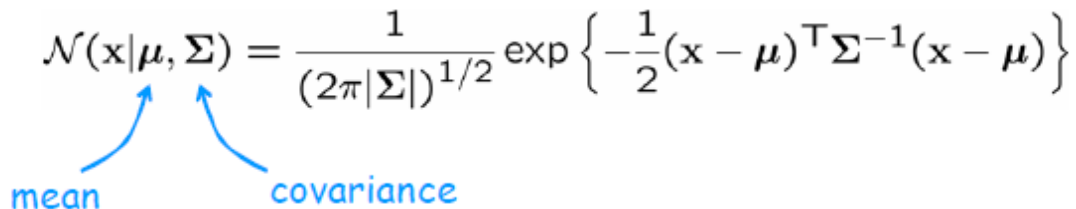


GMM方法概述

- ▶ 高斯混合模型 (GMM)
- ▶ 高斯分布与概率密度分布 – PDF
- ▶ 初始化

$$\mathcal{N}(\mathbf{x}|\mu, \Sigma) = \frac{1}{(2\pi|\Sigma|)^{1/2}} \exp \left\{ -\frac{1}{2}(\mathbf{x} - \mu)^T \Sigma^{-1}(\mathbf{x} - \mu) \right\}$$

mean covariance



GMM方法概述

- ▶ 跟K-Means相比较，属于软分类
- ▶ 实现方法-期望最大化(E-M)
- ▶ 停止条件-收敛

OpenCV API 说明

- ▶ OpenCV3.x中之前的版本有不同
- ▶ 分为两个步骤，训练与预言，在机器学习模块中
- ▶ 参数说明
- ▶ 数据整理与输入

```
// cluster the data
Ptr<EM> em_model = EM::create();
em_model->setClustersNumber(N);
em_model->setCovarianceMatrixType(EM::COV_MAT_SPHERICAL);
em_model->setTermCriteria(TermCriteria(TermCriteria::COUNT + TermCriteria::EPS, 100, 0.1));
em_model->trainEM(points, noArray(), labels, noArray());
```


代码演示

- ▶ 样本数据训练与预言
- ▶ 图像分割



Thank You