



Label Propagation

Extreme Value Theory

Transductive learning

Manifold regularization

Semi-supervised learning

Methods based Structured data(Graph)



open set

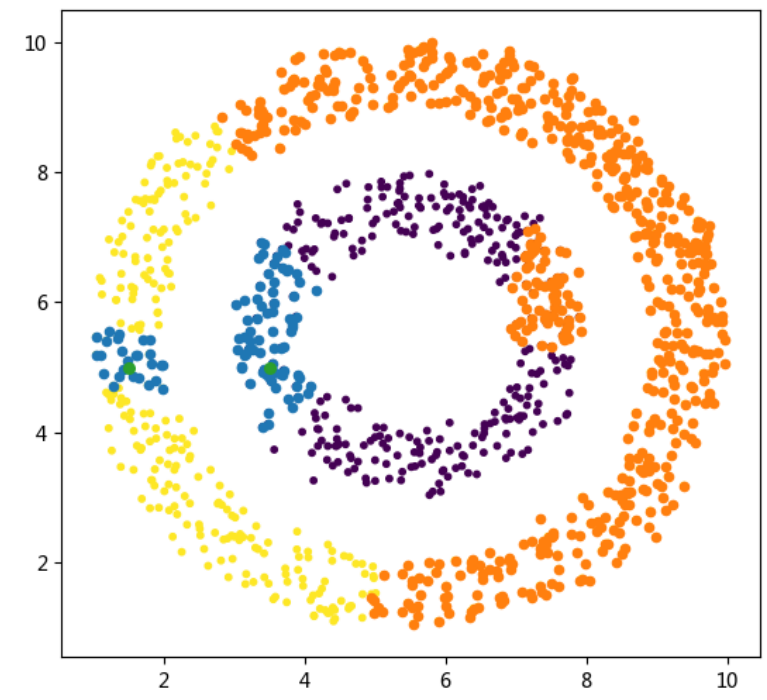
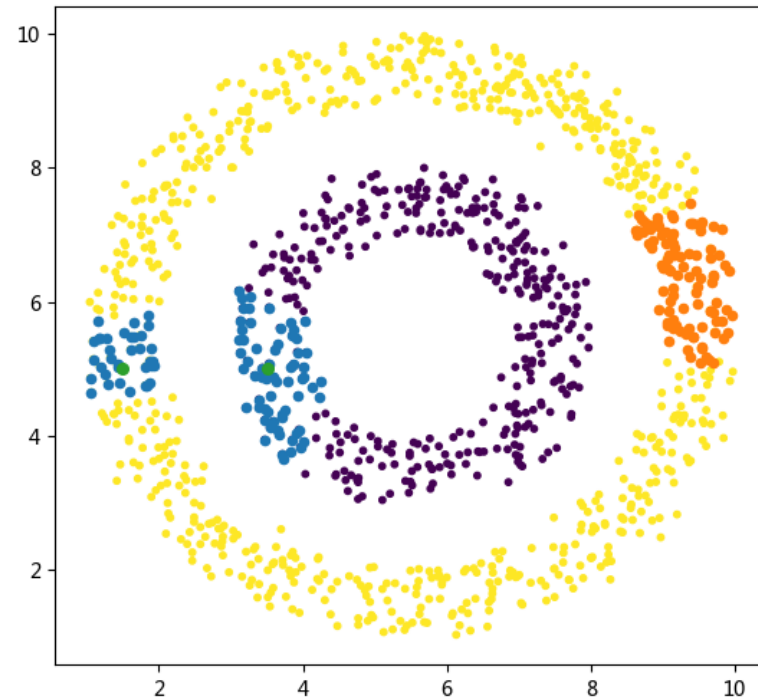


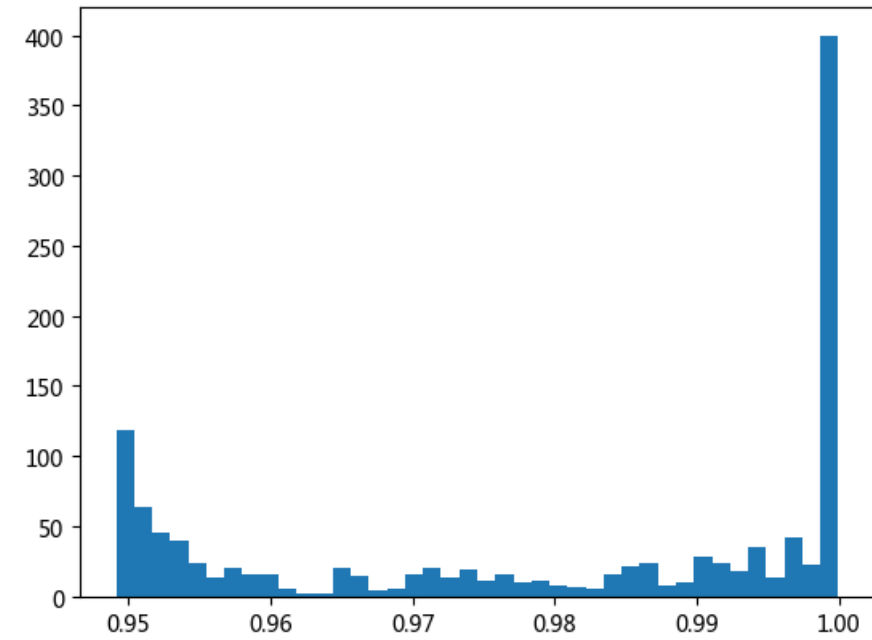
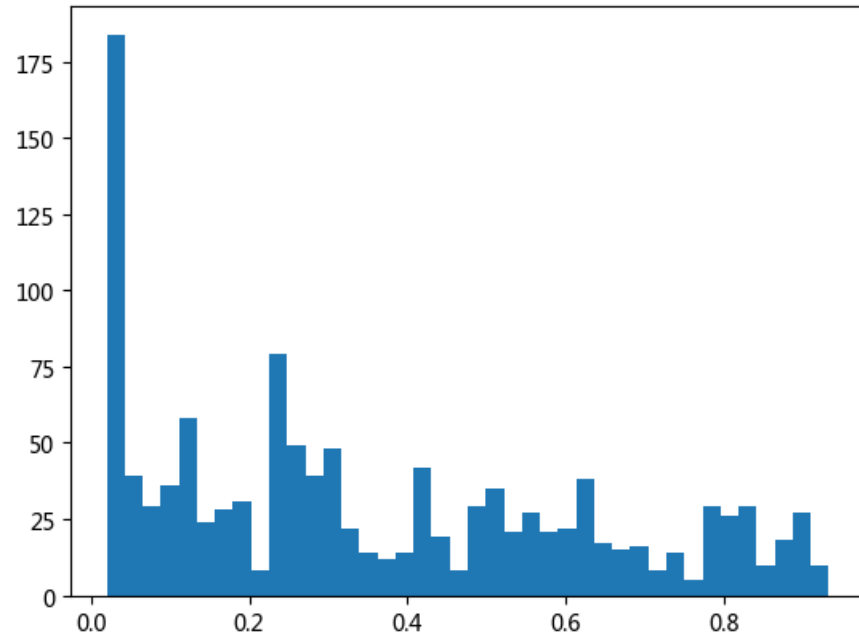
1. Propagate $f \leftarrow Pf$
2. Clamp the labeled data $f_L = Y_L$
3. Repeat from step 1 until f converges.

$$f = \begin{pmatrix} f_L \\ f_U \end{pmatrix}$$

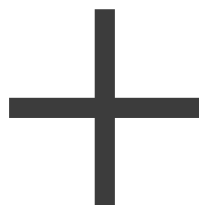
$$(l + u) \times 2$$

-1	1
1	0
1	0
0	1
-0.3	0.05
-0.42	0.67
0	0.51
...	...

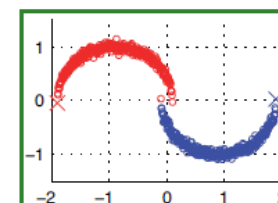
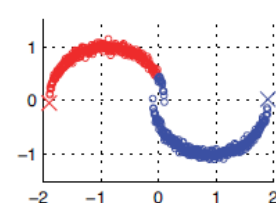
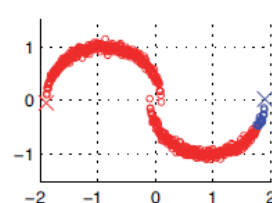
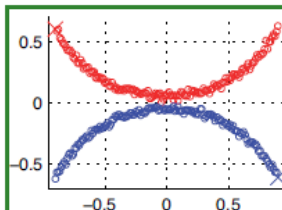
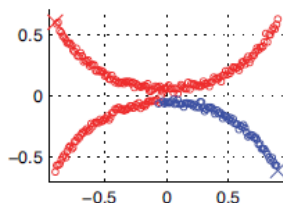
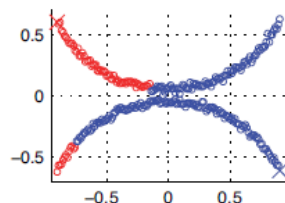
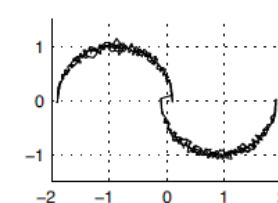
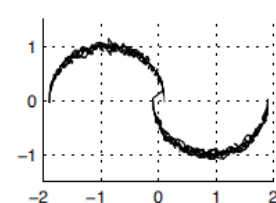
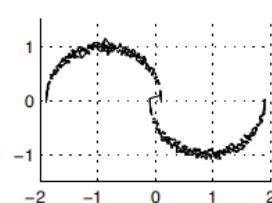
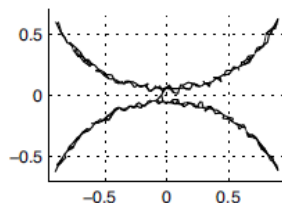
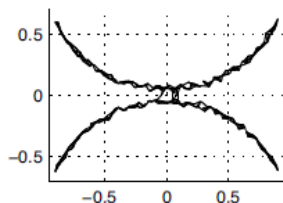
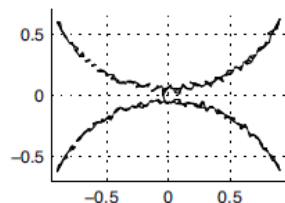
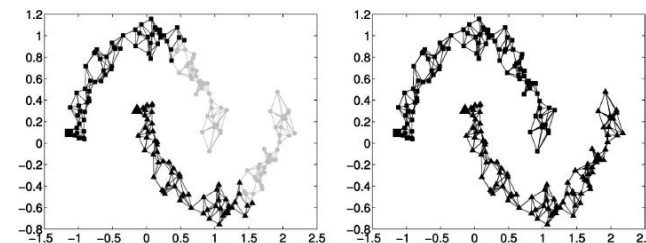
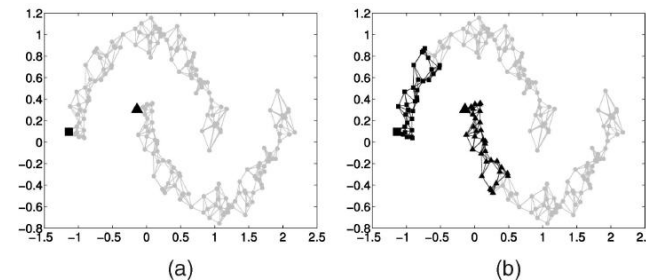




Label Propagation through Linear Neighborhoods (TKDE2008)



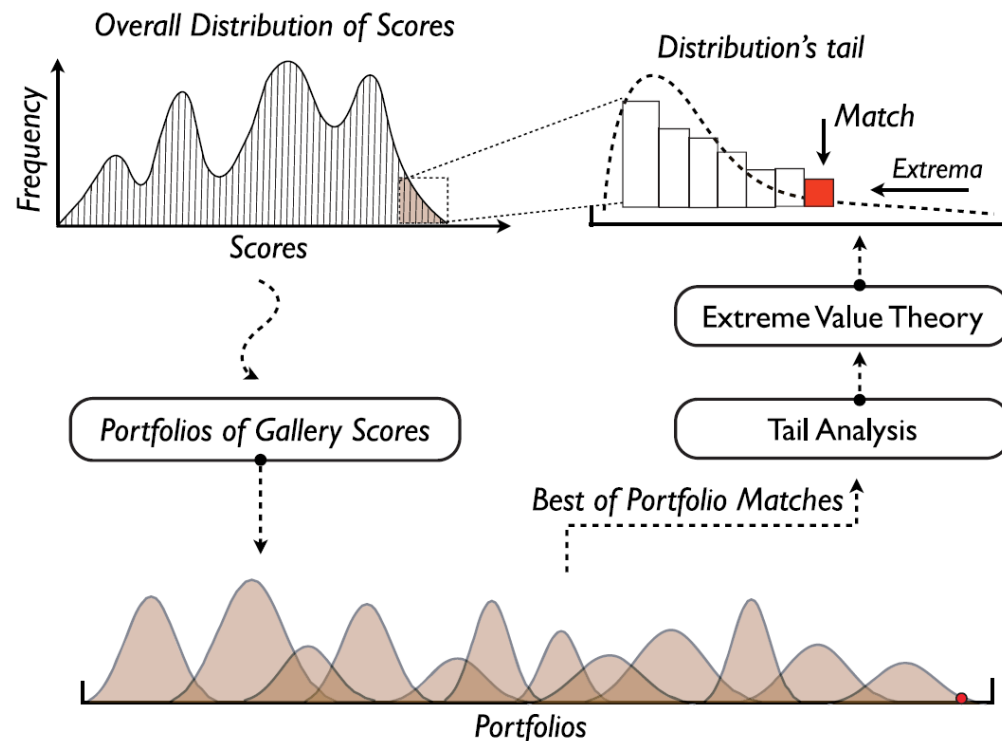
Semi-Supervised Learning with Manifold Fitted Graphs (IJCAI2013)



procedure



EVT make decision



Semi-Supervised Active Learning with Cross-Class Sample Transfer (IJCAI2016)

Active Learning



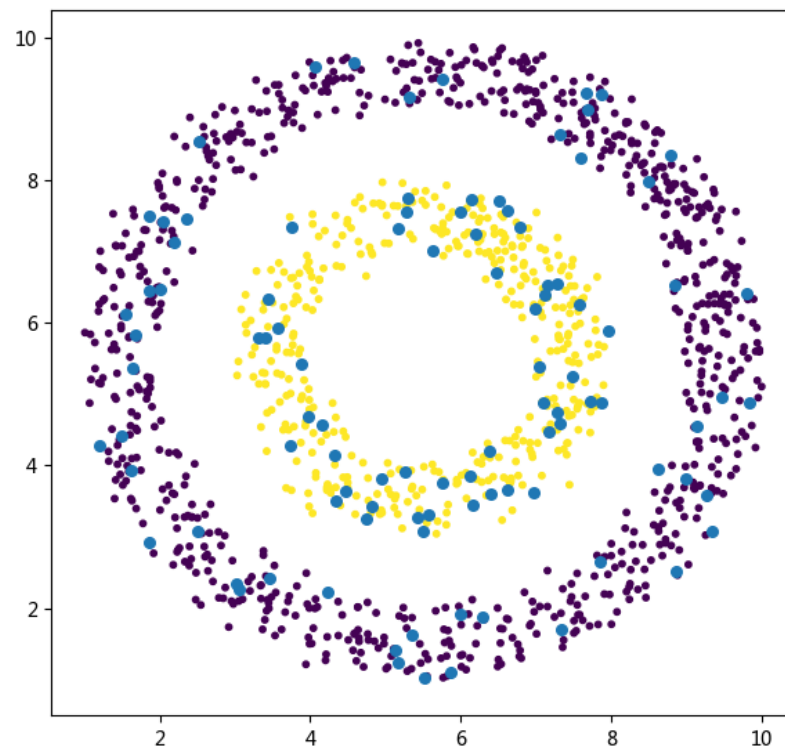
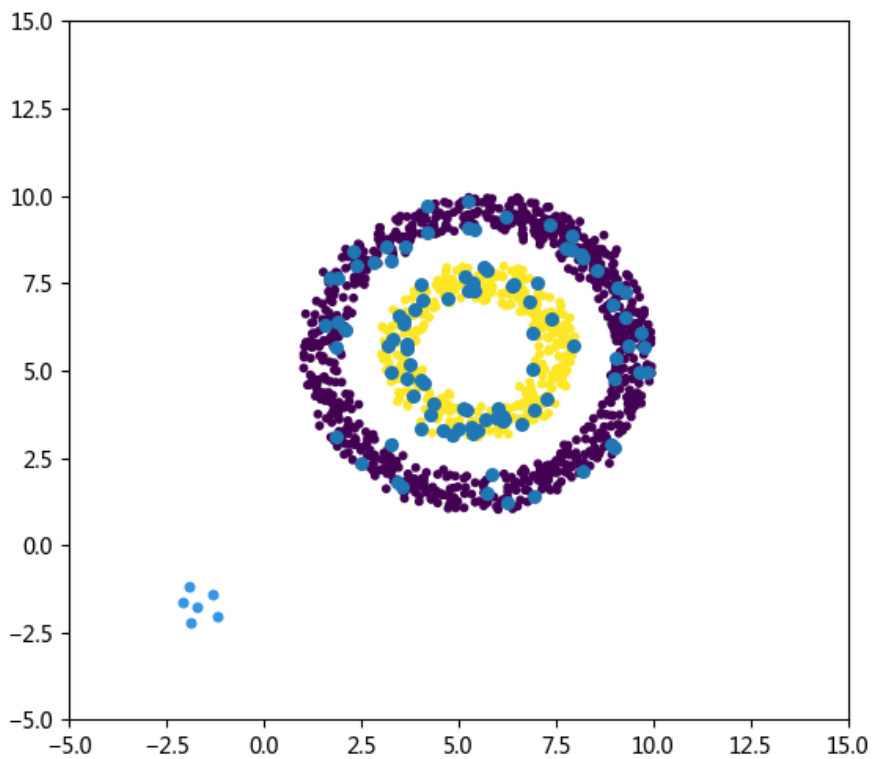
$$\min_{r_i} -\mathbf{r} \mathbf{S} \mathbf{E}' + \lambda \mathbf{r} \mathbf{S} \mathbf{r}', \text{ s.t. } \mathbf{r} \mathbf{1}' = \rho > 0, \mathbf{r} \succeq 0$$

where r_i is the ranking score for $x_i \in U$ and S is the k-NN graph on U and $S_{ii} = 1$. This problem can be solve by QP software or the augmented Lagrange multipliers algorithm.

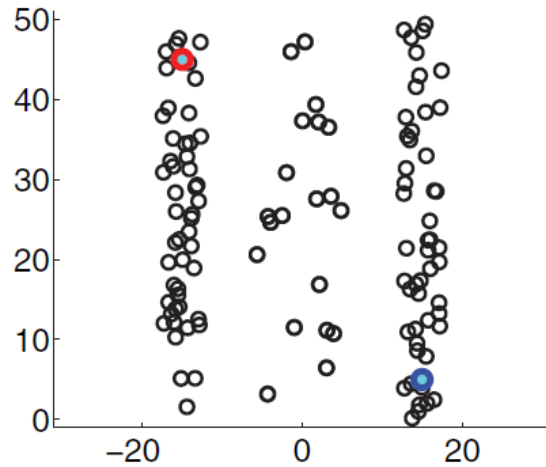
思考



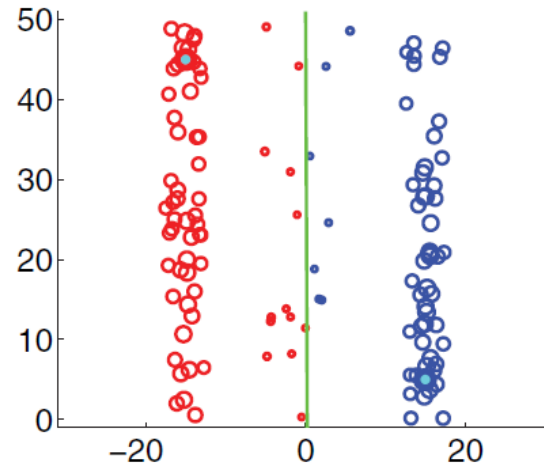
半监督学习中未标记数据为测试数据，在open set环境中新类数据依然有害，需要“剥离”或“降低”新类数据对模型的影响而保持其它未标记数据的对模型的贡献。



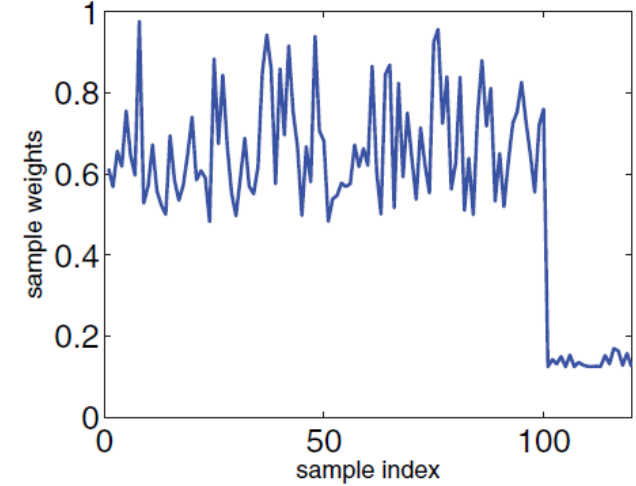
Large-Scale Adaptive Semi-Supervised Learning via Unified Inductive and Transductive Model (KDD2014)



(a) Original toy data

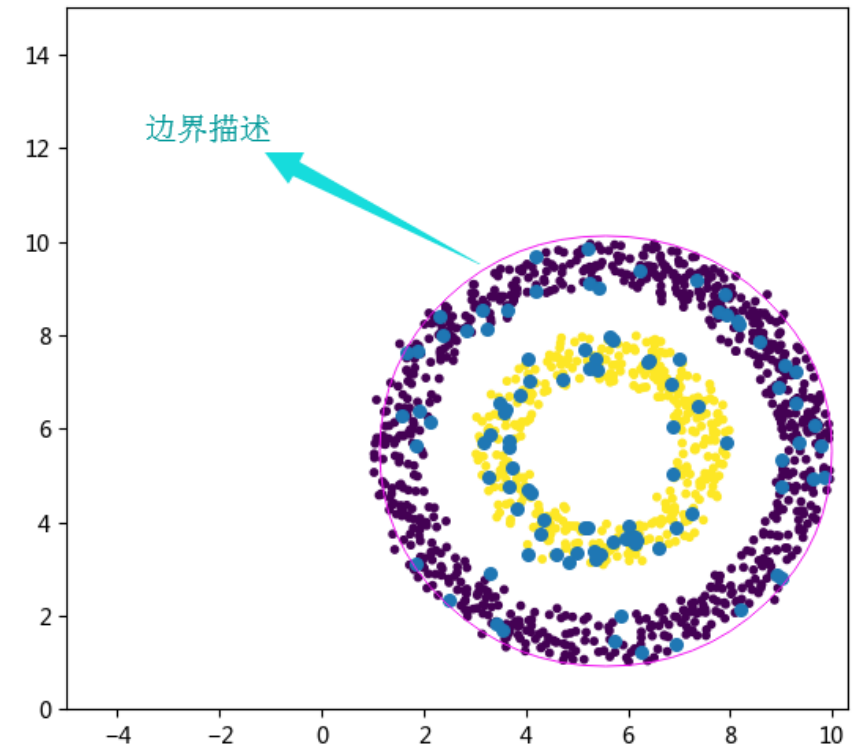
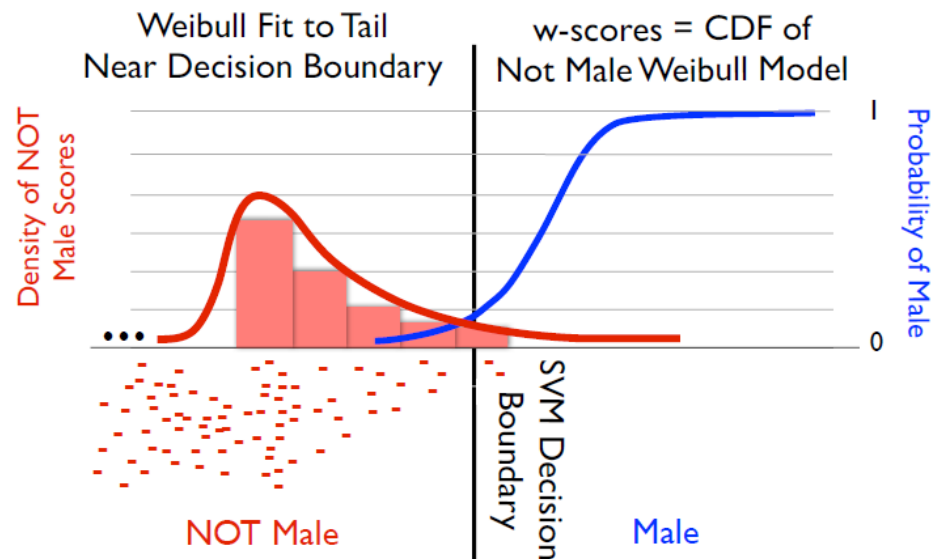
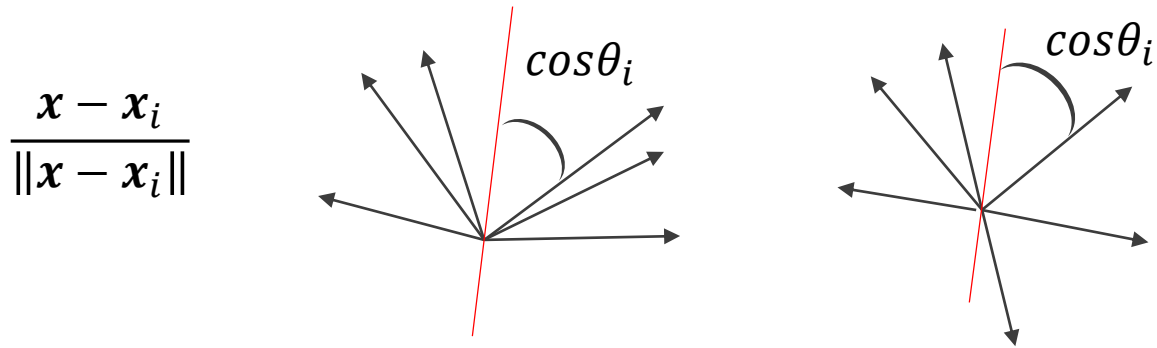


(b) Toy data after classification using our model



(c) Sample weights

寻找边界（非决策边界）部分数据点的空间特征信息并基于此做决策



Sparse Representation-Based Open Set Recognition (PAMI 2017)

