Research Proposal

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1. Introduction

What is the problem you plan to address?

Federated Learning involves training a shared global model using local data and compute on various user devices. Several approaches have been proposed to implement this paradigm starting with Federated Averaging (1). However, not many of these approaches consider low-end devices that are unable to perform training. This has implications for fairness due to introduction of systematic bias, in addition to degradation in model accuracy. Recent works such as FedProx (2) and Hassas (3) have attempted to include slow devices by incorporating partial work and serving a subset model according to device characteristics, respectively. These approaches have been evaluated on large-scale simulations using LEAF Benchmark (4) and a small-scale testbed of mobile devices in case of Hassas. To the best of our knowledge, none of these works have been evaluated on mid-scale federated learning systems using actual mobile devices with a sufficiently large number of clients.

Why is it important to solve?

2. Related Work

What are the most related works? (analyze prior works and cite related papers) LEAF, FLOWER Discuss approaches like FedProx, FedAdaptive, etc. and emphasize how these have only been evaluated on LEAF. Discuss any papers which evaluated on a testbed.

3. Approach

What is your proposal and how does it differ from prior work?

3.1. Application Layer - client only

3.2. FL Platform Layer - client, server

1. **FL Runtime**

2. **Device Analytics**
   No personally identifiable information will be logged.

   - Logs
   - Device OS
   - Device Model
   - Device State
   - Training time
   - Memory profile

3.3. Coordination Layer - server only

1. Device Selection Algorithm

2. Job Scheduler

4. Timeline and Work Division

Timeline and division of work.