

Zhao Ning - MSc - Applied Computing



Communication-efficient Personalised Federated Learning

1). Context

- Privacy-preserving on-device learning
- Distributed learning
- Federated Averaging

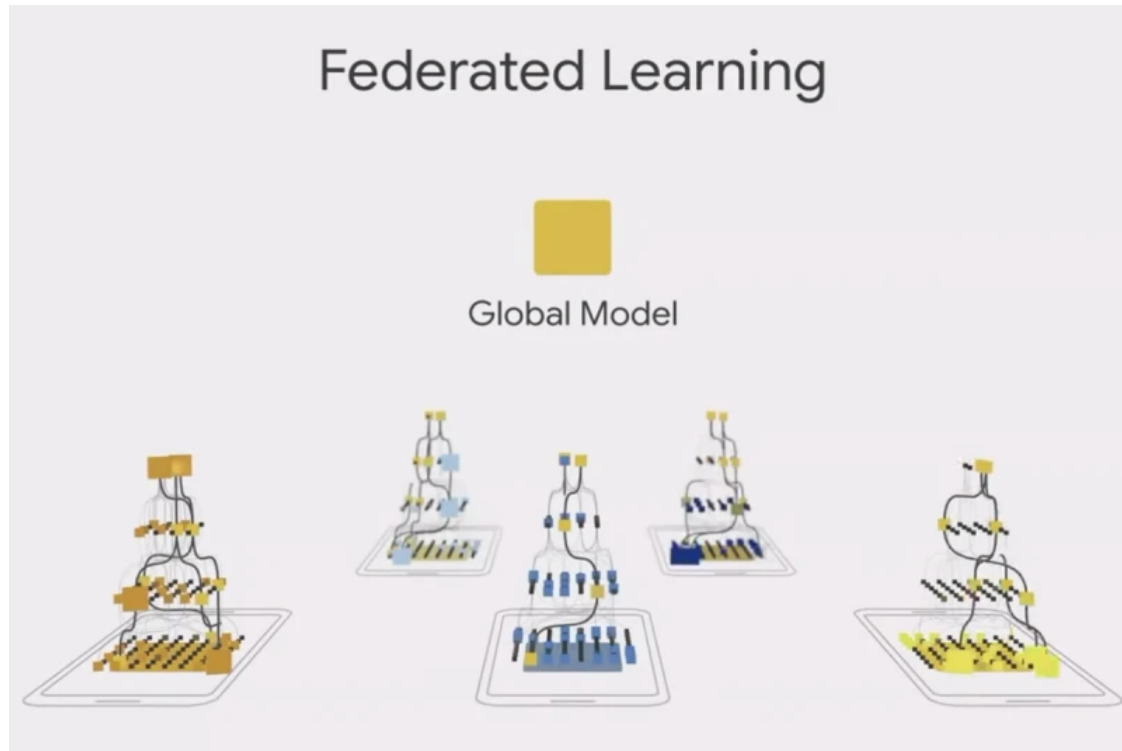


Image by Google

Typical Workflow

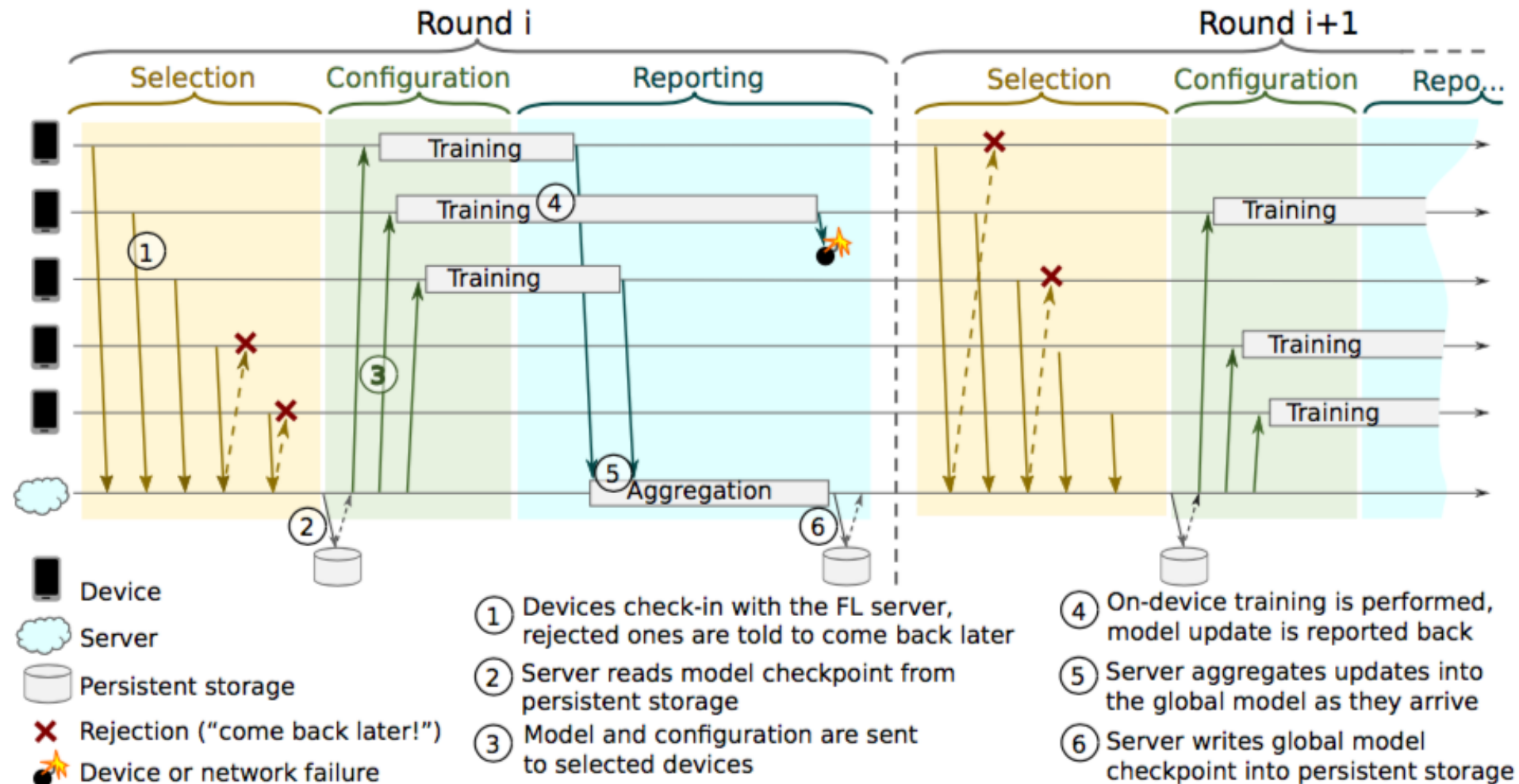


Image by Google

2). Motivation

- Reduce Communication Cost
 - Federated Distillation
- Personalisation
 - Weight Agnostic Neural Network

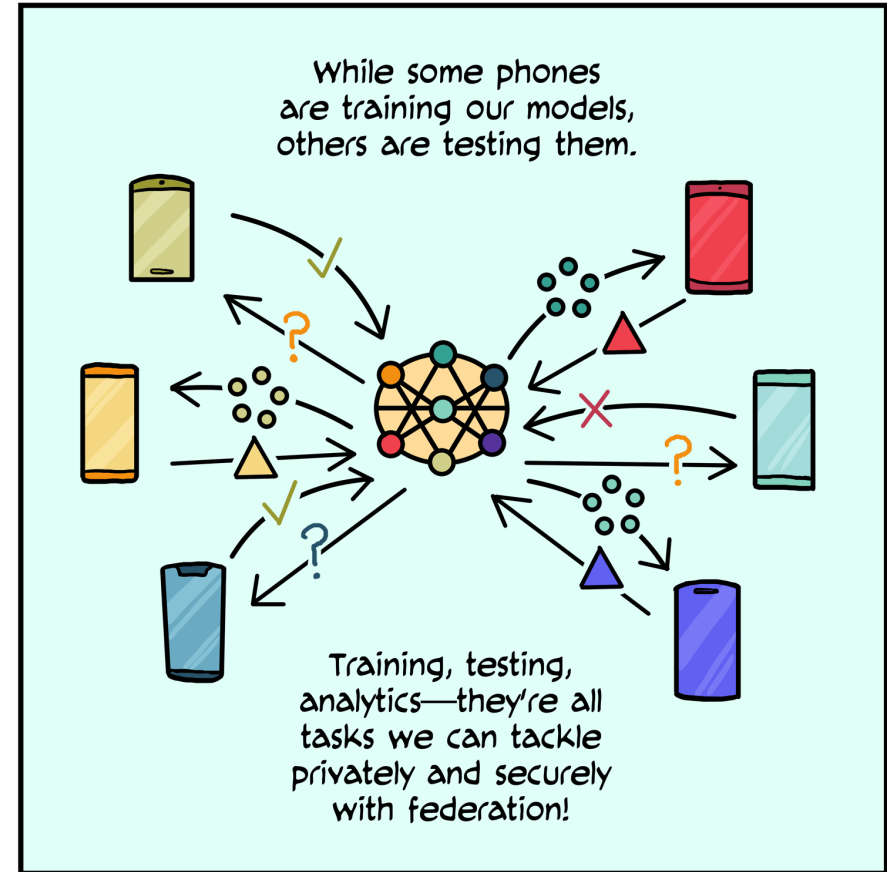


Image by Google



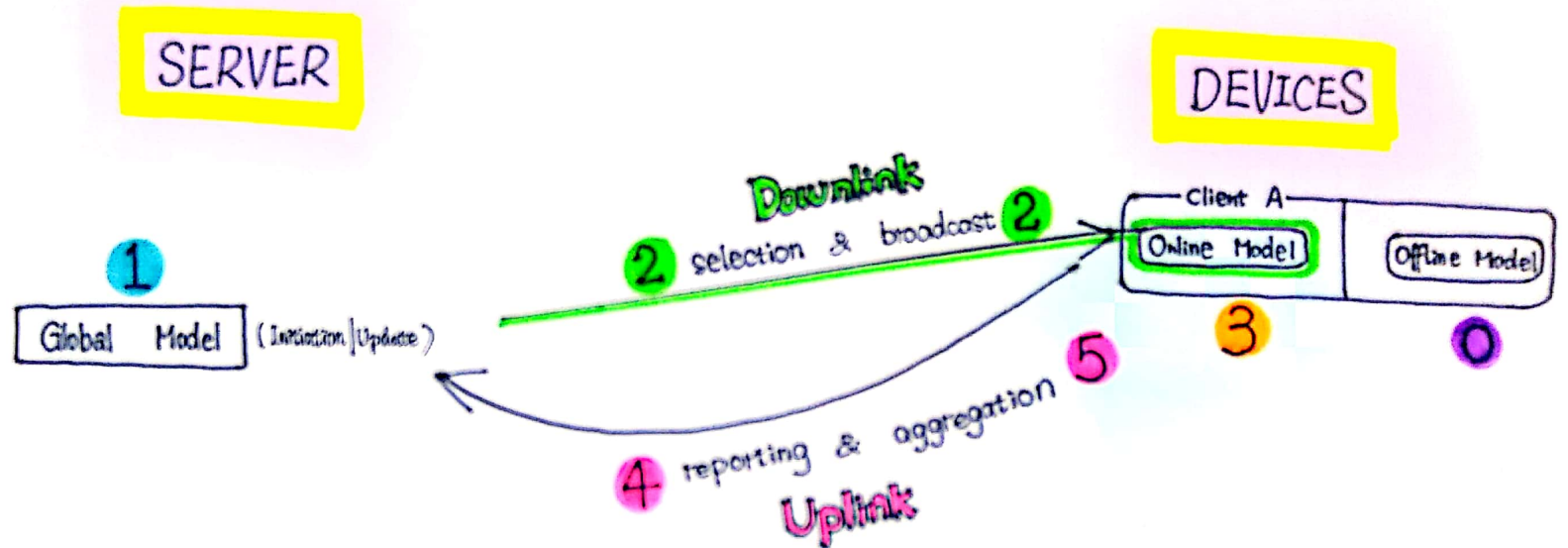
3). Methodology

- *FL + FD + Personalisation*
- *IL + WANN*
- **Dataset:** *MNIST* (Images of digits 0-9)
- **Task:** Image Classifying based on the SOTA *Capsule CNN*

Non-IID (label distribution skew)

Data split: training and test

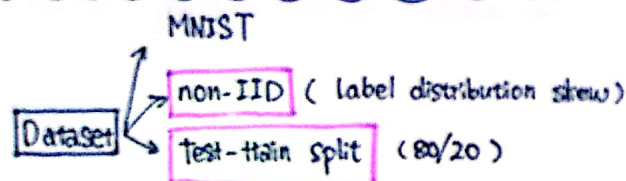
Extensions to the Federated Learning Framework



* **3** Personalisation

* **4** Federated Distillation

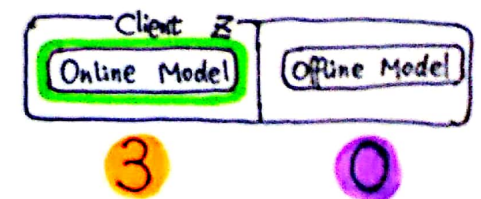
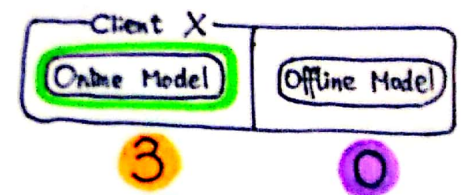
* **5** Federated Averaging

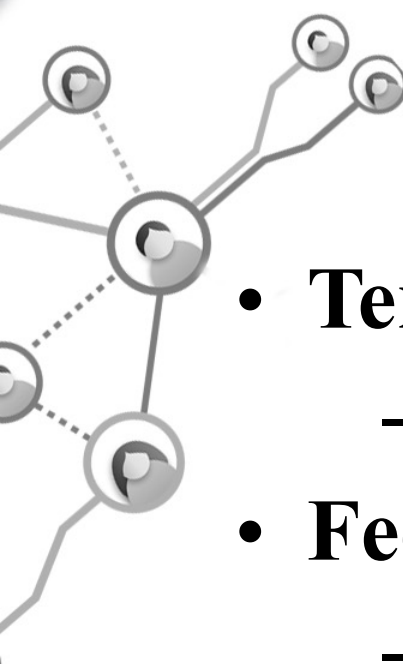


Task: Image Classification

Method: SOTA CNN with Homogeneous Filter Capsules

* **0** Weight Agnostic Neural Network





Existing Frameworks

- **Tensorflow Federated (TFF)**
 - Google
- **Federated AI Technology Enabler (FATE)**
 - FedAI

Evaluation Metrics

Importance



● Communication ● Accuracy ● Runtime



Thanks for listening.

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