

QCon

全球软件开发大会【上海站】

机器学习风控实践与未来

武广柱 | 百度安全事业部首席架构师



极客时间

重拾极客精神·提升技术认知

每天10分钟,邀请顶级技术专家,为你传道授业解惑。



扫一扫,试读专栏

AiCon

全球人工智能技术大会 2018

助力人工智能落地

2018.1.13 - 1.14 北京国际会议中心



扫描关注大会官网

APSEC 2017



APSEC 2017

24th Asia-Pacific Software Engineering Conference
4-8 December 2017, Nanjing, Jiangsu, China

12月4-8日
中国南京



了解详情

主办方 **Geekbang** & **InfoQ**
极客邦科技

ArchSummit

全球架构师峰会 2017

12月8-9日 北京·国际会议中心



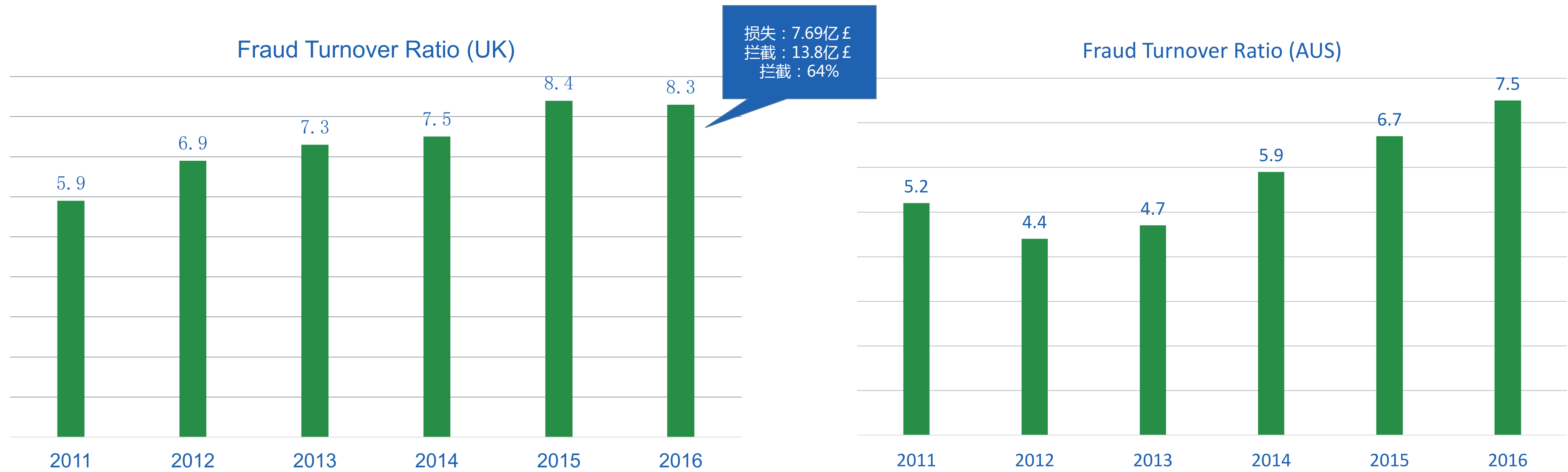
内容

- 背景介绍
- 关联分析用于风控
- 机器学习用于风控
- 展望

背景介绍

- 风控是金融保险行业的核心
 - 信贷风控
 - 交易风控
 - 保险风控
 - ...
- 也是其他互联网行业重要能力
 - 批量点击、恶意刷量
 - 垃圾注册
 - 薅羊毛
 - ...

• 银行卡盗刷



- 风控技术演进

黑白名
Reputation List

Value2	
179.60...	Spam
219.43...	Fraud
182.60...	S

规则引擎
Rules Engine



```
graph TD; WorkingMemory[Working Memory] --> Determine[Determine possible rules to fire]; Determine --> ConflictSet[Conflict Set]; ConflictSet --> SelectRule{Select Rule to Fire}; SelectRule -- Rule Found --> RuleFound[Rule Found]; SelectRule -- No Rule Found --> NoRuleFound[No Rule Found]; NoRuleFound --> Exit[exit];
```

大数据
Big Data



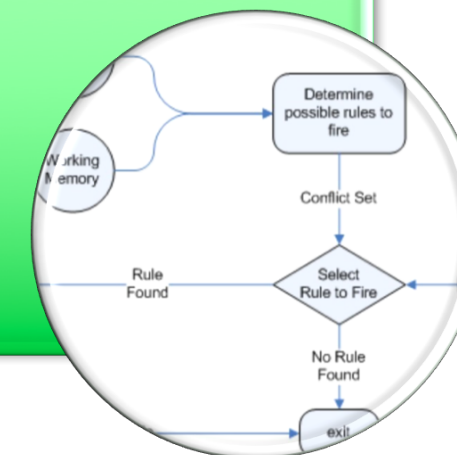
- 简单明了
- 滞后性
- 优质数据收集困难

黑白名 Reputation List

Value2	
179.60...	Spam
219.43...	Fraud
182.60...	S...

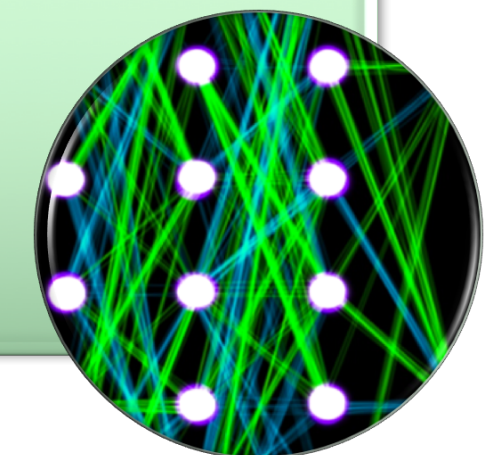
- 可解释，易开发
- 很好的利用了专家经验
- 实时生效
- 维护复杂（顺序、冲突、删减）
- 只表达数据与欺诈间的简单关系
- 容易被猜解突破

规则引擎 Rules Engine

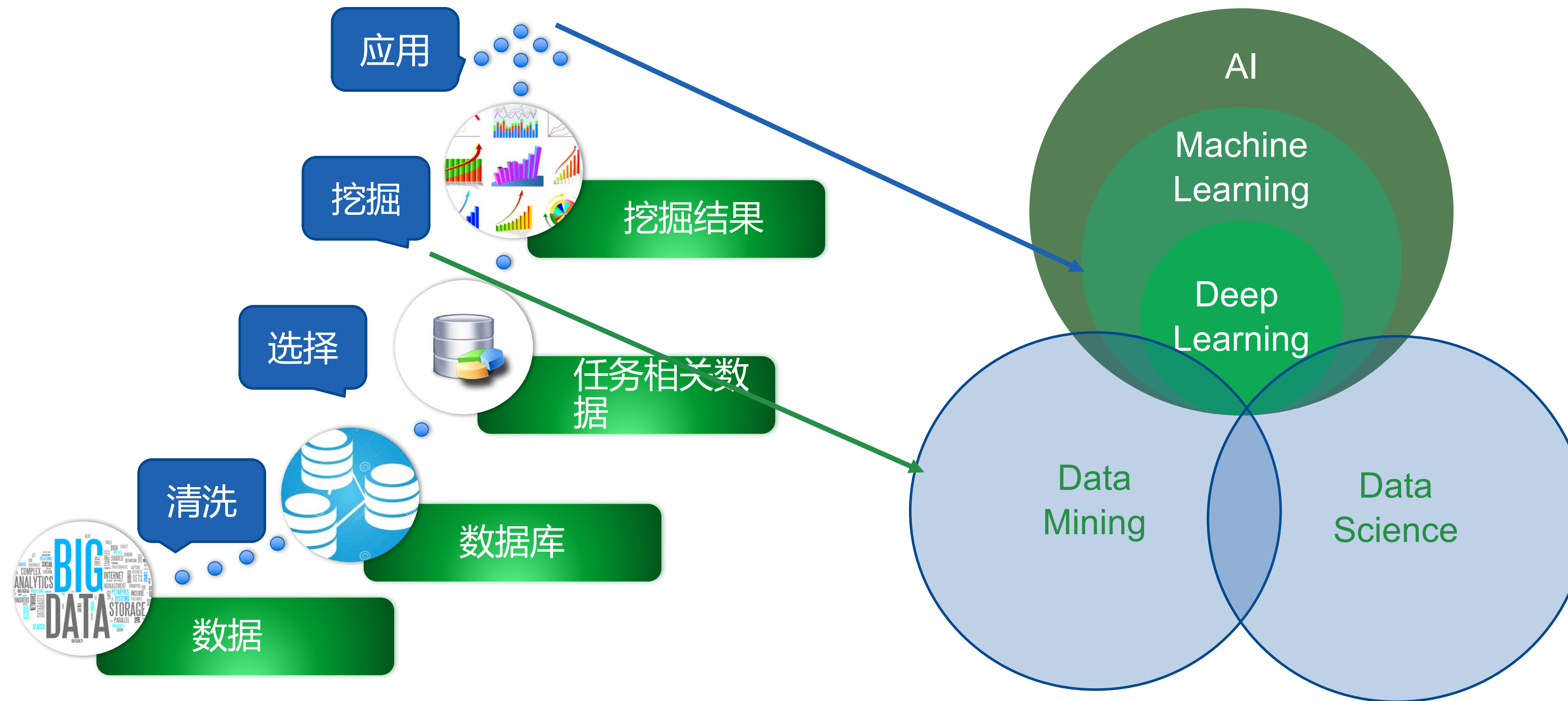


- 可利用大数据挖掘/机器学习
- 可学到复杂的数据与欺诈关系
- 可预测新型欺诈
- 可随欺诈演化而自动进化
- 完美？

大数据 Big Data



数据挖掘与机器学习



关联分析用于风控

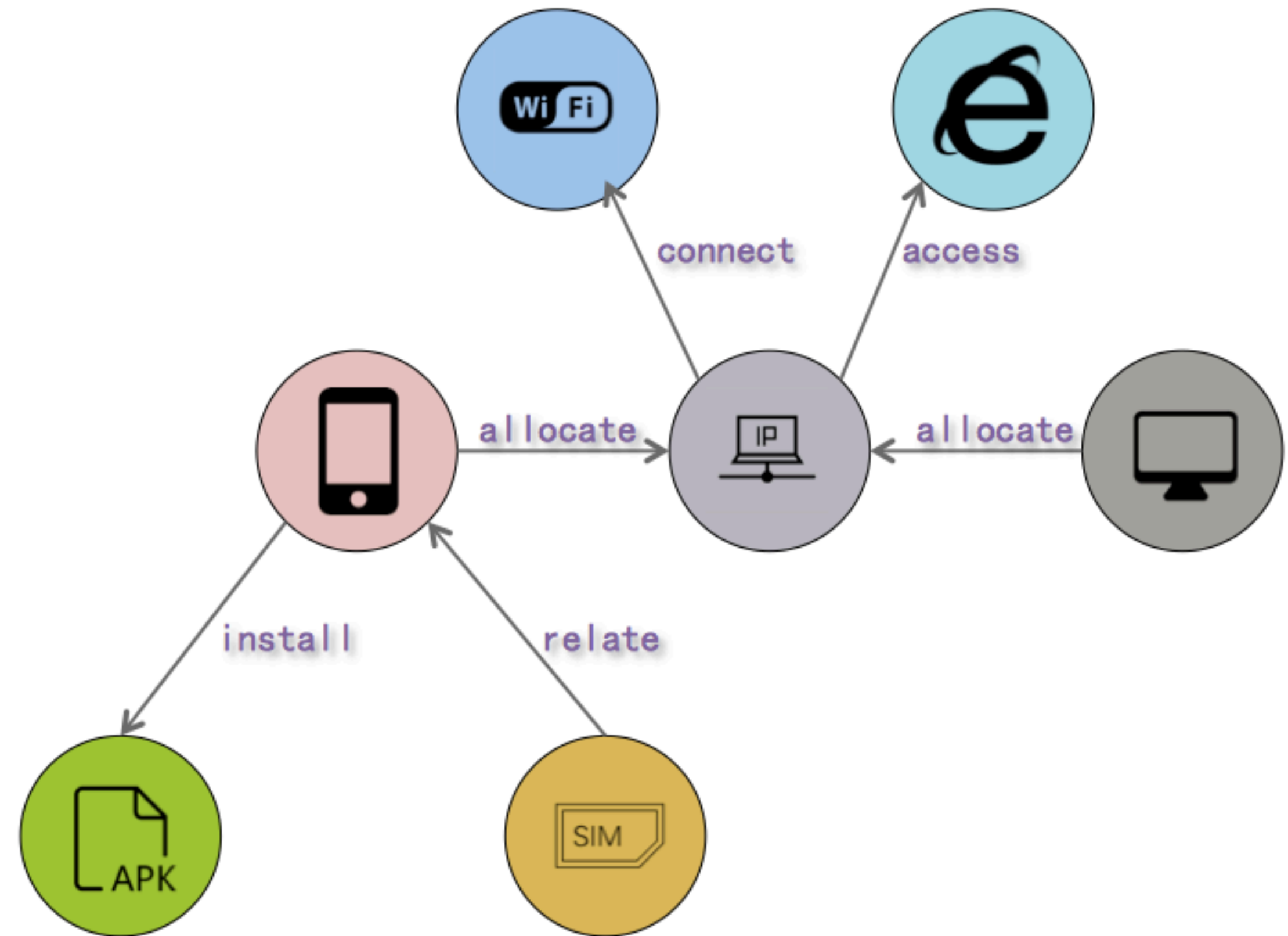
- 风控关联分析Schema

- IMEI、IMSI、Token

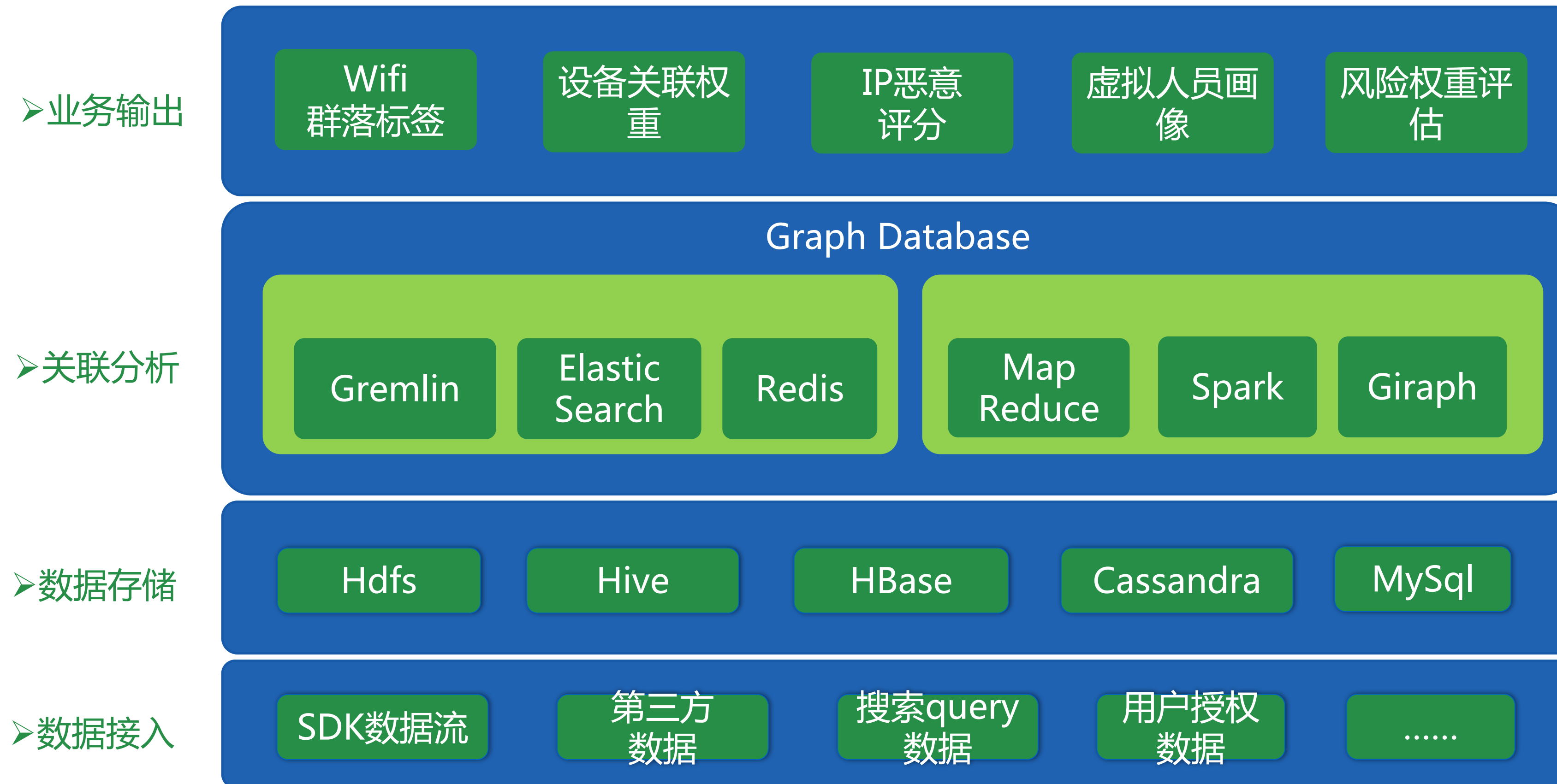
- WiFi、IP

- APP、URL

- 3.2亿顶点，50亿边



关联分析系统



机器学习用于风控



有监督学习 (Supervised)



无监督学习 (Unsupervised)

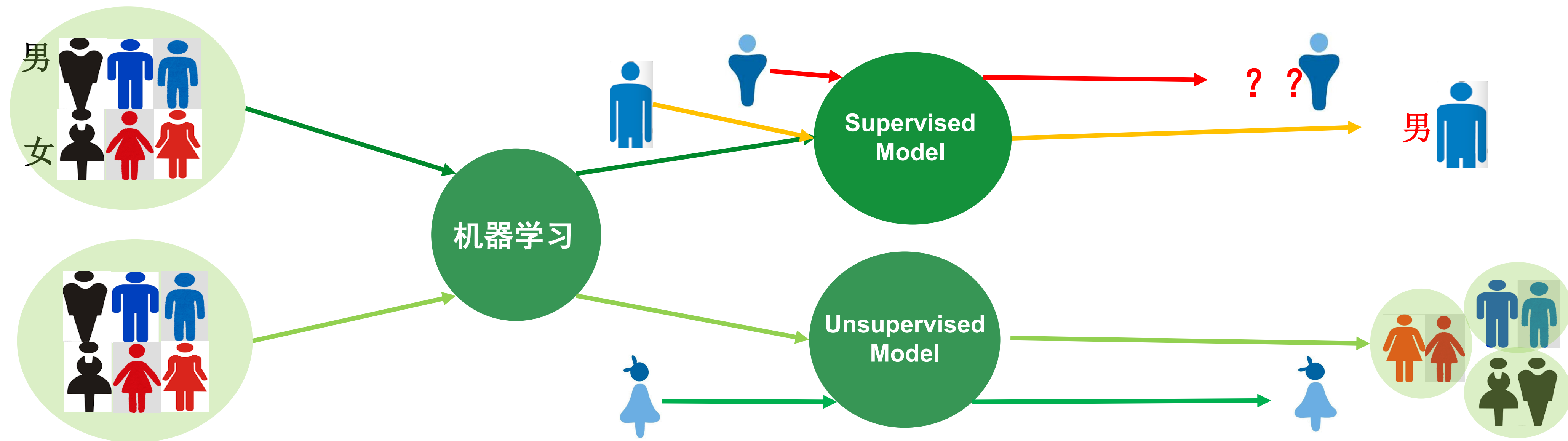


迁移学习 (Transfer)

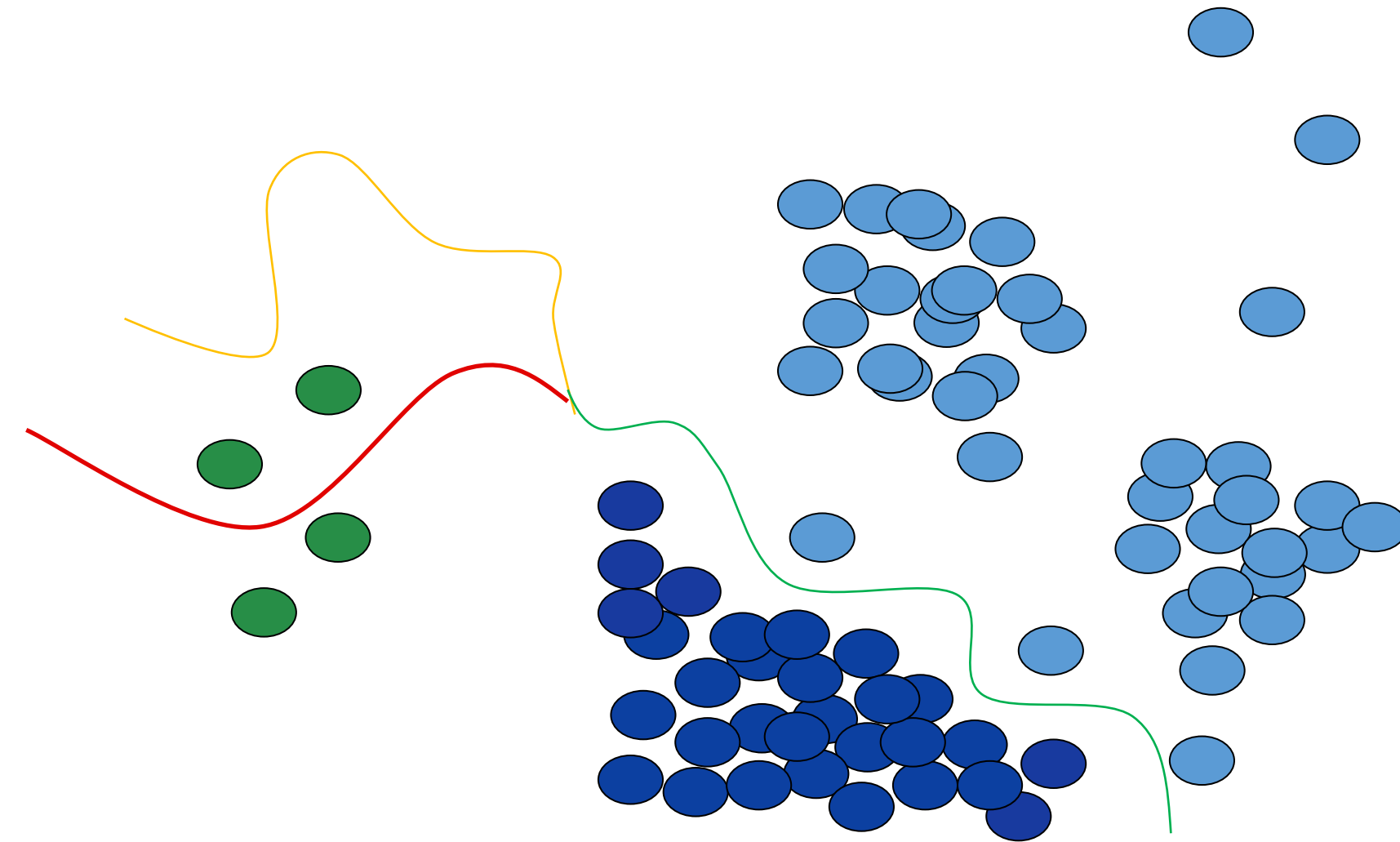
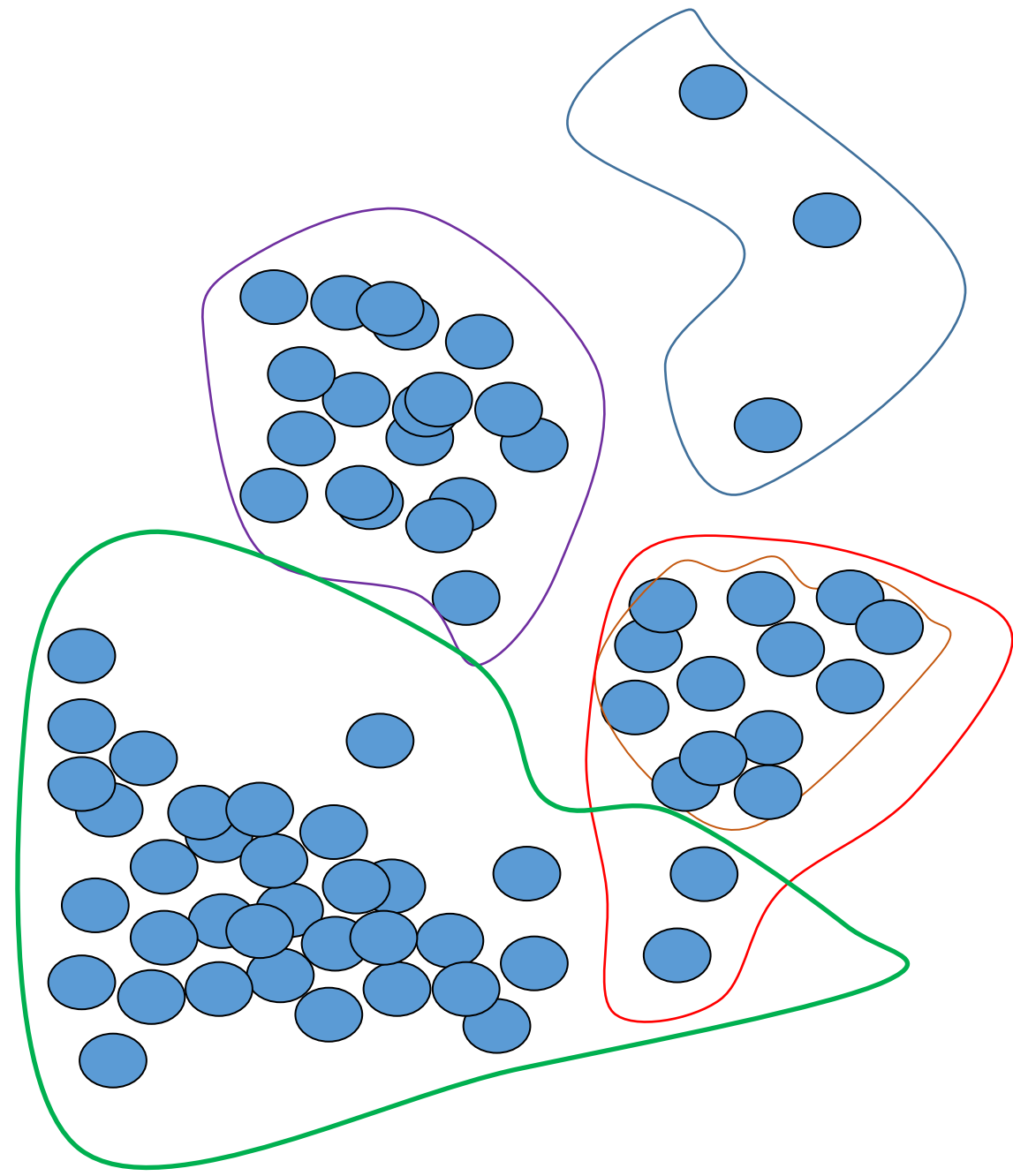


强化学习 (Reinforcement)

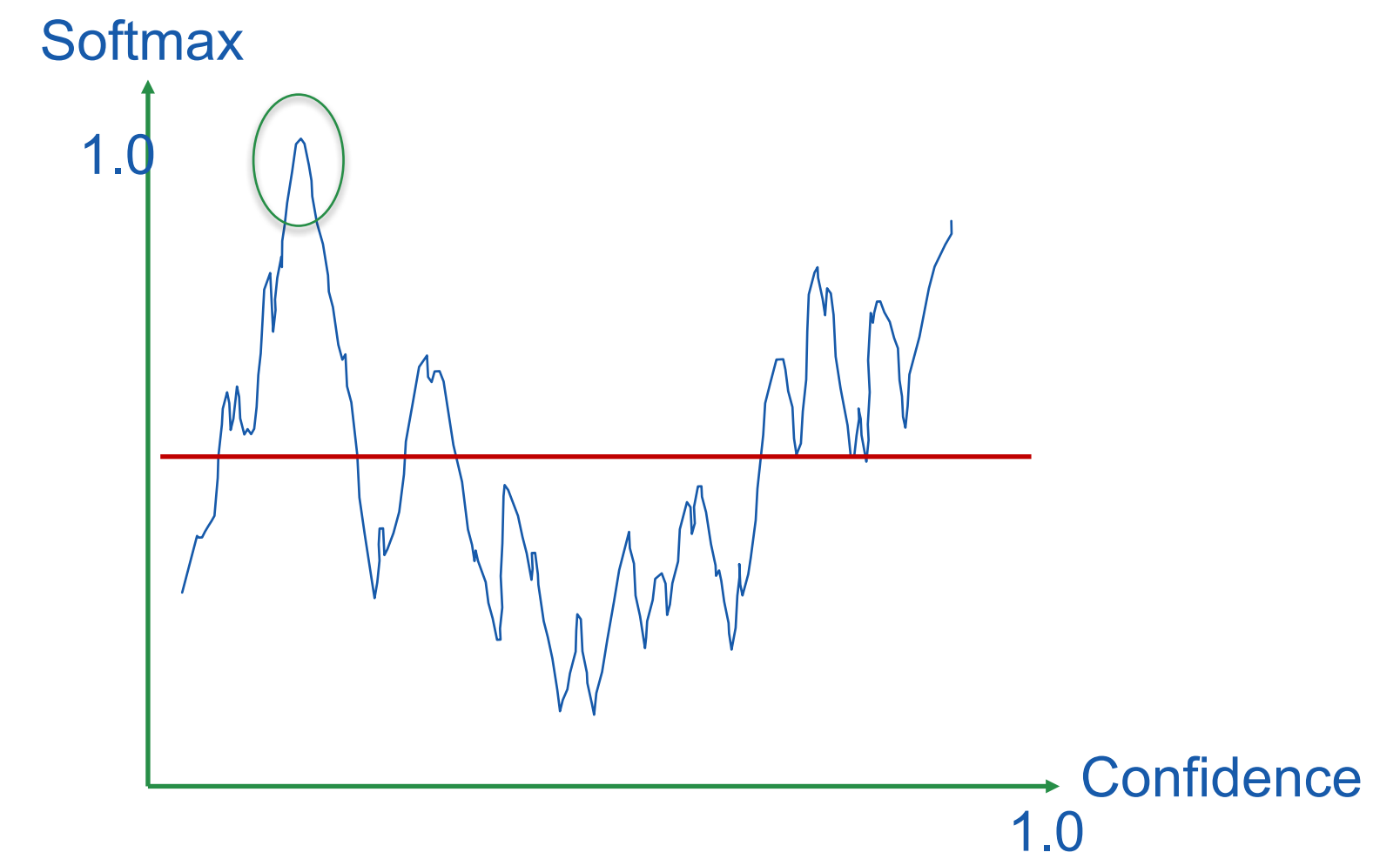
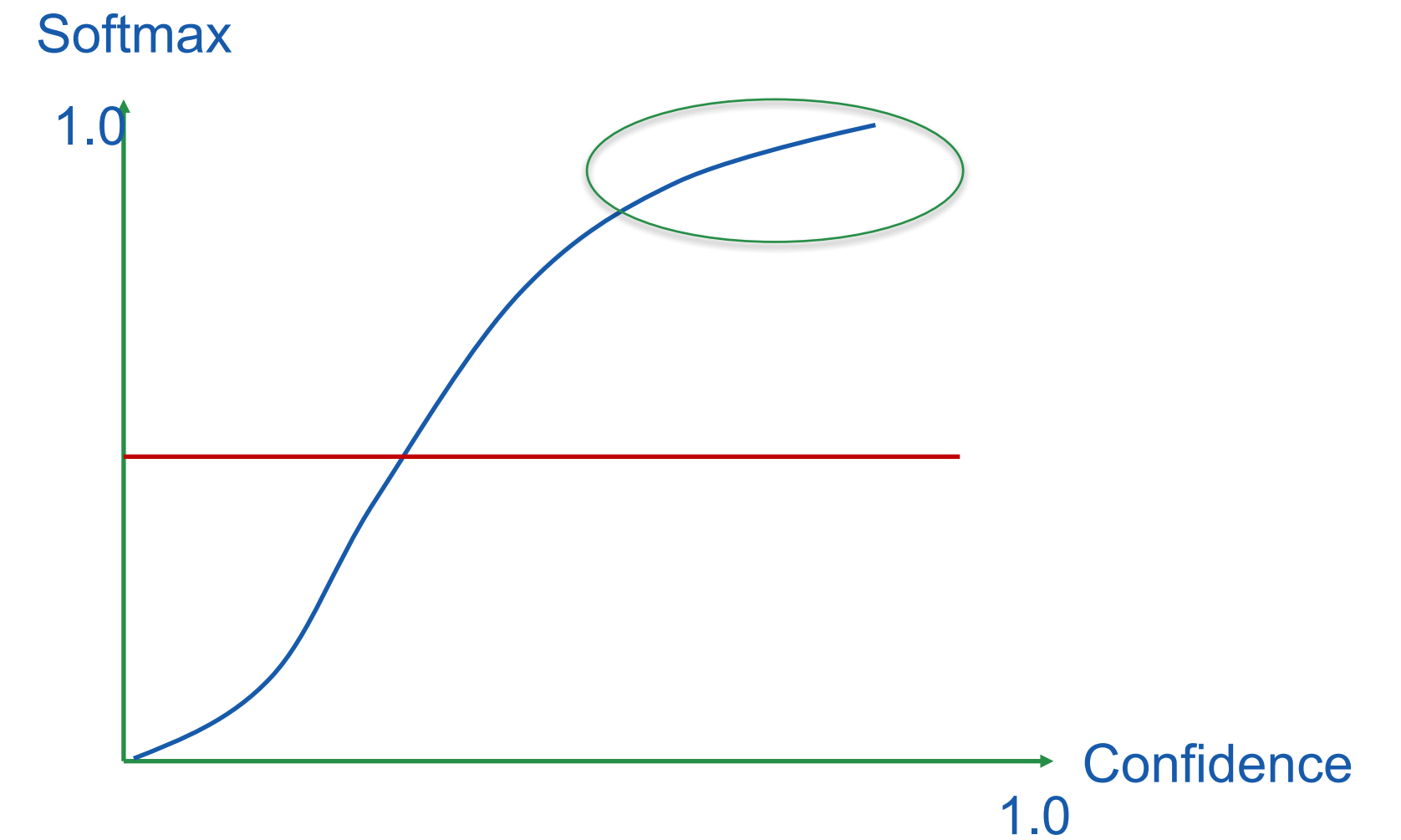
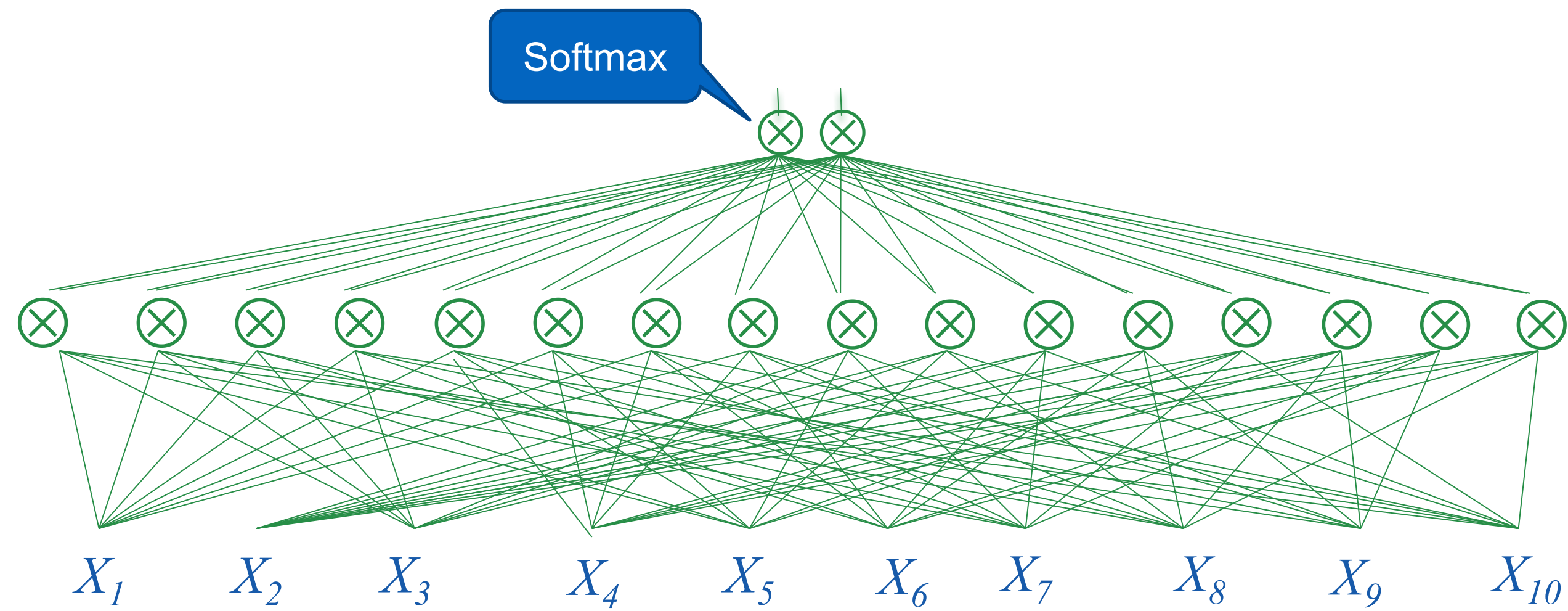
- 有监督学习和无监督学习



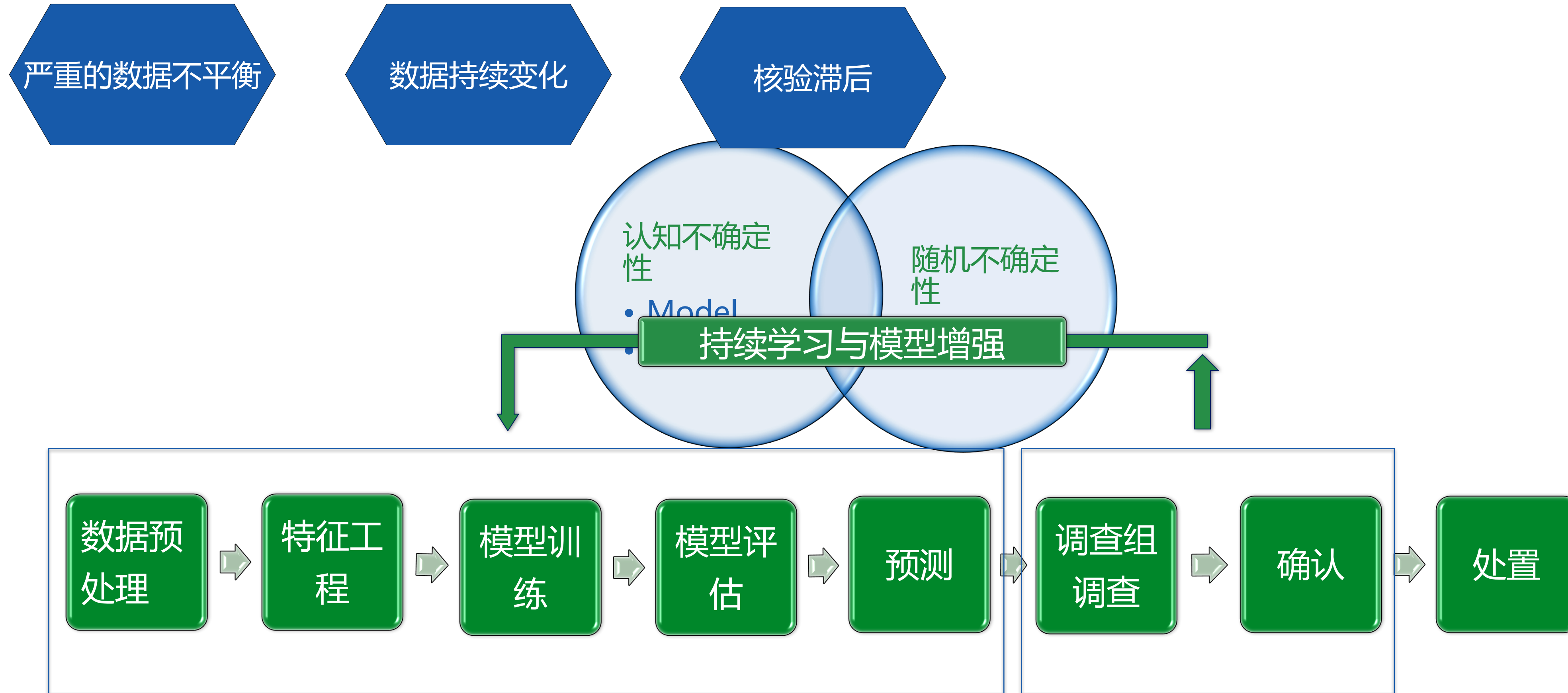
- 机器学习的不确定性



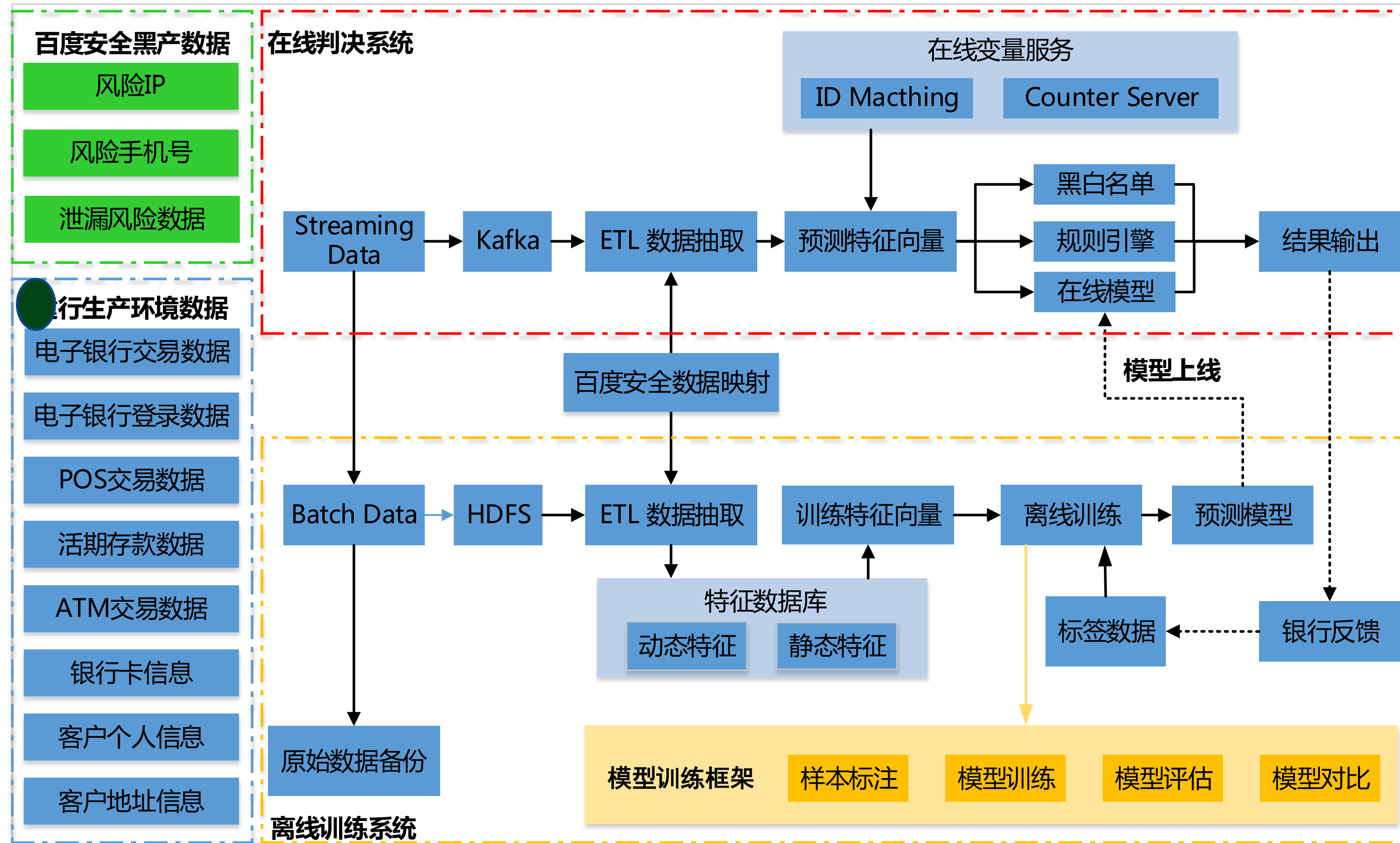
- 置信度获取是困难的



风控的特殊性加剧不确定性



基于机器学习的交易风控系统



- 静态角度的风控模型

- 2004~2015

LR (Logistic Regression)
ANN (Neural Network)
DT (Decision Tree)
SVM (Support Vector Machine)
NB (Naive Bayes)

- 我们的一个案例

	accuracy	precision	recall
GBDT	0.99583	0.94586	0.97139
GBDT+DNN	0.99884	0.99322	0.98239
GBDT+LR	0.99828	0.99586	0.96938
gcForest	0.99914	0.99674	0.98590
RF	0.99914	0.99715	0.98550

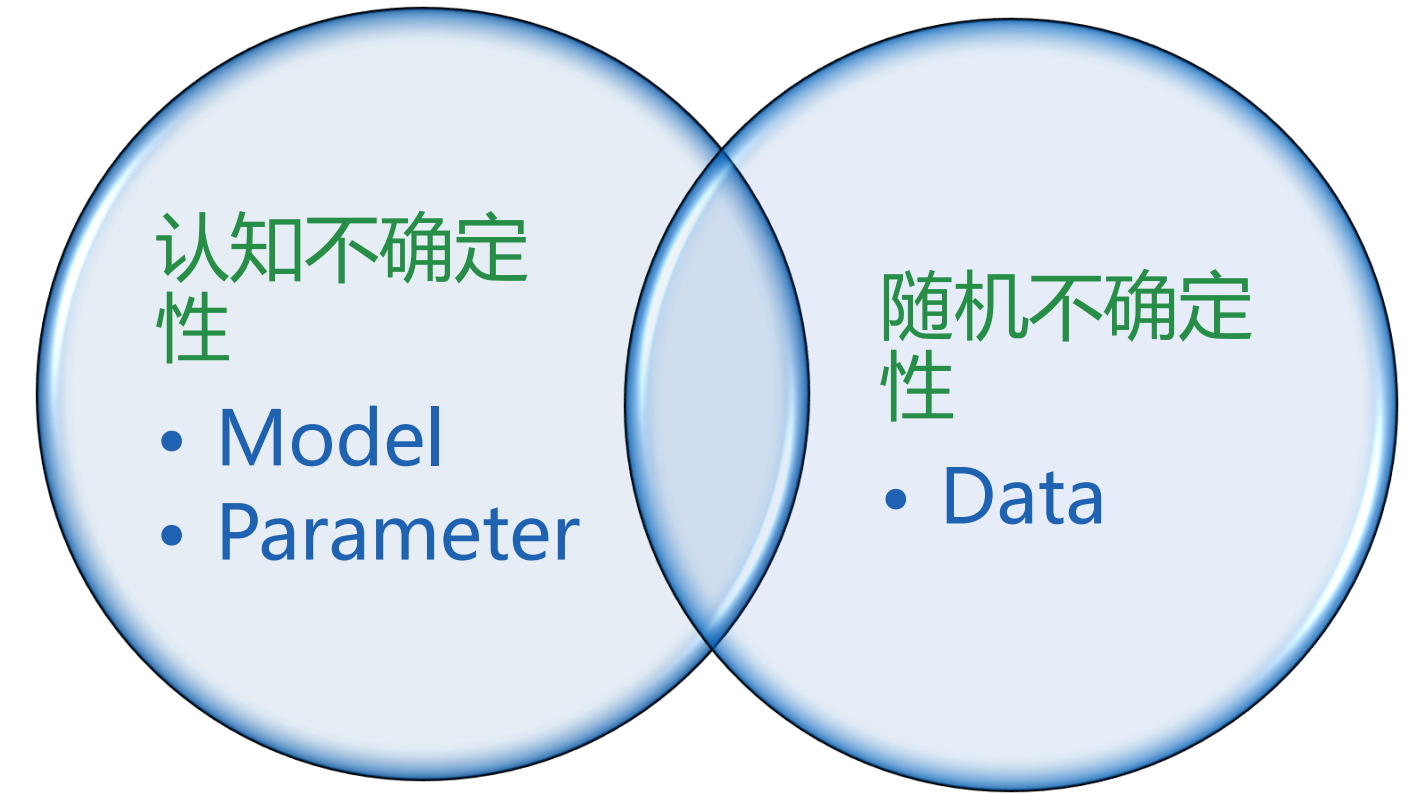
	accuracy	precision	recall
GBDT	0.99509	0.45871	0.52143
GBDT+DNN	\	\	\
GBDT+LR	0.99595	0.56588	0.41633
gcForest	0.99655	0.91255	0.24742
RF	0.99650	0.91498	0.23299

风控的特殊性加剧不确定性

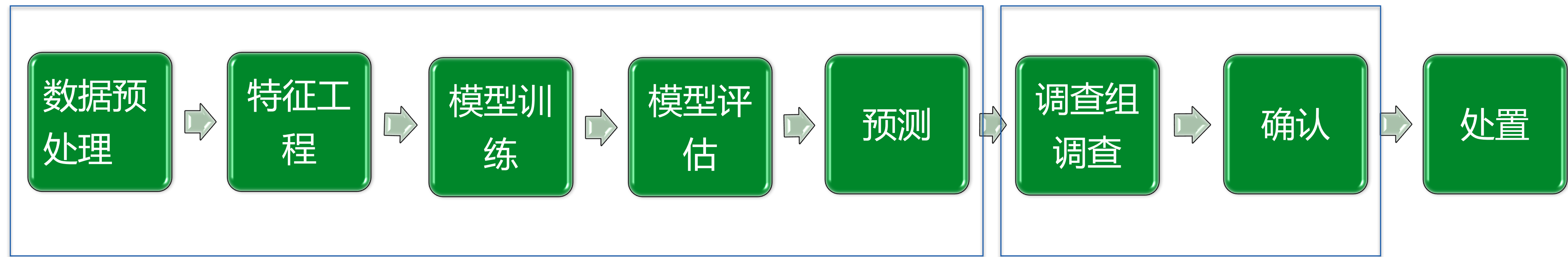
严重的数据不平衡

数据持续变化

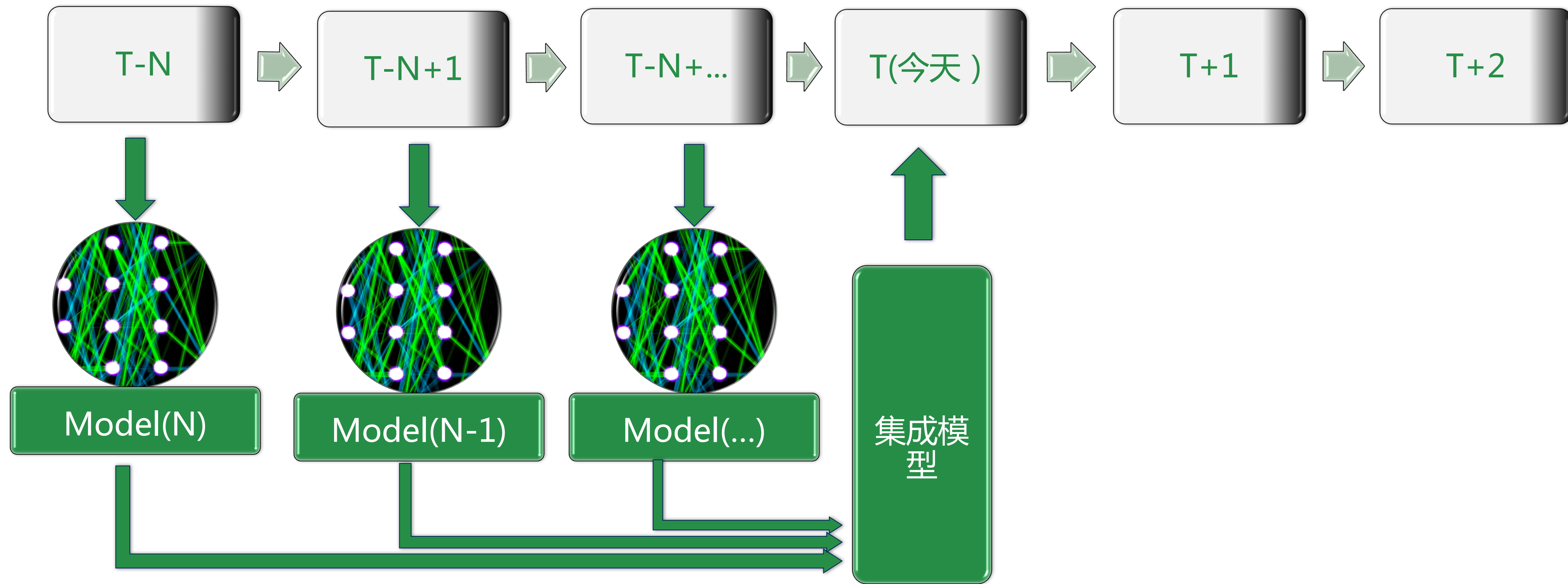
核验滞后



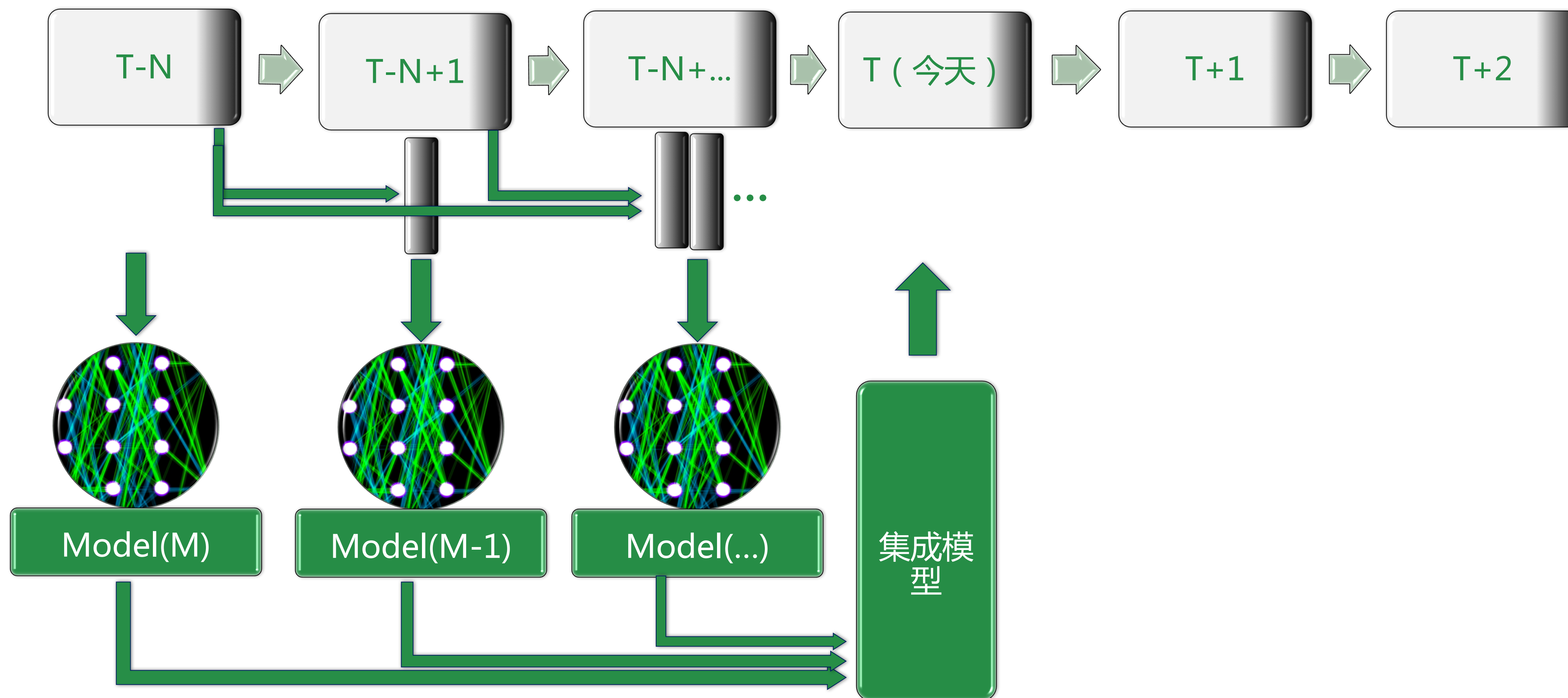
持续学习与模型增强



- 动态角度的风控模型（1）



• 动态角度的风控模型 (2)

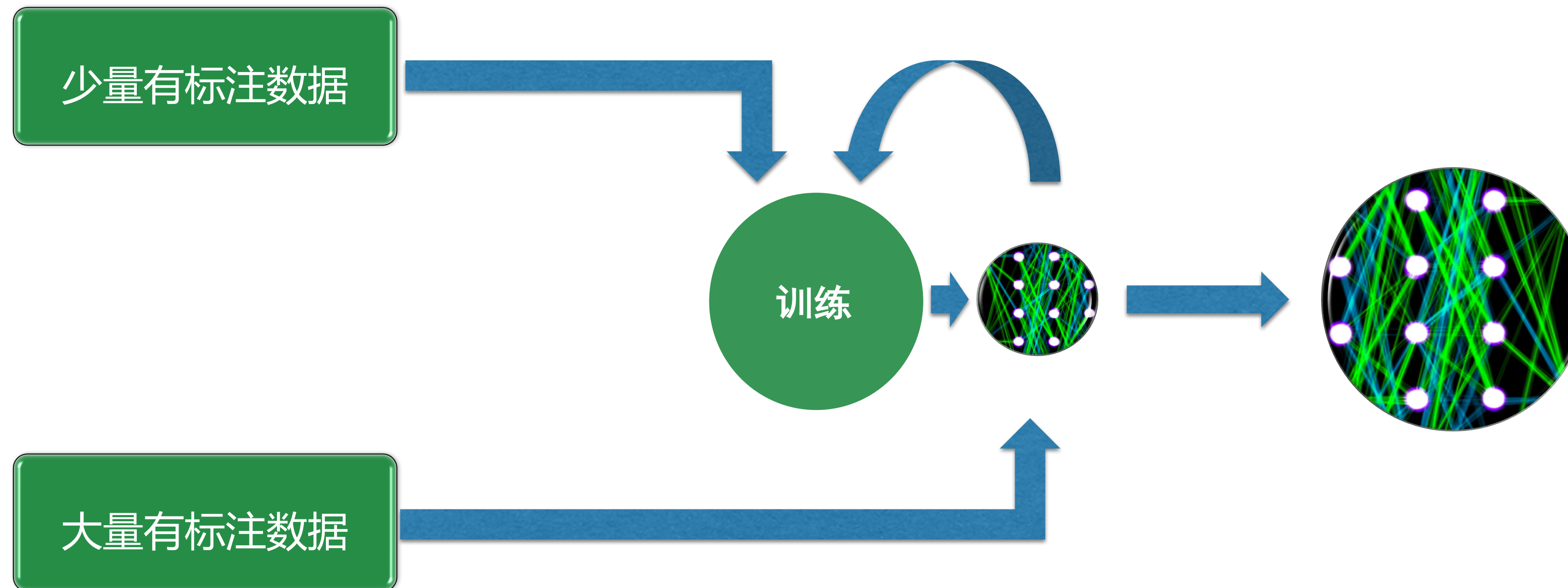


展望

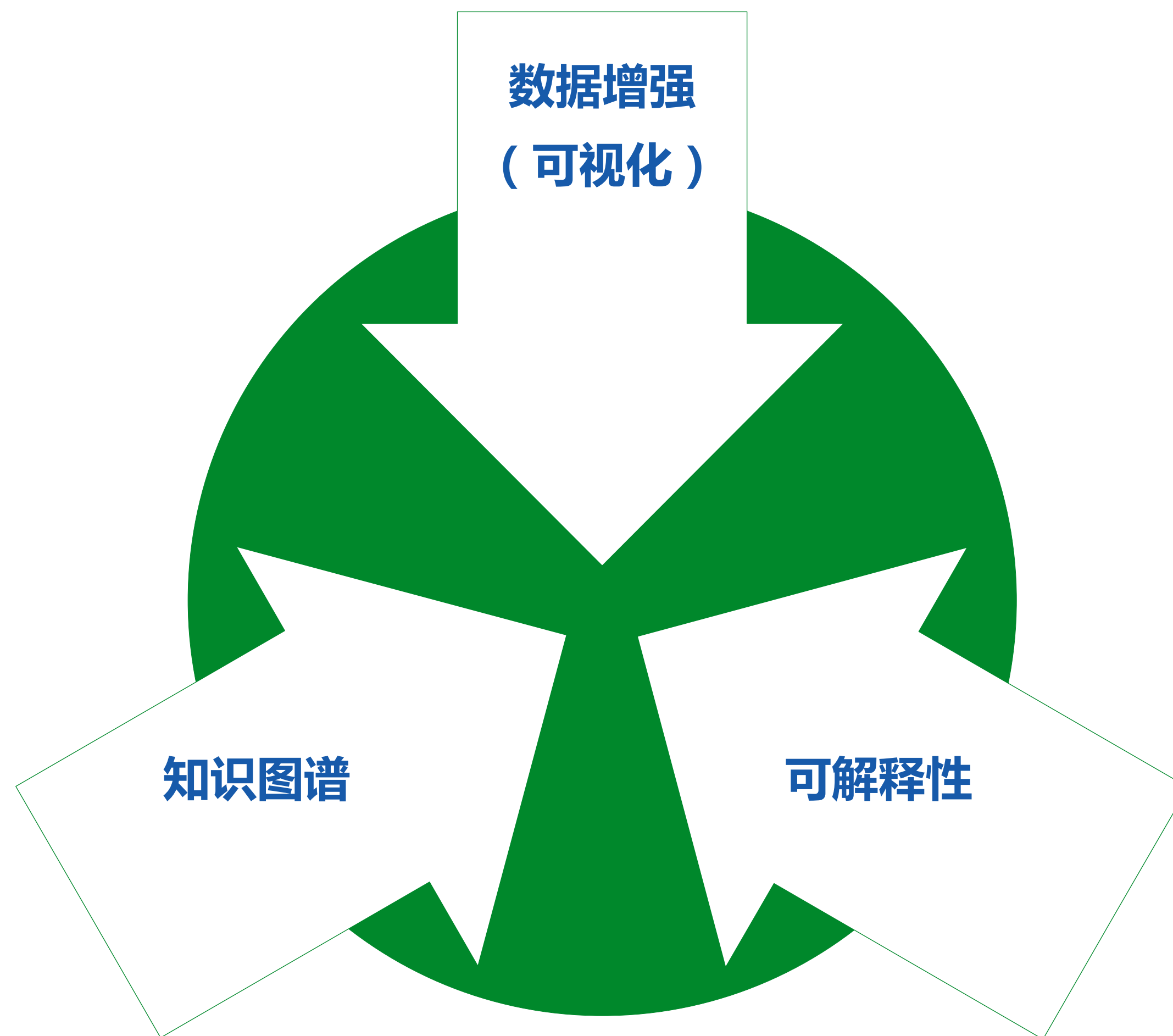
- 不确定性研究进展

- Bayesian Learning for Neural Networks. Lecture notes in statistics. Springer, New York, Berlin, Paris, 1996. ISBN 0-387-94724-8.
- Practical variational inference for neural networks. In *Advances in Neural Information Processing Systems 24*, pages 2348–2356, 2011.
- Dropout as a Bayesian approximation: Representing model uncertainty in deep learning. In *Proceedings of the 33rd International Conference on Machine Learning*, 2016
- Manifold Gaussian processes for regression. In *International Joint Conference on Neural Networks*, 2016
- Stochastic variational deep kernel learning. In *Advances in Neural Information Processing Systems*, pages 2586–2594, 2016.
- Deep kernel learning. In Arthur Gretton and Christian C. Robert, editors, *Proceedings of the 19th International Conference on Artificial Intelligence and Statistics*, volume 51 of *Proceedings of Machine Learning Research*, pages 370–378, Cadiz, Spain, 09–11 May 2016. PMLR.

- 无监督学习与监督学习结合



- 加速调查反馈





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Thanks!

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