

文件管理系統應用於聯邦學習模型建立平台

Document Management System Applied to Federated Learning Model Building Platform

指導教授: 張瑞紘

專題成員: 歐長諺、黃佳倫

開發工具: PHP、MongoDB、
JavaScript、HTML、CSS、Apache

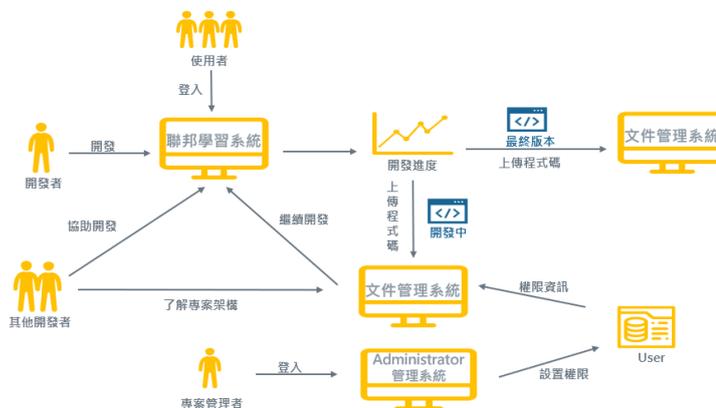
Pytorch/Tensorflow Nvflare

測試環境: Ubuntu、Windows

一. 簡介

機器學習依賴資料來進行訓練，當資料越多時，越可以幫助訓練成果有好的結果。隨著資料隱私的觀念興起，如何在資料不被外流的情況下同時能集結資料來進行訓練成了一大關鍵。聯邦學習可以在不共享原始數據的情況下訓練機器學習模型，相較於一般的機器學習，聯邦式學習可以讓多個裝置共同訓練出一個模型，並且資料保留在用戶手上，讓使用者決定何者資料可被使用。開發聯邦學習系統的時候，我們期望有一個程式碼文件解析系統幫助不同開發者可查閱程式碼注釋，讓不同的開發者可以透過該系統了解整體專案目前的程式架構。

架構圖



二. 測試結果

聯邦式學習

Server 執行過程

```
start fl because process of 6882 does not exist
new pid 3177971
2023-05-16 21:22:35,851 - FederatedServer - INFO - Starting secure server at server1:8802
2023-05-16 21:22:35,893 - FederatedServer - INFO - Got the primary sp: server1_fl_port: 8802 SSID: ebcc6129d-0a56-4688-9b68-355fe9e4d61a. Turning to hot.
deployed fl server trainer.
2023-05-16 21:22:35,899 - nvflare_fuel_hci_server_hci - INFO - Starting Admin Server server1 on port 8003
2023-05-16 21:22:35,906 - root - INFO - Server started
2023-05-16 21:23:32,567 - ClientManager - INFO - Client: New client site-1q127.0.0.1 joined. Sent token: 81268d92-1659-4f06-806f-5b258790bc5c. Total clients: 1
2023-05-16 21:23:35,324 - ClientManager - INFO - Client: New client site-2l27.0.0.1 joined. Sent token: ac8cfac3-6d25-490d-9aaa-8a2d77afafed. Total clients: 2
2023-05-16 21:27:16,486 - JobRunner - INFO - [Identity-example_project, run=7]: Got the job: 0b9a8fe8-ba1a-4079-8611-6a2956221133 from the scheduler to run
2023-05-16 21:27:16,494 - JobRunner - INFO - [Identity-example_project, run=7]: Application app deployed to the server for job: 0b9a8fe8-ba1a-4079-8611-6a2956221133
2023-05-16 21:27:16,494 - JobRunner - INFO - [Identity-example_project, run=7]: App app to be deployed to the clients: site-1,site-2 for run: 0b9a8fe8-ba1a-4079-8611-6a2956221133
2023-05-16 21:27:19,922 - JobRunner - INFO - [Identity-example_project, run=7]: Started run: 0b9a8fe8-ba1a-4079-8611-6a2956221133 For clients: site-1,site-2
2023-05-16 21:27:19,931 - runner_process - INFO - Runner process started.
2023-05-16 21:27:19,932 - ServerCommandAgent - INFO - ServerCommandAgent listening on port: 56913
2023-05-16 21:27:23,466 - ServerRunner - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133]: Server runner starting ...
2023-05-16 21:27:23,533 - ServerEngine - INFO - Start saving snapshot on server.
2023-05-16 21:27:24,378 - ServerEngine - INFO - persist the snapshot to: /tmp/nvflare/snapshot-storage/0b9a8fe8-ba1a-4079-8611-6a2956221133
2023-05-16 21:27:24,378 - ServerRunner - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133]: starting workflow scatter_and_gather (<class 'nvflare.app_common.workflows.scatter_and_gather.ScatterAndGather') state:
2023-05-16 21:27:24,378 - ScatterAndGather - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133]: Initializing ScatterAndGather workflow.
2023-05-16 21:27:24,216 - ServerRunner - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133]: Workflow scatter_and_gather (<class 'nvflare.app_common.workflows.scatter_and_gather.ScatterAndGather') state:
2023-05-16 21:27:24,217 - ScatterAndGather - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, wf=scatter_and_gather]: Beginning ScatterAndGather training phase.
2023-05-16 21:27:24,217 - ScatterAndGather - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, wf=scatter_and_gather]: Round 0 started.
2023-05-16 21:27:29,308 - ServerRunner - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, wf=scatter_and_gather]: scheduled task train
2023-05-16 21:27:29,308 - ServerRunner - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, wf=scatter_and_gather, peer=site-2, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133, task_name=train, task_id=a29d8dc-3aa9-4498-92b4-c9f2fc3e4d4e]: assigned task to client site-2 (ac8cfac3-6d25-490d-9aaa-8a2d77afafed) sent task assignment to client
2023-05-16 21:27:29,308 - ServerRunner - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, wf=scatter_and_gather, peer=site-2, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133, task_name=train, task_id=a29d8dc-3aa9-4498-92b4-c9f2fc3e4d4e]: sent task assignment to client
2023-05-16 21:27:48,834 - FederatedServer - INFO - GetTask: Return task: train to client: site-2 (ac8cfac3-6d25-490d-9aaa-8a2d77afafed)
2023-05-16 21:27:48,852 - ServerRunner - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, wf=scatter_and_gather, peer=site-1, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133, task_name=train, task_id=1b7af58-f962-4e85-acdc-df1abfd864]: assigned task to client site-1: name=train, id=1b7af58-f962-4e85-acdc-df1abfd864
2023-05-16 21:27:48,853 - ServerRunner - INFO - [Identity-example_project, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, wf=scatter_and_gather, peer=site-1, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133, task_name=train, task_id=1b7af58-f962-4e85-acdc-df1abfd864]: sent task assignment to client
2023-05-16 21:27:53,925 - FederatedServer - INFO - GetTask: Return task: train to client: site-1 (81268d92-1659-4f06-806f-5b258790bc5c)
```

Client 執行過程

```
(19): Conv2d(256, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(20): ReLU(inplace=True)
(21): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(22): ReLU(inplace=True)
(23): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(24): ReLU(inplace=True)
(25): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(26): ReLU(inplace=True)
(27): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
(28): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(29): ReLU(inplace=True)
(30): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(31): ReLU(inplace=True)
(32): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(33): ReLU(inplace=True)
(34): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(35): ReLU(inplace=True)
(36): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
}
(avgpool): AdaptiveAvgPool2d(output_size=(7, 7))
(classifier): Sequential
(0): Linear(in_features=25888, out_features=4096, bias=True)
(1): ReLU(inplace=True)
(2): Dropout(p=0.5, inplace=False)
(3): Linear(in_features=4096, out_features=4096, bias=True)
(4): ReLU(inplace=True)
(5): Dropout(p=0.5, inplace=False)
(6): Linear(in_features=4096, out_features=1000, bias=True)
}
/home/ovic/workspace/workspace/example_project/prod_08/site-1/0b9a8fe8-ba1a-4079-8611-6a2956221133/ap
p_site-1/custom
Files already downloaded and verified
2023-05-16 21:27:29,209 - ClientRunner - INFO - [Identity-site-1, run=0b9a8fe8-ba1a-4079-8611-6a2956221133]: client runner started
2023-05-16 21:27:29,908 - ProcessExecutor - INFO - run (0b9a8fe8-ba1a-4079-8611-6a2956221133): waiting for child worker process to finish.
2023-05-16 21:28:28,198 - Communicator - INFO - Received from example_project server (574076967 Bytes)
getTask time: 58.8971930792783 seconds
2023-05-16 21:28:28,252 - FederatedClient - INFO - pull task completed. Task name=train Status=True
2023-05-16 21:28:29,191 - ClientRunner - INFO - [Identity-site-1, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, peer=example_project, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133]: got task assignment: name=train, id=a29d8dc-3aa9-4498-92b4-c9f2fc3e4d4e
2023-05-16 21:28:29,194 - ClientRunner - INFO - [Identity-site-1, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, peer=example_project, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133, task_name=train, task_id=1b7af58-f962-4e85-acdc-df1abfd864]: invoking task executor <class 'Cifar10Trainer.Cifar10Trainer'>
2023-05-16 21:28:34,696 - Cifar10Trainer - INFO - [Identity-site-1, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, peer=example_project, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133, task_name=train, task_id=1b7af58-f962-4e85-acdc-df1abfd864]: Epoch: 0/1, Iteration: 0, Loss: 0.88057620333530784
(19): Conv2d(256, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(20): ReLU(inplace=True)
(21): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(22): ReLU(inplace=True)
(23): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(24): ReLU(inplace=True)
(25): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(26): ReLU(inplace=True)
(27): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
(28): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(29): ReLU(inplace=True)
(30): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(31): ReLU(inplace=True)
(32): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(33): ReLU(inplace=True)
(34): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
(35): ReLU(inplace=True)
(36): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
}
(avgpool): AdaptiveAvgPool2d(output_size=(7, 7))
(classifier): Sequential
(0): Linear(in_features=25888, out_features=4096, bias=True)
(1): ReLU(inplace=True)
(2): Dropout(p=0.5, inplace=False)
(3): Linear(in_features=4096, out_features=4096, bias=True)
(4): ReLU(inplace=True)
(5): Dropout(p=0.5, inplace=False)
(6): Linear(in_features=4096, out_features=1000, bias=True)
}
/home/ovic/workspace/workspace/example_project/prod_08/site-2/0b9a8fe8-ba1a-4079-8611-6a2956221133/ap
p_site-2/custom
Files already downloaded and verified
2023-05-16 21:27:29,209 - ClientRunner - INFO - [Identity-site-2, run=0b9a8fe8-ba1a-4079-8611-6a2956221133]: client runner started
2023-05-16 21:27:29,921 - ProcessExecutor - INFO - run (0b9a8fe8-ba1a-4079-8611-6a2956221133): waiting for child worker process to finish.
2023-05-16 21:28:16,181 - Communicator - INFO - Received from example_project server (574076967 Bytes)
getTask time: 46.88860927391052 seconds
2023-05-16 21:28:16,201 - FederatedClient - INFO - pull task completed. Task name=train Status=True
2023-05-16 21:28:16,918 - ClientRunner - INFO - [Identity-site-2, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, peer=example_project, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133]: got task assignment: name=train, id=a29d8dc-3aa9-4498-92b4-c9f2fc3e4d4e
2023-05-16 21:28:16,921 - ClientRunner - INFO - [Identity-site-2, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, peer=example_project, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133, task_name=train, task_id=a29d8dc-3aa9-4498-92b4-c9f2fc3e4d4e]: invoking task executor <class 'Cifar10Trainer.Cifar10Trainer'>
2023-05-16 21:28:16,261 - Cifar10Trainer - INFO - [Identity-site-2, run=0b9a8fe8-ba1a-4079-8611-6a2956221133, peer=example_project, peer_run=0b9a8fe8-ba1a-4079-8611-6a2956221133, task_name=train, task_id=a29d8dc-3aa9-4498-92b4-c9f2fc3e4d4e]: Epoch: 0/1, Iteration: 0, Loss: 0.88057620333530784
```

文件管理系統

選擇版本

Documentation Parser

user

所有文件

搜索文件...

新增文件 刪除文件 新增版本

Template_Model

檢視版本	複製版本	重新命名	更新版本	刪除版本
版本	修改時間			
<input type="checkbox"/>	v2	2023-05-03 11:21:41		
<input type="checkbox"/>	v3	2023-05-03 11:21:56		