real_experiment_Air_quality_B2

June 8, 2025

[1]:
```
import sys
import os

src_path = os.path.abspath(os.path.join(os.getcwd(), "..", "src"))
if src_path not in sys.path:
    sys.path.insert(0, src_path)

from plots import plot_plotly, preprocessing_results, plot_plotly_real
```

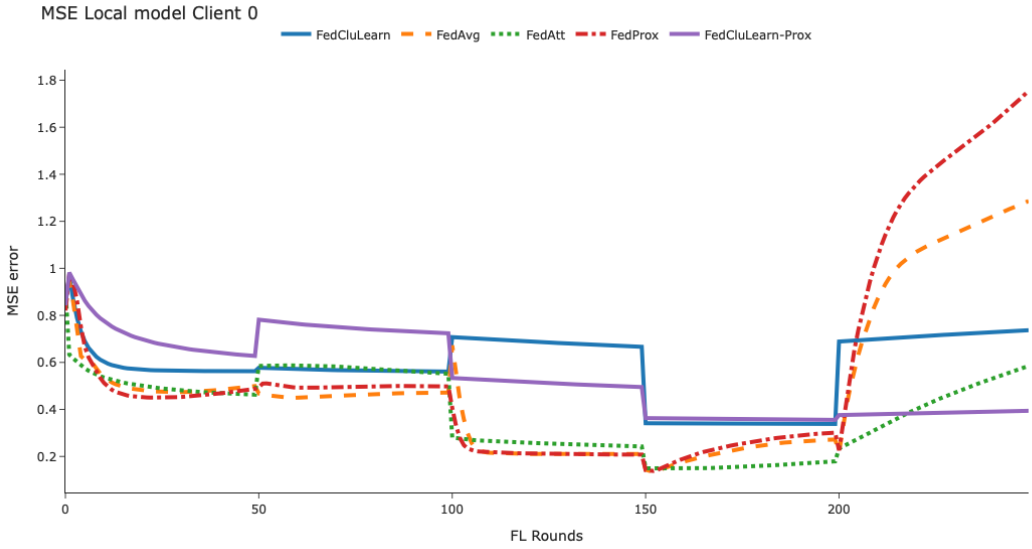
[2]:
```
# Air quality, 5 partitions, 250 global rounds
local_FedCluLearn = 'results/results_FedCluLearn_2025-03-01_09_51_51.529043.txt'
global_FedCluLearn = 'results/
 ↪global_model_evaluation_FedCluLearn_2025-03-01_09_51_51.529043.txt'

global_FedCluLearn_Prox = 'results/
 ↪global_model_evaluation_FedCluLearn_Prox_2025-03-01_09_52_36.832767.txt'
local_FedCluLearn_Prox = 'results/results_FedCluLearn_Prox_2025-03-01_09_52_36.
 ↪832767.txt'

local_FedAvg = 'results/results_FedAvg_2025-03-01_10_04_23.908322.txt'
global_FedAvg = 'results/global_model_evaluation_FedAvg_2025-03-01_10_04_23.
 ↪908322.txt'

local_FedAtt = 'results/results_FedAtt_2025-03-01_10_04_31.386712.txt'
global_FedAtt = 'results/global_model_evaluation_FedAtt_2025-03-01_10_04_31.
 ↪386712.txt'

local_FedProx = 'results/results_FedProx_2025-03-01_10_21_02.496987.txt'
global_FedProx = 'results/global_model_evaluation_FedProx_2025-03-01_10_21_02.
 ↪496987.txt'

local_FedCluLearn_recent = 'results/
 ↪results_FedCluLearn_recent_2025-03-01_10_21_17.925095.txt'
global_FedCluLearn_recent = 'results/
 ↪global_model_evaluation_FedCluLearn_recent_2025-03-01_10_21_17.925095.txt'
```

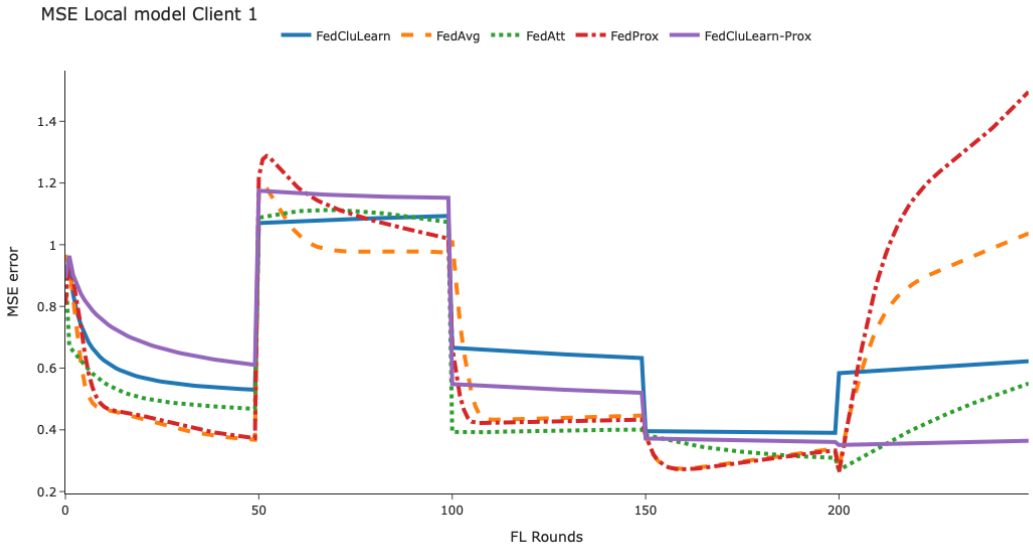
```
local_FedCluLearn_Prox_recent = 'results/
 ↪results_FedCluLearn_Prox_recent_2025-03-01_10_37_43.355040.txt'
global_FedCluLearn_Prox_recent = 'results/
 ↪global_model_evaluation_FedCluLearn_Prox_recent_2025-03-01_10_37_43.355040.
 ↪txt'

local_FedCluLearn_Prox_percentage = 'results/
 ↪results_FedCluLearn_Prox_percentage_2025-03-01_10_37_51.469483.txt'
global_FedCluLearn_Prox_percentage = 'results/
 ↪global_model_evaluation_FedCluLearn_Prox_percentage_2025-03-01_10_37_51.
 ↪469483.txt'

local_FedCluLearn_percentage = 'results/
 ↪results_FedCluLearn_percentage_2025-03-01_10_50_36.016247.txt'
global_FedCluLearn_percentage = 'results/
 ↪global_model_evaluation_FedCluLearn_percentage_2025-03-01_10_50_36.016247.
 ↪txt'

local_FedCluLearn_percentage_25 = 'results/
 ↪results_FedCluLearn_percentage_2025-03-01_18_38_33.162443.txt'
global_FedCluLearn_percentage_25 = 'results/
 ↪global_model_evaluation_FedCluLearn_percentage_2025-03-01_18_38_33.162443.
 ↪txt'

local_FedCluLearn_Prox_percentage_25 = 'results/
 ↪results_FedCluLearn_Prox_percentage_2025-03-01_18_38_40.197468.txt'
global_FedCluLearn_Prox_percentage_25 = 'results/
 ↪global_model_evaluation_FedCluLearn_Prox_percentage_2025-03-01_18_38_40.
 ↪197468.txt'

local_FedCluLearn_Prox_percentage_75 = 'results/
 ↪results_FedCluLearn_Prox_percentage_2025-03-01_18_50_18.689538.txt'
global_FedCluLearn_Prox_percentage_75 = 'results/
 ↪global_model_evaluation_FedCluLearn_Prox_percentage_2025-03-01_18_50_18.
 ↪689538.txt'

local_FedCluLearn_percentage_75 = 'results/
 ↪results_FedCluLearn_percentage_2025-03-01_18_50_24.475484.txt'
global_FedCluLearn_percentage_75 = 'results/
 ↪global_model_evaluation_FedCluLearn_percentage_2025-03-01_18_50_24.475484.
 ↪txt'
```

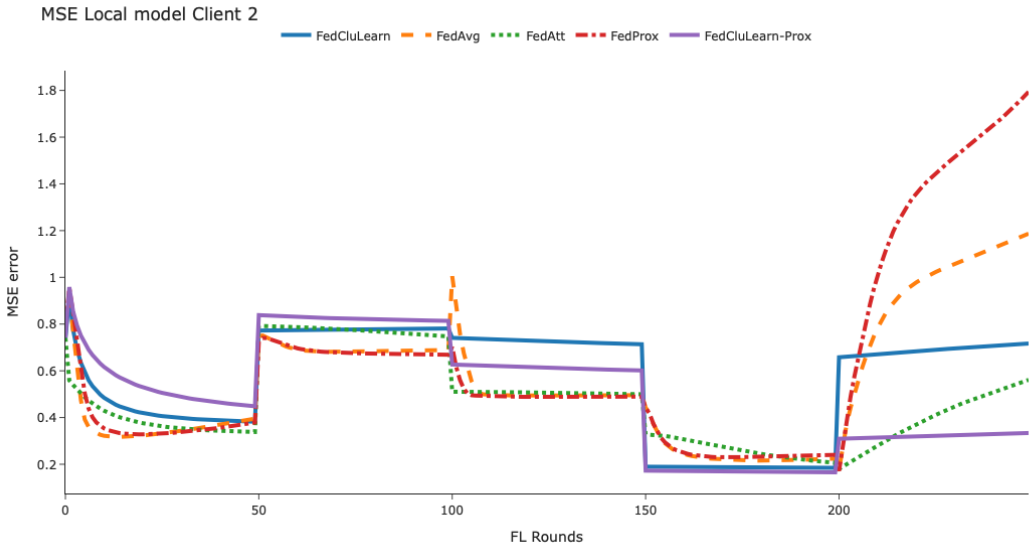
[3]:
```
local_filenames = [local_FedCluLearn, local_FedAvg, local_FedAtt,␣
 ↪local_FedProx, local_FedCluLearn_Prox]
global_filenames = [global_FedCluLearn, global_FedAvg, global_FedAtt,␣
 ↪global_FedProx, global_FedCluLearn_Prox]
```

[4]:
```
mse_column = 'mse'
n_rounds, y = preprocessing_results(filenames=local_filenames,␣
 ↪mse_column=mse_column)
plot_plotly(n_rounds, y, title='Avg MSE Local models',␣
 ↪y_axis_title=f'{mse_column.upper()} error', y_axis_max=0.3)
```

[5]:
```
for client_id in [0,1,2]:
    n_rounds, y = preprocessing_results(filenames=local_filenames,␣
 ↪client_id=client_id, mse_column='mse')
    plot_plotly(n_rounds, y, title=f'MSE Local model Client {client_id}',␣
 ↪y_axis_title='MSE error')
```

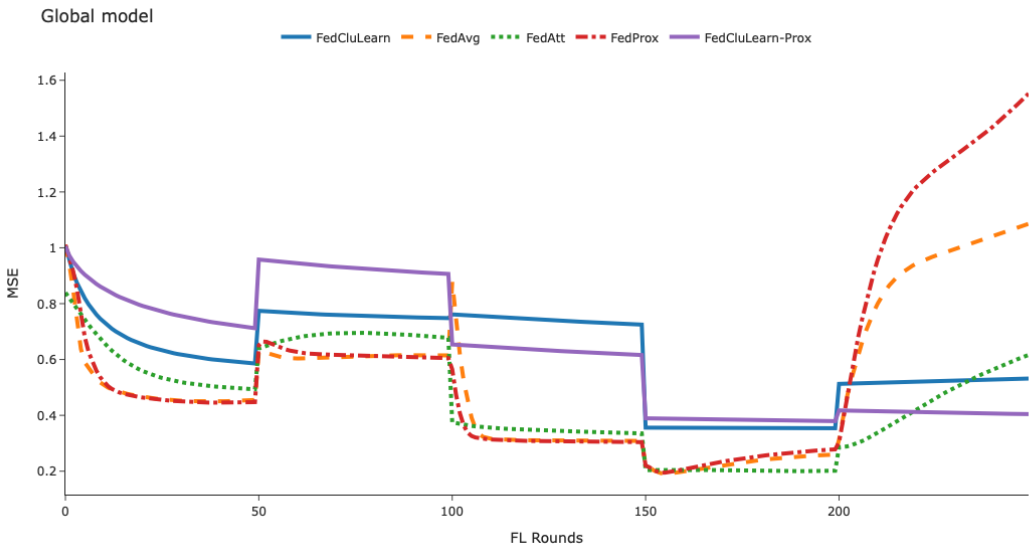






[6]:
```
mse_column = 'mse'
# n_rounds, y = preprocessing_results(filenames=[global_FedCluLearn,␣
 ↪global_FedCluLearn_recent, global_FedCluLearn_percentage, global_FedAvg,␣
 ↪global_FedAtt, global_FedProx, global_FedCluLearn_Prox,␣
 ↪global_FedCluLearn_Prox_recent, None], mse_column=mse_column)
# global_filenames = [global_FedCluLearn, global_FedAvg, global_FedAtt,␣
 ↪global_FedProx, global_FedCluLearn_Prox]
```

```
global_filenames = [global_FedCluLearn, global_FedAvg, global_FedAtt,␣
 ↪global_FedProx, global_FedCluLearn_Prox]
n_rounds, y = preprocessing_results(filenames=global_filenames,␣
 ↪mse_column=mse_column)
#Avg {mse_column.upper()} Global model
plot_plotly(n_rounds, y, title=f'Global model', y_axis_title=f'{mse_column.
 ↪upper()}', y_axis_max=1)
```



[7]:
```
mse_column = 'r2'
global_filenames = [global_FedCluLearn, global_FedAvg, global_FedAtt,␣
 ↪global_FedProx, global_FedCluLearn_Prox]
n_rounds, y = preprocessing_results(filenames=global_filenames,␣
 ↪mse_column=mse_column)
plot_plotly(n_rounds, y, title=f'Global model', y_axis_title=f'{mse_column.
 ↪upper()}', y_axis_max=1)
```

[8]:
```
mse_column='mse'
for client_id in [0,1,2]:
    n_rounds, y = preprocessing_results(filenames=global_filenames,␣
 ↪client_id=client_id,mse_column=mse_column)
    plot_plotly(n_rounds, y, title=f'Global model - test data Client␣
 ↪{client_id}', y_axis_title=f'{mse_column} error')
```

[9]:
```
mse_column='r2'
for client_id in [0,1,2]:
    n_rounds, y = preprocessing_results(filenames=global_filenames,␣
 ↪client_id=client_id,mse_column=mse_column)
```

```
    plot_plotly(n_rounds, y, title=f'Global model - test data Client␣
 ↪{client_id}', y_axis_title=f'{mse_column} error')
```

[10]:
```
mse_column='mse'
for client_id in [0,1,2]:
    n_rounds, y = preprocessing_results(filenames=[local_FedCluLearn,␣
 ↪global_FedCluLearn, None, None, None],␣
 ↪client_id=client_id,mse_column=mse_column)
    plot_plotly(n_rounds, y, title=f'Local vs Global Client {client_id}',␣
 ↪y_axis_title=f'{mse_column} error', algo_name1='Local FedCluLearn',␣
 ↪algo_name4='Global FedCluLearn')
```

[11]:
```
mse_column = 'mse'
# n_rounds, y = preprocessing_results(filenames=[global_FedCluLearn,␣
 ↪global_FedCluLearn_recent, global_FedCluLearn_percentage, global_FedAvg,␣
 ↪global_FedAtt, global_FedProx, global_FedCluLearn_Prox,␣
 ↪global_FedCluLearn_Prox_recent, None], mse_column=mse_column)
# global_filenames = [None, None, global_FedCluLearn_percentage, global_FedAvg,␣
 ↪global_FedAtt, global_FedProx, None, None,␣
 ↪global_FedCluLearn_Prox_percentage, None, None, None, None]
global_filenames = [None, None, None, global_FedAvg, global_FedAtt,␣
 ↪global_FedProx, None, None, None, global_FedCluLearn_percentage_25, None,␣
 ↪global_FedCluLearn_Prox_percentage_25, None]
n_rounds, y = preprocessing_results(filenames=global_filenames,␣
 ↪mse_column=mse_column)
plot_plotly_real(n_rounds, y, title=f'', y_axis_title=f'{mse_column.upper()}␣
 ↪error', y_axis_max=1, name='real_mse_air_all_5_parts',␣
 ↪algo_name10='FedCluLearn-25%', algo_name12='FedCluLearn-Prox-25%')  #Avg␣
 ↪{mse_column.upper()} Global model
```

[12]:
```
mse_column = 'mse'
# n_rounds, y = preprocessing_results(filenames=[global_FedCluLearn,␣
 ↪global_FedCluLearn_recent, global_FedCluLearn_percentage, global_FedAvg,␣
 ↪global_FedAtt, global_FedProx, global_FedCluLearn_Prox,␣
 ↪global_FedCluLearn_Prox_recent, None], mse_column=mse_column)
global_filenames = [global_FedCluLearn, global_FedCluLearn_recent,␣
 ↪global_FedCluLearn_percentage, None, None, None, None, None, None,␣
 ↪global_FedCluLearn_percentage_25, global_FedCluLearn_percentage_75, None,␣
 ↪None]
n_rounds, y = preprocessing_results(filenames=global_filenames,␣
 ↪mse_column=mse_column)
plot_plotly_real(n_rounds, y, title=f'Global model FedCluLearn',␣
 ↪y_axis_title=f'{mse_column.upper()} error', y_axis_max=1,␣
 ↪name='real_mse_air_fedclulearn_5_parts')  # Avg {mse_column.upper()} Global␣
 ↪model
```

[13]:
```
mse_column = 'mse'
# n_rounds, y = preprocessing_results(filenames=[global_FedCluLearn,␣
 ↪global_FedCluLearn_recent, global_FedCluLearn_percentage, global_FedAvg,␣
 ↪global_FedAtt, global_FedProx, global_FedCluLearn_Prox,␣
 ↪global_FedCluLearn_Prox_recent, None], mse_column=mse_column)
global_filenames = [None, None, None, None, None, None,␣
 ↪global_FedCluLearn_Prox, global_FedCluLearn_Prox_recent,␣
 ↪global_FedCluLearn_Prox_percentage, None, None,␣
 ↪global_FedCluLearn_Prox_percentage_25, global_FedCluLearn_Prox_percentage_75]
n_rounds, y = preprocessing_results(filenames=global_filenames,␣
 ↪mse_column=mse_column)
plot_plotly_real(n_rounds, y, title=f'Global model FedCluLearn-Prox',␣
 ↪y_axis_title=f'{mse_column.upper()} error', y_axis_max=1,␣
 ↪name='real_mse_air_fedclulearn_prox_5_parts')  # Avg {mse_column.upper()}␣
 ↪Global model
```