

CASA: Clustered Federated Learning with Asynchronous Clients

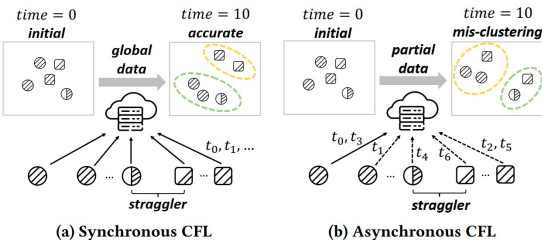
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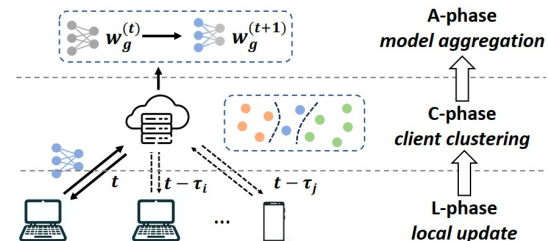
²City University of Hong Kong

Introduction

Clustered Federated Learning harnesses the *decentralized, heterogeneous* data of IoT devices



CFL suffers from **stragglers**, a promising solution is to integrate **asynchrony** into CFL



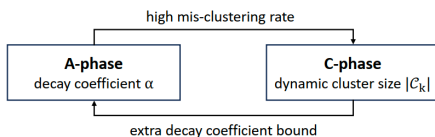
New setting, new challenges!

Understanding Impact

Direct impact

A-phase: aggregation strategy changes

C-phase: similarity calculation changes



★Compound impact

A-phase: **more difficult convergence**

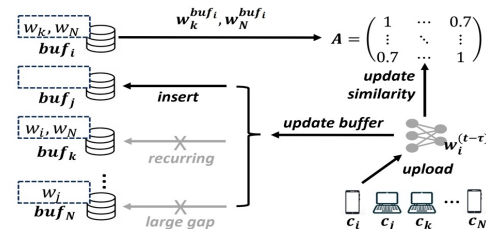
due to dynamic clustering relationship

C-phase: **higher mis-clustering rate** due to stale similarity calculation

Methods

We design a **bi-level asynchronous aggregation** to separate and manage the complex dependencies on factors as time, cluster scale, computation capacity et al.

We incorporate a **buffer-aided similarity calculation** to enable timely and accurate clustering.



Experiments

