预备知识

A. 模型在noisy dataset学的是noisy label posterior 不是 clean label posterior

B. 噪声分instance independent(又分为symmetric,asymmetric,pair noise); instance dependent

C. 一些非基于深度学习的噪声处理方法

1. data cleaning: 直接在数据集中应用bagging, K means, outlier detection等处理掉错误标签
2. surrogate loss: 尝试解决0-1分类损失函数的非凸性和计算硬度，只能在2分类中有较好表现
3. probablistic method: 生成式模型学习特征分布，但是参数量很大
4. model-based method: 魔改某个模型，如SVM使得其noise-tolerant

D. DNN更易受噪声影响，关于这个话题的研究使得现在通过深度学习解决noise 的算法鲁棒性更高

E. 也讨论了关于noisy label的回归问题

标签噪声算法分类

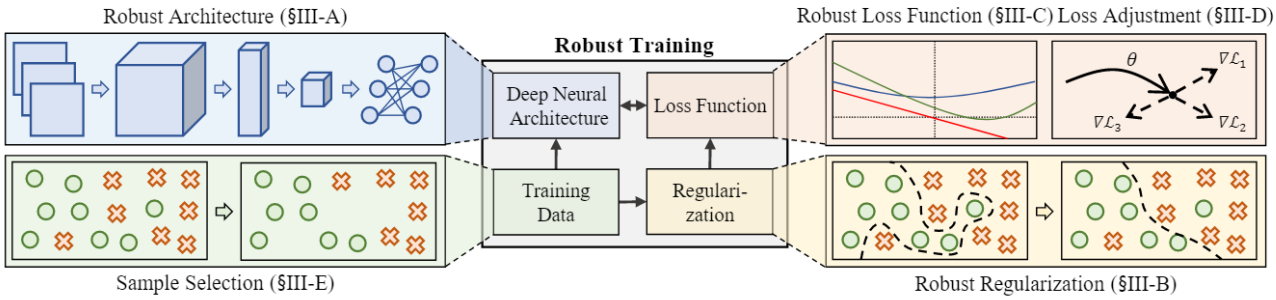
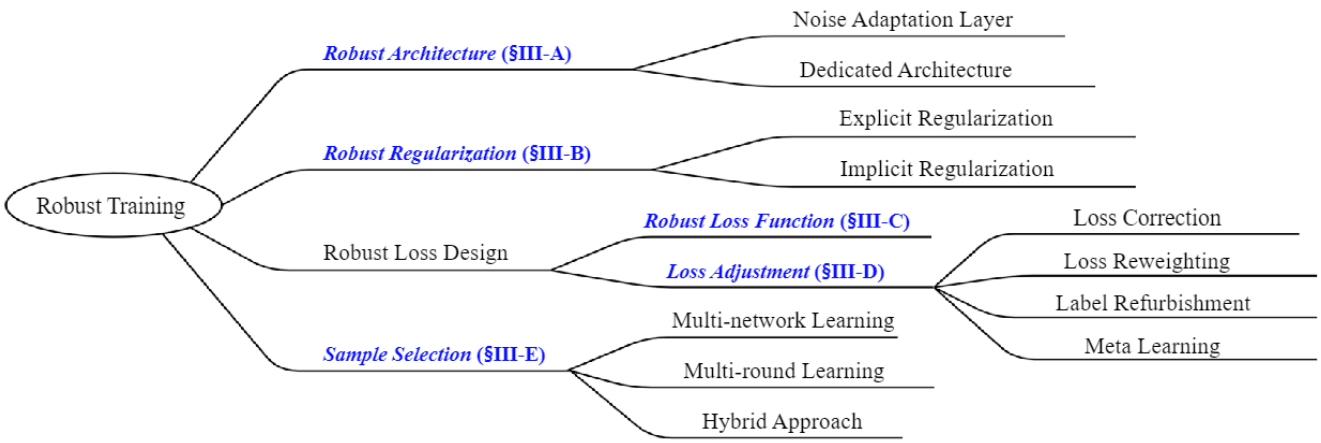


Fig. 2. Categorization of recent deep learning methods for overcomming noisy labels.



😊😊😊具体分类的具体内容还没看！之后补充

衡量label noise learning算法的指标

- flexibility: 是否可以快速适应新的框架
- no pre-training: 需不需要预训练
- full exploration: 每个样本是否都用了，有没有生硬的把一些错误样本排除掉
- no supervision: 数据集没有人工干预，如噪声率、clean validation set等
- heavy noise: 是否可以对抗heavy noise
- complex noise: 对标签的先验假设的强弱

TABLE III
COMPARISON OF ROBUST DEEP LEARNING CATEGORIES FOR OVERCOMING NOISY LABELS.

Category		P1 Flexibility	P2 No Pre-train	P3 Full Exploration	P4 No Supervision	P5 Heavy Noise	P6 Complex Noise
Robust Architecture (§III-A)	Noise Adaptation Layer	△	○	○	○	×	×
	Dedicated Architecture	×	△	○	△	△	○
Robust Regularization (§III-B)	Implicit Regularization	○	○	○	○	△	△
	Explicit Regularization	○	○	○	○	×	△
Robust Loss Function (§III-C)		○	○	○	○	×	×
Loss Adjustment (§III-D)	Loss Correction	○	×	○	×	×	×
	Loss Reweighting	○	○	○	○	×	△
	Label Refurbishment	○	○	○	○	△	△
	Meta Learning	○	○	○	×	△	△
Sample Selection (§III-E)	Multi-Network Learning	○	○	×	×	○	△
	Multi-Round Learning	○	○	×	○	○	△
	Hybrid Approach	○	○	○	○	○	△

预测噪声率的方法

统计noise transition matrix后通过计算得出

通过GMM来建模true label和noisy label 的两个高斯分布

通过干净的验证集交叉验证

噪声数据集

TABLE IV
SUMMARY OF PUBLICLY AVAILABLE DATASETS USED FOR STUDYING LABEL NOISE.

	Dataset	# Training	# Validation	# Testing	# Classes	Noise Rate (%)
Clean Data	MNIST [154][50]	60K	N/A	10K	10	≈ 0.0
	Fashion-MNIST [155][51]	60K	N/A	10K	10	≈ 0.0
	CIFAR-10 [156][52]	50K	N/A	10K	10	≈ 0.0
	CIFAR-100 [156][52]	50K	N/A	10K	100	≈ 0.0
	SVHN [157][53]	73K	N/A	26K	10	≈ 0.0
	Tiny-ImageNet [158][55]	100K	10K	10K	200	≈ 0.0
	ImageNet [1][54]	1.3M	50K	50K	1000	≈ 0.0
Real-world Noisy Data	ANIMAL-10N [19][56]	50K	N/A	5K	10	≈ 8.0
	CIFAR-10N [159][57]	50K	N/A	10K	10	≈ 9.0/18.0/40.2
	CIFAR-100N [159][57]	50K	N/A	10K	100	≈ 25.6/40.2
	Food-101N [18][58]	310K	5K	25K	101	≈ 18.4
	Clothing1M [16][59]	1M	14K	10K	14	≈ 38.5
	WebVision [17][60]	2.4M	50K	50K	1000	≈ 20.0

其他

如何评估模型的泛化性?

未来研究方向?

😊 😊 😊具体分类的具体内容还没看！之后补充