

6G网络AI-分级协作智能架构

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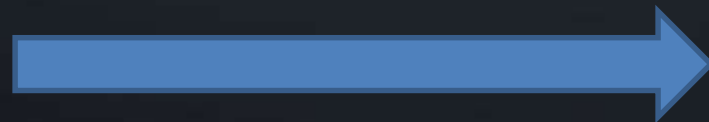


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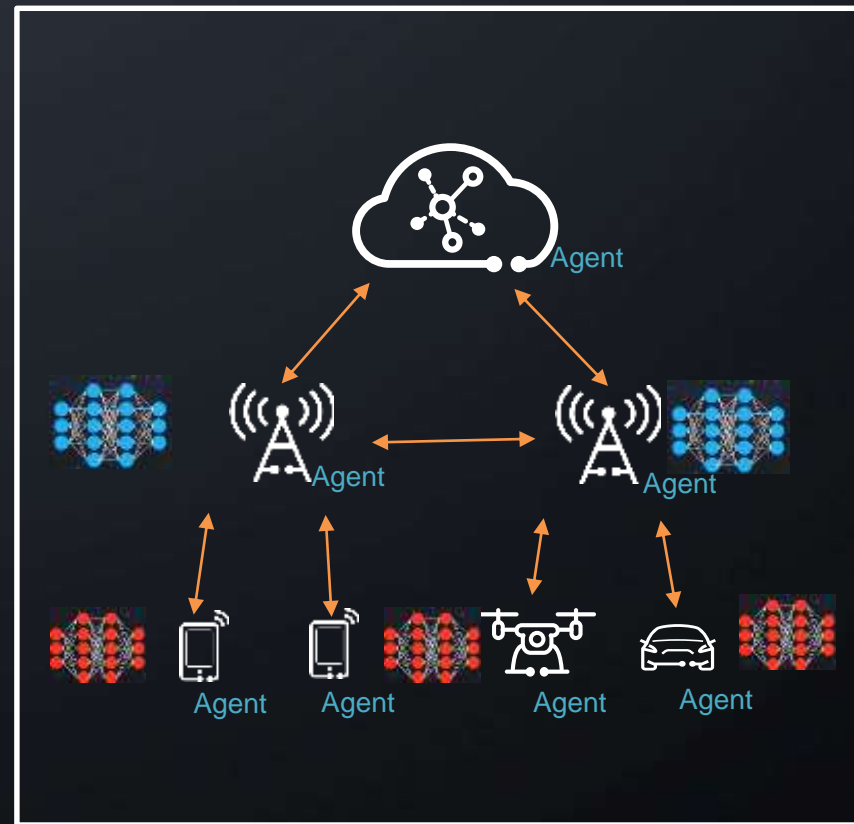
分级协作是6G网络AI的重要形式



网络的各节点是有内生智能的agent
 节点与周边协作来达到全局最优
 多层次节点协作使能各类AI服务



无处不在的连接 + 内生智能 =
 无处不在的智能服务

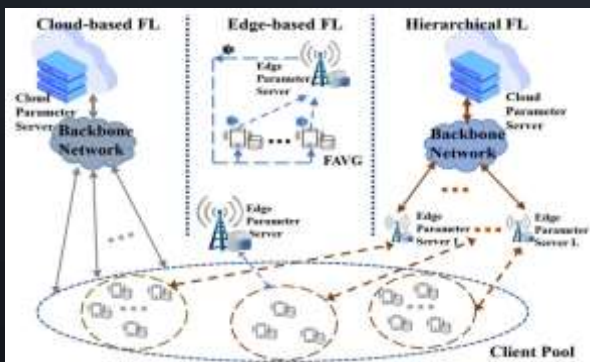


问题： (1) 相关的分布式机器学习算法？ (2) 对网络架构的影响？

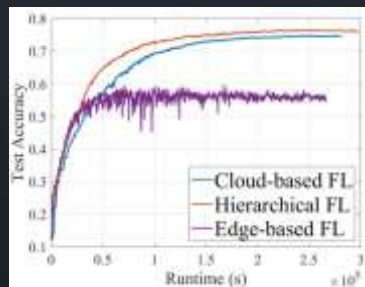
网络AI相关的分布式机器学习调研

1、(分层) 联邦学习

- 【目标】：数据隐私、提升精度和效率、更低碳节能 (天然是将计算带到数据)

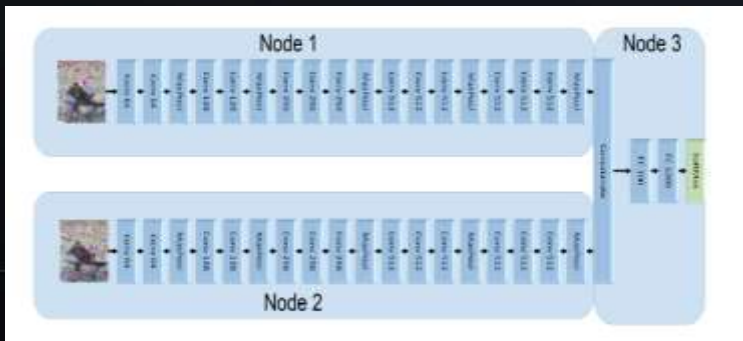


Cloud-based, Edge-based and Client-Edge-Cloud hierarchical FL



3、模型拆分学习

- 【目标】：通信效率 (相比传统FL压缩数据)、数据隐私



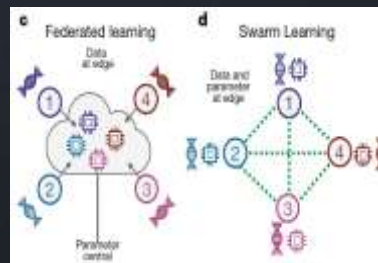
In-Network Learning

类似NN做数据压缩, 网络中只传递中间层embedding, 这个数据量要比传递整个NN要小, 代价就是每一个样本都要传递一个embedding, 在数据集比较小的时候这个方案就可以获得非常大的通信流量增益

2、去中心的学习

- 【目标】：数据隐私、私有模型、通信效率

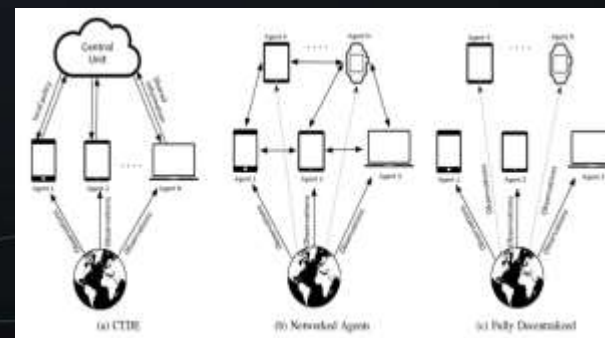
本质是P2P的FL, 与FL不同在于中心参数服务器是动态选举的, 并通过区块链认证用户是否允许参与SL



Swarm Learning

4、多智能体强化学习

- 【目标】：区域最优、通信效率

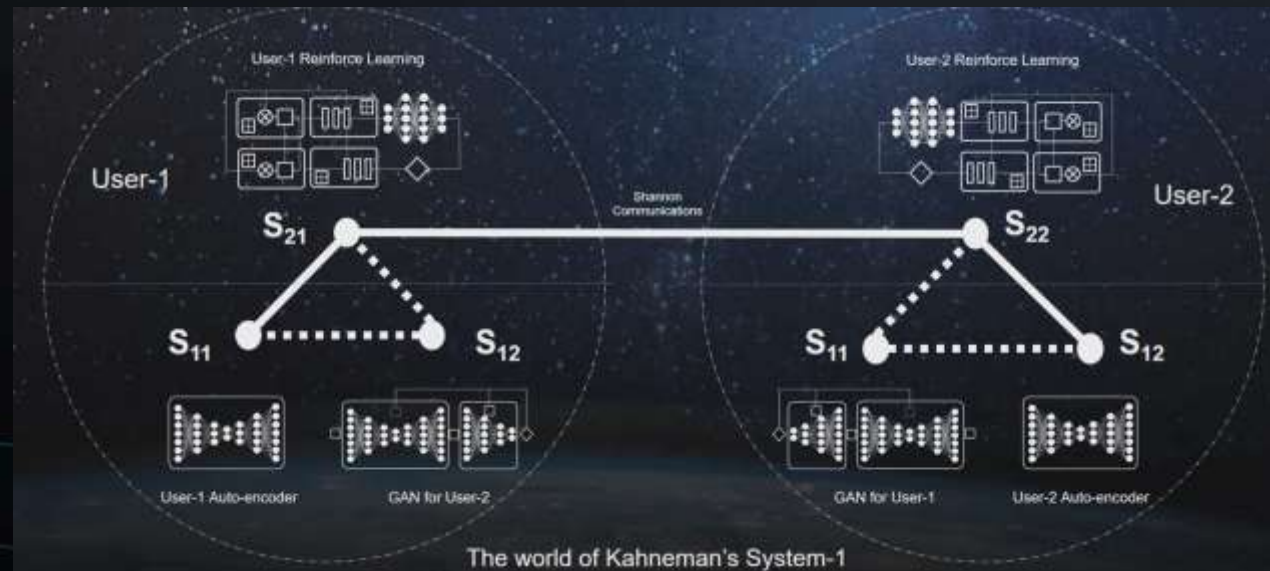
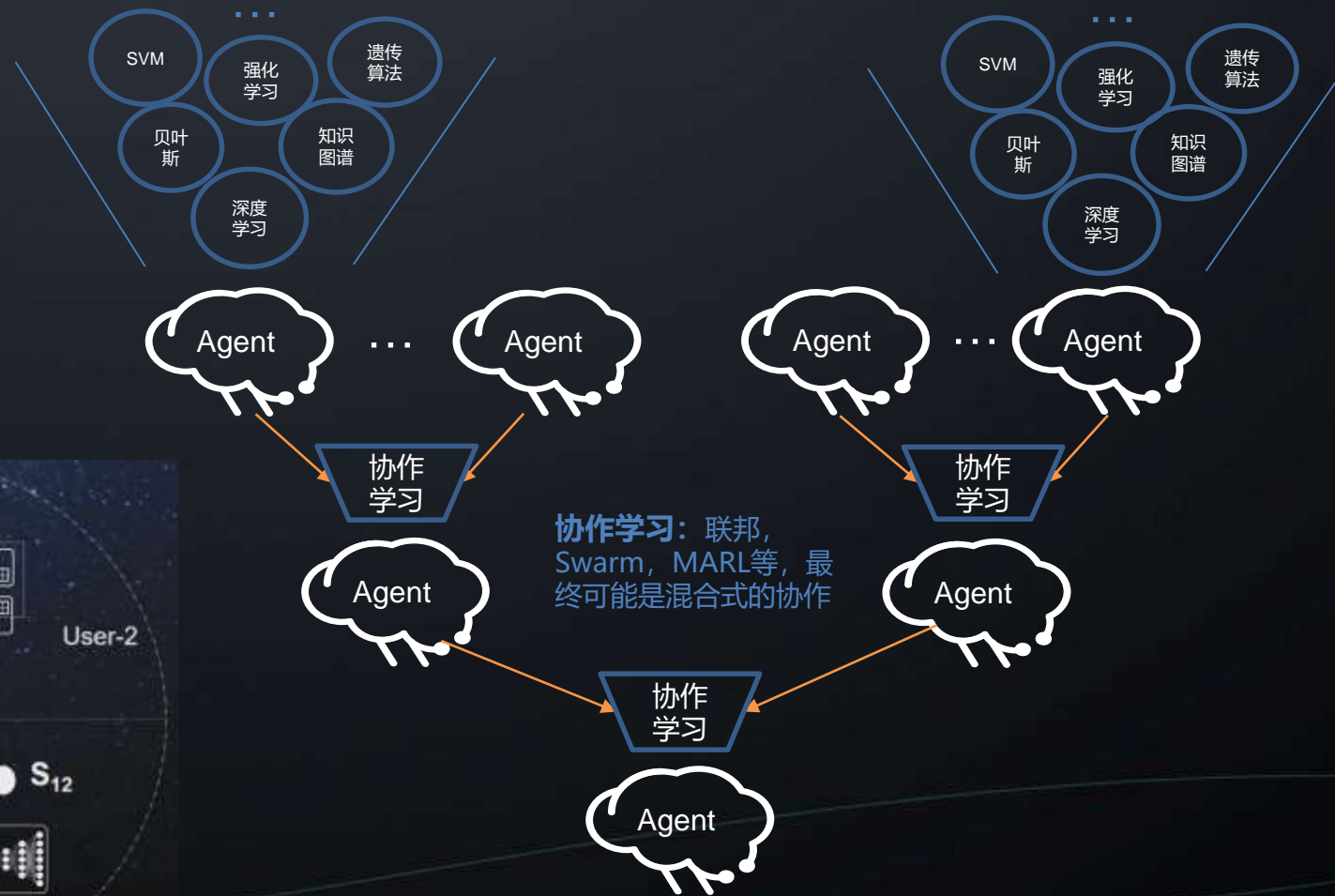


传统多智能体的3种模式

相比FL, 多智能体之间传递Policy、Reward、Q函数等信息

分级协作对6G架构潜在影响分析

- Agent逻辑功能定义
- Agent内部逻辑功能之间接口
- Agent之间接口
- 架构演进（新增功能、接口）





Thank You.

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