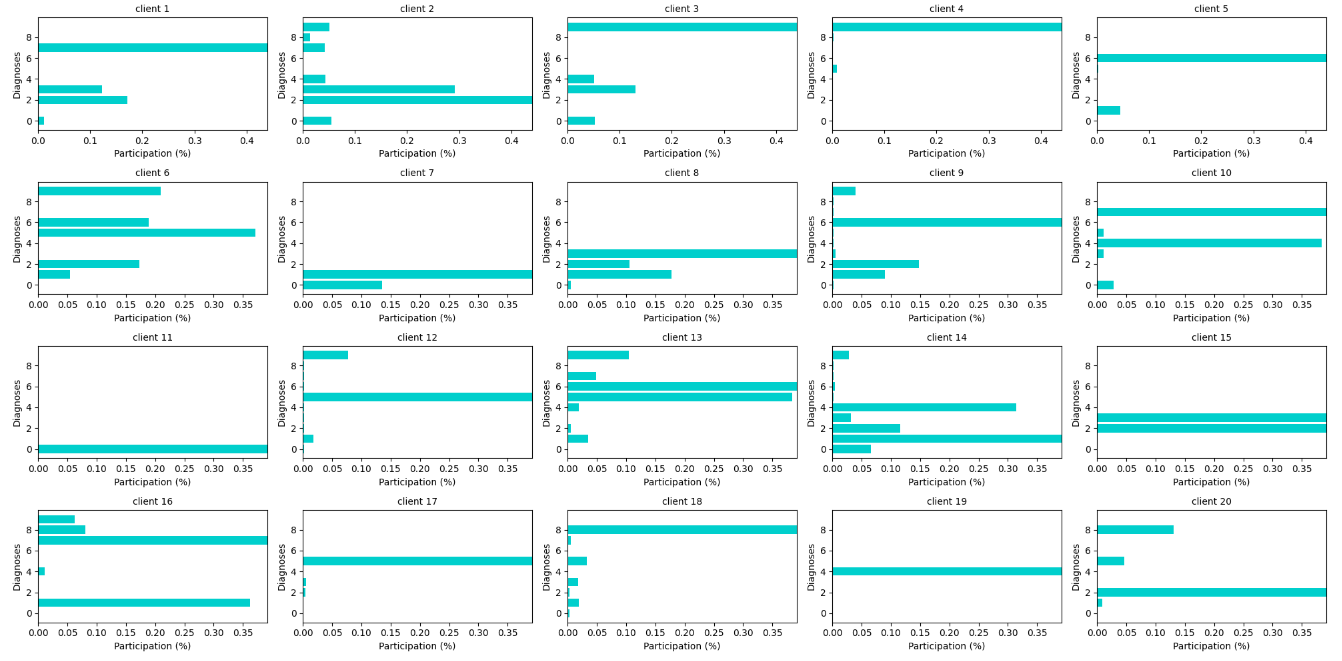
100 rounds

20 clients, chọn 6

Alpha = 0.1

Data size:

|  |  |
| --- | --- |
| Client1 shape: (2461, 2)  Client2 shape: (1971, 2)  Client3 shape: (1609, 2)  Client4 shape: (3747, 2)  Client5 shape: (4610, 2)  Client6 shape: (2771, 2)  Client7 shape: (5416, 2)  Client8 shape: (3478, 2)  Client9 shape: (575, 2)  Client10 shape: (6236, 2) | Client11 shape: (4716, 2)  Client12 shape: (381, 2)  Client13 shape: (1471, 2)  Client14 shape: (465, 2)  Client15 shape: (4760, 2)  Client16 shape: (1771, 2)  Client17 shape: (3136, 2)  Client18 shape: (5982, 2)  Client19 shape: (3081, 2)  Client20 shape: (1363, 2) |



|  |  |
| --- | --- |
| Client 1 0.3896085329177084  Client 2 0.5879311053035007  Client 3 0.3491039686105749  Client 4 0.04020593802830355  Client 5 0.09253743528365771  Client 6 0.6456222226334557  Client 7 0.17790529899435584  Client 8 0.3602094644301599  Client 9 0.4140501772533089  Client 10 0.3904837207554003 | Client 11 0.007825299843988397  Client 12 0.21046722001097007  Client 13 0.5893950371014276  Client 14 0.6205314569415838  Client 15 0.30740264271915607  Client 16 0.5082701217584538  Client 17 0.035742501865640486  Client 18 0.1782224852970751  Client 19 0.01446544110692198  Client 20 0.2837767712161275 |

Jensen-Shannon distance: 0.7261498642133747

Hellinger distance: 0.8703336372043755

Earth Mover’s distance: 0.23645689587704172

FedAvg

Test: commun\_round: 100 | global\_acc: 0.9825 | global\_pre: 0.9827036406497913 | global\_rec: 0.9825 | global\_f1s: 0.982515019654139

[(0, 0.1001), (1, 0.3425), (2, 0.4116), (3, 0.3442), (4, 0.3625), (5, 0.6211), (6, 0.6098), (7, 0.6741), (8, 0.6685), (9, 0.701), (10, 0.7318), (11, 0.8605), (12, 0.8162), (13, 0.8224), (14, 0.8937), (15, 0.9196), (16, 0.8585), (17, 0.9312), (18, 0.9445), (19, 0.862), (20, 0.9293), (21, 0.9341), (22, 0.9011), (23, 0.9271), (24, 0.9225), (25, 0.9235), (26, 0.955), (27, 0.9262), (28, 0.9586), (29, 0.926), (30, 0.9529), (31, 0.957), (32, 0.939), (33, 0.9579), (34, 0.9684), (35, 0.9697), (36, 0.9723), (37, 0.9451), (38, 0.9308), (39, 0.962), (40, 0.9574), (41, 0.9683), (42, 0.9748), (43, 0.9714), (44, 0.9719), (45, 0.9718), (46, 0.9559), (47, 0.9666), (48, 0.9712), (49, 0.9601), (50, 0.9603), (51, 0.9699), (52, 0.9744), (53, 0.9599), (54, 0.9736), (55, 0.9612), (56, 0.9595), (57, 0.9634), (58, 0.9519), (59, 0.9699), (60, 0.9694), (61, 0.9599), (62, 0.9718), (63, 0.9767), (64, 0.9732), (65, 0.9688), (66, 0.9721), (67, 0.968), (68, 0.9627), (69, 0.9561), (70, 0.9721), (71, 0.9686), (72, 0.9738), (73, 0.9682), (74, 0.9724), (75, 0.9743), (76, 0.9784), (77, 0.981), (78, 0.973), (79, 0.9753), (80, 0.9812), (81, 0.9771), (82, 0.9825), (83, 0.9729), (84, 0.9714), (85, 0.9761), (86, 0.98), (87, 0.9798), (88, 0.9806), (89, 0.9791), (90, 0.9683), (91, 0.9784), (92, 0.9766), (93, 0.973), (94, 0.9773), (95, 0.9773), (96, 0.9787), (97, 0.9679), (98, 0.9757), (99, 0.9711), (100, 0.9801)]

FedAvgM

Test: commun\_round: 100 | global\_acc: 0.9808 | global\_pre: 0.9810625479664684 | global\_rec: 0.9808 | global\_f1s: 0.9808268049296166

[(0, 0.0747), (1, 0.2696), (2, 0.1765), (3, 0.145), (4, 0.4637), (5, 0.6955), (6, 0.5863), (7, 0.6306), (8, 0.814), (9, 0.8523), (10, 0.88), (11, 0.7979), (12, 0.9062), (13, 0.8572), (14, 0.8075), (15, 0.8548), (16, 0.8798), (17, 0.8515), (18, 0.9102), (19, 0.8889), (20, 0.9356), (21, 0.9016), (22, 0.921), (23, 0.9223), (24, 0.9112), (25, 0.8813), (26, 0.9444), (27, 0.9483), (28, 0.9346), (29, 0.9338), (30, 0.9381), (31, 0.9573), (32, 0.966), (33, 0.9651), (34, 0.9667), (35, 0.9631), (36, 0.9563), (37, 0.9581), (38, 0.9628), (39, 0.9606), (40, 0.9609), (41, 0.9693), (42, 0.9688), (43, 0.9664), (44, 0.9616), (45, 0.9624), (46, 0.9638), (47, 0.9591), (48, 0.9659), (49, 0.9673), (50, 0.9636), (51, 0.9733), (52, 0.9723), (53, 0.9672), (54, 0.9641), (55, 0.9728), (56, 0.9648), (57, 0.9749), (58, 0.9769), (59, 0.9757), (60, 0.9733), (61, 0.9445), (62, 0.9668), (63, 0.9617), (64, 0.9736), (65, 0.9767), (66, 0.969), (67, 0.9754), (68, 0.9713), (69, 0.972), (70, 0.9746), (71, 0.9733), (72, 0.971), (73, 0.9772), (74, 0.9771), (75, 0.9715), (76, 0.9775), (77, 0.9298), (78, 0.9727), (79, 0.9761), (80, 0.9695), (81, 0.9649), (82, 0.9735), (83, 0.9754), (84, 0.9757), (85, 0.9775), (86, 0.9693), (87, 0.9734), (88, 0.9652), (89, 0.9738), (90, 0.9718), (91, 0.9693), (92, 0.9768), (93, 0.9722), (94, 0.9761), (95, 0.9808), (96, 0.9786), (97, 0.963), (98, 0.9692), (99, 0.9698), (100, 0.9633)]

FedProx

Test: commun\_round: 100 | global\_acc: 0.9821 | global\_pre: 0.9823549703876004 | global\_rec: 0.9821 | global\_f1s: 0.9821253667643159

[(0, 0.0773), (1, 0.2214), (2, 0.4024), (3, 0.2932), (4, 0.6182), (5, 0.7549), (6, 0.8303), (7, 0.8357), (8, 0.7221), (9, 0.8172), (10, 0.9149), (11, 0.8667), (12, 0.8975), (13, 0.871), (14, 0.8502), (15, 0.7777), (16, 0.9282), (17, 0.8864), (18, 0.9017), (19, 0.9123), (20, 0.9363), (21, 0.9298), (22, 0.9329), (23, 0.9609), (24, 0.9353), (25, 0.9315), (26, 0.9305), (27, 0.9378), (28, 0.9611), (29, 0.9529), (30, 0.9564), (31, 0.9631), (32, 0.9615), (33, 0.9469), (34, 0.9446), (35, 0.9073), (36, 0.9508), (37, 0.944), (38, 0.8886), (39, 0.9365), (40, 0.9653), (41, 0.962), (42, 0.9576), (43, 0.9677), (44, 0.9627), (45, 0.9594), (46, 0.906), (47, 0.9514), (48, 0.9454), (49, 0.9584), (50, 0.9567), (51, 0.9701), (52, 0.9464), (53, 0.9637), (54, 0.9294), (55, 0.9235), (56, 0.9647), (57, 0.9783), (58, 0.9738), (59, 0.972), (60, 0.9562), (61, 0.9435), (62, 0.9668), (63, 0.9693), (64, 0.9714), (65, 0.9661), (66, 0.9642), (67, 0.9607), (68, 0.9719), (69, 0.9663), (70, 0.9743), (71, 0.9718), (72, 0.9767), (73, 0.9742), (74, 0.9715), (75, 0.9559), (76, 0.9737), (77, 0.9731), (78, 0.9724), (79, 0.9676), (80, 0.9778), (81, 0.9743), (82, 0.9704), (83, 0.9808), (84, 0.9802), (85, 0.9736), (86, 0.9681), (87, 0.9662), (88, 0.9821), (89, 0.9721), (90, 0.9674), (91, 0.9761), (92, 0.9704), (93, 0.9737), (94, 0.9644), (95, 0.9757), (96, 0.9736), (97, 0.978), (98, 0.9738), (99, 0.9688), (100, 0.9731)]

QFedAvg

Test: commun\_round: 100 | global\_acc: 0.9488 | global\_pre: 0.9524580411816982 | global\_rec: 0.9488 | global\_f1s: 0.9495059275534613

[(0, 0.1102), (1, 0.1078), (2, 0.1908), (3, 0.2081), (4, 0.2161), (5, 0.3506), (6, 0.3557), (7, 0.4541), (8, 0.4754), (9, 0.5391), (10, 0.5996), (11, 0.6058), (12, 0.5852), (13, 0.7163), (14, 0.7466), (15, 0.7079), (16, 0.7148), (17, 0.7511), (18, 0.7759), (19, 0.8024), (20, 0.8017), (21, 0.8115), (22, 0.8273), (23, 0.8389), (24, 0.8488), (25, 0.8567), (26, 0.8617), (27, 0.8623), (28, 0.8622), (29, 0.8719), (30, 0.8796), (31, 0.8855), (32, 0.8899), (33, 0.8801), (34, 0.8808), (35, 0.8888), (36, 0.8908), (37, 0.8937), (38, 0.8969), (39, 0.9011), (40, 0.903), (41, 0.9076), (42, 0.9082), (43, 0.9073), (44, 0.9066), (45, 0.9052), (46, 0.9136), (47, 0.9121), (48, 0.9137), (49, 0.913), (50, 0.9178), (51, 0.915), (52, 0.9178), (53, 0.9176), (54, 0.9189), (55, 0.9198), (56, 0.9182), (57, 0.9173), (58, 0.9178), (59, 0.9172), (60, 0.9179), (61, 0.9218), (62, 0.922), (63, 0.9239), (64, 0.926), (65, 0.9276), (66, 0.9261), (67, 0.9243), (68, 0.9263), (69, 0.9251), (70, 0.9269), (71, 0.9295), (72, 0.932), (73, 0.9337), (74, 0.9341), (75, 0.9352), (76, 0.9364), (77, 0.9358), (78, 0.9368), (79, 0.9363), (80, 0.9373), (81, 0.9358), (82, 0.9385), (83, 0.9381), (84, 0.9401), (85, 0.94), (86, 0.9425), (87, 0.9447), (88, 0.9453), (89, 0.9452), (90, 0.943), (91, 0.9448), (92, 0.9446), (93, 0.946), (94, 0.9466), (95, 0.9469), (96, 0.9476), (97, 0.9488), (98, 0.948), (99, 0.9482), (100, 0.9462)]

FedMedian

Test: commun\_round: 100 | global\_acc: 0.9762 | global\_pre: 0.9995 | global\_rec: 0.9762 | global\_f1s: 0.9763677113979077

[(0, 0.0958), (1, 0.399), (2, 0.3894), (3, 0.551), (4, 0.4858), (5, 0.6457), (6, 0.6719), (7, 0.651), (8, 0.7538), (9, 0.7863), (10, 0.8548), (11, 0.8612), (12, 0.835), (13, 0.8459), (14, 0.8903), (15, 0.849), (16, 0.9266), (17, 0.9162), (18, 0.9292), (19, 0.9223), (20, 0.8845), (21, 0.9252), (22, 0.9209), (23, 0.9198), (24, 0.9085), (25, 0.9164), (26, 0.9284), (27, 0.9254), (28, 0.9605), (29, 0.9324), (30, 0.9639), (31, 0.9574), (32, 0.9582), (33, 0.9604), (34, 0.9546), (35, 0.9465), (36, 0.9383), (37, 0.9696), (38, 0.9688), (39, 0.9617), (40, 0.9549), (41, 0.9588), (42, 0.9518), (43, 0.951), (44, 0.9502), (45, 0.9514), (46, 0.9554), (47, 0.9593), (48, 0.9594), (49, 0.9518), (50, 0.9447), (51, 0.9618), (52, 0.9644), (53, 0.9645), (54, 0.95), (55, 0.9459), (56, 0.9652), (57, 0.9652), (58, 0.969), (59, 0.964), (60, 0.9576), (61, 0.9653), (62, 0.9657), (63, 0.9685), (64, 0.9686), (65, 0.967), (66, 0.9584), (67, 0.9646), (68, 0.9579), (69, 0.9699), (70, 0.9651), (71, 0.9573), (72, 0.9741), (73, 0.9666), (74, 0.9691), (75, 0.9709), (76, 0.9667), (77, 0.9709), (78, 0.9717), (79, 0.9702), (80, 0.9658), (81, 0.9722), (82, 0.9698), (83, 0.9744), (84, 0.9645), (85, 0.9604), (86, 0.9726), (87, 0.9729), (88, 0.9716), (89, 0.9629), (90, 0.9674), (91, 0.9692), (92, 0.9762), (93, 0.9673), (94, 0.9602), (95, 0.9687), (96, 0.9717), (97, 0.976), (98, 0.9694), (99, 0.9755), (100, 0.9754)]

FedTrimmedAvg

Test: commun\_round: 100 | global\_acc: 0.9797 | global\_pre: 0.9799705545768053 | global\_rec: 0.9797 | global\_f1s: 0.9797361876522412

[(0, 0.1473), (1, 0.3114), (2, 0.3399), (3, 0.4205), (4, 0.3868), (5, 0.5204), (6, 0.5848), (7, 0.6583), (8, 0.779), (9, 0.6369), (10, 0.8109), (11, 0.8411), (12, 0.8924), (13, 0.8789), (14, 0.8277), (15, 0.8676), (16, 0.9071), (17, 0.9165), (18, 0.9023), (19, 0.9104), (20, 0.9296), (21, 0.9258), (22, 0.9296), (23, 0.9485), (24, 0.9225), (25, 0.9191), (26, 0.9262), (27, 0.9388), (28, 0.9378), (29, 0.9312), (30, 0.9511), (31, 0.9558), (32, 0.9509), (33, 0.9445), (34, 0.9611), (35, 0.9465), (36, 0.95), (37, 0.9298), (38, 0.9155), (39, 0.9564), (40, 0.9603), (41, 0.9608), (42, 0.9588), (43, 0.9518), (44, 0.9559), (45, 0.9199), (46, 0.9514), (47, 0.9656), (48, 0.9692), (49, 0.9683), (50, 0.9666), (51, 0.965), (52, 0.9647), (53, 0.969), (54, 0.965), (55, 0.9482), (56, 0.9668), (57, 0.971), (58, 0.9682), (59, 0.9645), (60, 0.9662), (61, 0.9595), (62, 0.9636), (63, 0.9658), (64, 0.9705), (65, 0.9672), (66, 0.9717), (67, 0.9748), (68, 0.9797), (69, 0.9756), (70, 0.9678), (71, 0.9711), (72, 0.9653), (73, 0.9658), (74, 0.9686), (75, 0.9748), (76, 0.9776), (77, 0.9739), (78, 0.9694), (79, 0.9679), (80, 0.9649), (81, 0.9596), (82, 0.9716), (83, 0.9637), (84, 0.9698), (85, 0.9712), (86, 0.9717), (87, 0.9696), (88, 0.9751), (89, 0.9776), (90, 0.9762), (91, 0.9751), (92, 0.9742), (93, 0.9747), (94, 0.9647), (95, 0.9747), (96, 0.9721), (97, 0.9749), (98, 0.976), (99, 0.9702), (100, 0.9739)]

FaultTolerantFedAvg

Test: commun\_round: 100 | global\_acc: 0.9822 | global\_pre: 0.9824774045667342 | global\_rec: 0.9822 | global\_f1s: 0.9822177649259743

[(0, 0.0892), (1, 0.4295), (2, 0.4672), (3, 0.3785), (4, 0.6427), (5, 0.7467), (6, 0.8084), (7, 0.7772), (8, 0.8658), (9, 0.9323), (10, 0.9056), (11, 0.936), (12, 0.92), (13, 0.9199), (14, 0.9194), (15, 0.9124), (16, 0.9039), (17, 0.94), (18, 0.9354), (19, 0.9496), (20, 0.9513), (21, 0.9494), (22, 0.9436), (23, 0.9382), (24, 0.9302), (25, 0.9445), (26, 0.9582), (27, 0.9411), (28, 0.9462), (29, 0.9499), (30, 0.9549), (31, 0.9522), (32, 0.9553), (33, 0.937), (34, 0.9684), (35, 0.9078), (36, 0.8941), (37, 0.9643), (38, 0.9731), (39, 0.9679), (40, 0.9574), (41, 0.9642), (42, 0.9599), (43, 0.9599), (44, 0.9582), (45, 0.9635), (46, 0.9568), (47, 0.9634), (48, 0.9781), (49, 0.9664), (50, 0.9629), (51, 0.9579), (52, 0.97), (53, 0.9708), (54, 0.971), (55, 0.9753), (56, 0.969), (57, 0.9712), (58, 0.9643), (59, 0.9602), (60, 0.9655), (61, 0.9721), (62, 0.9786), (63, 0.9721), (64, 0.9708), (65, 0.9779), (66, 0.967), (67, 0.9555), (68, 0.972), (69, 0.9747), (70, 0.9725), (71, 0.976), (72, 0.9493), (73, 0.9717), (74, 0.9723), (75, 0.9746), (76, 0.9784), (77, 0.9752), (78, 0.9798), (79, 0.969), (80, 0.9618), (81, 0.9736), (82, 0.9596), (83, 0.955), (84, 0.9786), (85, 0.9737), (86, 0.9474), (87, 0.9686), (88, 0.9725), (89, 0.9701), (90, 0.9725), (91, 0.9632), (92, 0.9787), (93, 0.9787), (94, 0.9756), (95, 0.9822), (96, 0.9765), (97, 0.9758), (98, 0.9783), (99, 0.9772), (100, 0.978)]

FedWeightsLoss1

Test: commun\_round: 100 | global\_acc: 0.9856 | global\_pre: 0.985639371698281 | global\_rec: 0.9856 | global\_f1s: 0.9856042342215069

[(0, 0.105), (1, 0.1624), (2, 0.4881), (3, 0.456), (4, 0.5961), (5, 0.8499), (6, 0.8048), (7, 0.8008), (8, 0.801), (9, 0.8343), (10, 0.8656), (11, 0.9021), (12, 0.9315), (13, 0.9161), (14, 0.944), (15, 0.9254), (16, 0.9607), (17, 0.9608), (18, 0.9579), (19, 0.9467), (20, 0.9213), (21, 0.9568), (22, 0.969), (23, 0.9627), (24, 0.9638), (25, 0.9464), (26, 0.9445), (27, 0.9389), (28, 0.9617), (29, 0.9704), (30, 0.9639), (31, 0.9619), (32, 0.9667), (33, 0.9553), (34, 0.9607), (35, 0.9691), (36, 0.9649), (37, 0.9671), (38, 0.9668), (39, 0.9666), (40, 0.9694), (41, 0.9728), (42, 0.9774), (43, 0.9746), (44, 0.9688), (45, 0.9734), (46, 0.9611), (47, 0.9688), (48, 0.9645), (49, 0.9747), (50, 0.9736), (51, 0.9618), (52, 0.9718), (53, 0.9694), (54, 0.9804), (55, 0.9627), (56, 0.975), (57, 0.9751), (58, 0.976), (59, 0.9747), (60, 0.9752), (61, 0.9723), (62, 0.9787), (63, 0.9693), (64, 0.9696), (65, 0.9703), (66, 0.977), (67, 0.98), (68, 0.9812), (69, 0.9785), (70, 0.9786), (71, 0.9694), (72, 0.9575), (73, 0.9682), (74, 0.9803), (75, 0.9824), (76, 0.979), (77, 0.9751), (78, 0.9799), (79, 0.9759), (80, 0.9789), (81, 0.9772), (82, 0.9856), (83, 0.9816), (84, 0.9831), (85, 0.9801), (86, 0.9745), (87, 0.9685), (88, 0.977), (89, 0.9759), (90, 0.9787), (91, 0.9828), (92, 0.9793), (93, 0.9749), (94, 0.9801), (95, 0.9798), (96, 0.9804), (97, 0.982), (98, 0.9807), (99, 0.9773), (100, 0.9772)]

FedWeightsLoss2

Test: commun\_round: 100 | global\_acc: 0.9841 | global\_pre: 0.984155379183493 | global\_rec: 0.9841 | global\_f1s: 0.9841056523688336

[(0, 0.0622), (1, 0.2883), (2, 0.4676), (3, 0.6495), (4, 0.6206), (5, 0.636), (6, 0.8196), (7, 0.7995), (8, 0.8897), (9, 0.9074), (10, 0.9112), (11, 0.9357), (12, 0.905), (13, 0.9171), (14, 0.9412), (15, 0.8981), (16, 0.9254), (17, 0.9468), (18, 0.9163), (19, 0.9532), (20, 0.9395), (21, 0.929), (22, 0.9563), (23, 0.965), (24, 0.9504), (25, 0.9658), (26, 0.963), (27, 0.9686), (28, 0.9603), (29, 0.9601), (30, 0.9617), (31, 0.9711), (32, 0.9669), (33, 0.9668), (34, 0.9675), (35, 0.958), (36, 0.9686), (37, 0.96), (38, 0.9657), (39, 0.9675), (40, 0.9763), (41, 0.9508), (42, 0.9667), (43, 0.9741), (44, 0.9745), (45, 0.9721), (46, 0.9705), (47, 0.9707), (48, 0.977), (49, 0.959), (50, 0.9698), (51, 0.9761), (52, 0.9761), (53, 0.975), (54, 0.9742), (55, 0.9764), (56, 0.9692), (57, 0.9769), (58, 0.9754), (59, 0.9777), (60, 0.9794), (61, 0.9736), (62, 0.9756), (63, 0.9775), (64, 0.9799), (65, 0.9757), (66, 0.9771), (67, 0.9725), (68, 0.9766), (69, 0.9787), (70, 0.9797), (71, 0.9799), (72, 0.9766), (73, 0.9722), (74, 0.9752), (75, 0.9788), (76, 0.9748), (77, 0.9751), (78, 0.9733), (79, 0.9827), (80, 0.9813), (81, 0.9767), (82, 0.9728), (83, 0.9832), (84, 0.9814), (85, 0.9774), (86, 0.9817), (87, 0.9785), (88, 0.9762), (89, 0.9811), (90, 0.9803), (91, 0.9833), (92, 0.9786), (93, 0.9806), (94, 0.9814), (95, 0.9792), (96, 0.9841), (97, 0.9809), (98, 0.9826), (99, 0.97), (100, 0.9766)]

FedImp

Test: commun\_round: 100 | global\_acc: 0.9798 | global\_pre: 0.9800903288519764 | global\_rec: 0.9798 | global\_f1s: 0.979819326026717

[(0, 0.054), (1, 0.2314), (2, 0.5955), (3, 0.6099), (4, 0.7336), (5, 0.7072), (6, 0.8442), (7, 0.6946), (8, 0.6991), (9, 0.6934), (10, 0.9057), (11, 0.8803), (12, 0.9041), (13, 0.9158), (14, 0.8843), (15, 0.923), (16, 0.9467), (17, 0.9351), (18, 0.8741), (19, 0.9523), (20, 0.9635), (21, 0.9387), (22, 0.9295), (23, 0.9633), (24, 0.9432), (25, 0.9571), (26, 0.9021), (27, 0.9247), (28, 0.9598), (29, 0.9597), (30, 0.9198), (31, 0.9662), (32, 0.9585), (33, 0.962), (34, 0.963), (35, 0.9628), (36, 0.9652), (37, 0.9712), (38, 0.964), (39, 0.946), (40, 0.9644), (41, 0.9586), (42, 0.9687), (43, 0.9446), (44, 0.9552), (45, 0.9669), (46, 0.9674), (47, 0.9735), (48, 0.9756), (49, 0.9688), (50, 0.9697), (51, 0.9731), (52, 0.9571), (53, 0.9571), (54, 0.9711), (55, 0.975), (56, 0.9713), (57, 0.9681), (58, 0.9737), (59, 0.9633), (60, 0.9652), (61, 0.9679), (62, 0.9433), (63, 0.9673), (64, 0.9572), (65, 0.9737), (66, 0.9696), (67, 0.9752), (68, 0.9563), (69, 0.9719), (70, 0.9659), (71, 0.9738), (72, 0.9709), (73, 0.9722), (74, 0.951), (75, 0.9485), (76, 0.937), (77, 0.9714), (78, 0.9756), (79, 0.9725), (80, 0.9752), (81, 0.9681), (82, 0.976), (83, 0.9734), (84, 0.9772), (85, 0.9725), (86, 0.9724), (87, 0.9764), (88, 0.9731), (89, 0.9615), (90, 0.9713), (91, 0.975), (92, 0.9755), (93, 0.9798), (94, 0.9521), (95, 0.9538), (96, 0.9756), (97, 0.9785), (98, 0.9702), (99, 0.9675), (100, 0.9702)]

FedAcc

Test: commun\_round: 100 | global\_acc: 0.9793 | global\_pre: 0.9795645201233932 | global\_rec: 0.9793 | global\_f1s: 0.9793359104137833

[(0, 0.0715), (1, 0.2375), (2, 0.323), (3, 0.4297), (4, 0.6169), (5, 0.667), (6, 0.7463), (7, 0.8037), (8, 0.8522), (9, 0.7916), (10, 0.8822), (11, 0.8546), (12, 0.9248), (13, 0.9382), (14, 0.8923), (15, 0.9068), (16, 0.9261), (17, 0.9309), (18, 0.9558), (19, 0.9208), (20, 0.9345), (21, 0.9364), (22, 0.9365), (23, 0.9267), (24, 0.9282), (25, 0.9575), (26, 0.9545), (27, 0.9582), (28, 0.957), (29, 0.9573), (30, 0.9239), (31, 0.9521), (32, 0.9588), (33, 0.9578), (34, 0.9425), (35, 0.9613), (36, 0.966), (37, 0.9664), (38, 0.9599), (39, 0.9712), (40, 0.9676), (41, 0.9533), (42, 0.9619), (43, 0.9557), (44, 0.9686), (45, 0.9671), (46, 0.962), (47, 0.9623), (48, 0.9696), (49, 0.9731), (50, 0.9759), (51, 0.9636), (52, 0.9604), (53, 0.9764), (54, 0.9759), (55, 0.9633), (56, 0.9686), (57, 0.9721), (58, 0.9733), (59, 0.9709), (60, 0.9589), (61, 0.9708), (62, 0.9653), (63, 0.9673), (64, 0.9696), (65, 0.9754), (66, 0.9717), (67, 0.9772), (68, 0.9739), (69, 0.9744), (70, 0.9771), (71, 0.9753), (72, 0.9777), (73, 0.9704), (74, 0.9649), (75, 0.97), (76, 0.9789), (77, 0.9763), (78, 0.971), (79, 0.9704), (80, 0.9729), (81, 0.9723), (82, 0.9782), (83, 0.9764), (84, 0.964), (85, 0.9626), (86, 0.9756), (87, 0.9783), (88, 0.9584), (89, 0.9709), (90, 0.9775), (91, 0.9672), (92, 0.9678), (93, 0.9703), (94, 0.9793), (95, 0.9785), (96, 0.9722), (97, 0.9694), (98, 0.9727), (99, 0.9729), (100, 0.9772)]

FedTranfer

Test: commun\_round: 100 | global\_acc: 0.9812 | global\_pre: 0.981485784825411 | global\_rec: 0.9812 | global\_f1s: 0.9812318129154066

[(0, 0.104), (1, 0.2244), (2, 0.2292), (3, 0.227), (4, 0.6003), (5, 0.5754), (6, 0.7028), (7, 0.7176), (8, 0.7203), (9, 0.739), (10, 0.8), (11, 0.9105), (12, 0.8968), (13, 0.9064), (14, 0.8864), (15, 0.8918), (16, 0.904), (17, 0.9492), (18, 0.9456), (19, 0.9588), (20, 0.94), (21, 0.9443), (22, 0.8934), (23, 0.913), (24, 0.9531), (25, 0.9355), (26, 0.9193), (27, 0.9402), (28, 0.9529), (29, 0.9292), (30, 0.9534), (31, 0.9352), (32, 0.9515), (33, 0.951), (34, 0.9535), (35, 0.9563), (36, 0.9624), (37, 0.9644), (38, 0.9517), (39, 0.9574), (40, 0.9701), (41, 0.9325), (42, 0.9545), (43, 0.9727), (44, 0.9535), (45, 0.9646), (46, 0.9721), (47, 0.9697), (48, 0.9527), (49, 0.9425), (50, 0.9579), (51, 0.9642), (52, 0.9636), (53, 0.9717), (54, 0.9521), (55, 0.9737), (56, 0.9689), (57, 0.9693), (58, 0.9753), (59, 0.9648), (60, 0.975), (61, 0.9762), (62, 0.9764), (63, 0.9685), (64, 0.9681), (65, 0.947), (66, 0.9554), (67, 0.9714), (68, 0.9779), (69, 0.9799), (70, 0.9723), (71, 0.9769), (72, 0.9777), (73, 0.9646), (74, 0.9804), (75, 0.9656), (76, 0.9746), (77, 0.9754), (78, 0.9602), (79, 0.9769), (80, 0.973), (81, 0.9767), (82, 0.9593), (83, 0.973), (84, 0.9757), (85, 0.97), (86, 0.9764), (87, 0.9669), (88, 0.9662), (89, 0.9812), (90, 0.9777), (91, 0.9721), (92, 0.9675), (93, 0.968), (94, 0.9722), (95, 0.9713), (96, 0.9785), (97, 0.9739), (98, 0.9785), (99, 0.9808), (100, 0.9796)]

FedTR x FedWL2

Test: commun\_round: 100 | global\_acc: 0.9799 | global\_pre: 0.9801281299880736 | global\_rec: 0.9799 | global\_f1s: 0.979908212214428

[(0, 0.1072), (1, 0.2218), (2, 0.6397), (3, 0.7297), (4, 0.6106), (5, 0.7868), (6, 0.8228), (7, 0.8514), (8, 0.8725), (9, 0.9088), (10, 0.9117), (11, 0.927), (12, 0.9383), (13, 0.8843), (14, 0.9373), (15, 0.9221), (16, 0.9442), (17, 0.9321), (18, 0.9387), (19, 0.95), (20, 0.9541), (21, 0.9456), (22, 0.9674), (23, 0.9457), (24, 0.9485), (25, 0.9696), (26, 0.9547), (27, 0.9565), (28, 0.9661), (29, 0.9676), (30, 0.9691), (31, 0.9648), (32, 0.9573), (33, 0.9689), (34, 0.9597), (35, 0.9636), (36, 0.9719), (37, 0.9723), (38, 0.9762), (39, 0.9676), (40, 0.9684), (41, 0.9599), (42, 0.9711), (43, 0.9534), (44, 0.9638), (45, 0.9664), (46, 0.9686), (47, 0.9753), (48, 0.9701), (49, 0.9643), (50, 0.9689), (51, 0.9737), (52, 0.9678), (53, 0.9705), (54, 0.9709), (55, 0.9671), (56, 0.9722), (57, 0.9732), (58, 0.9621), (59, 0.9767), (60, 0.9769), (61, 0.9718), (62, 0.9781), (63, 0.968), (64, 0.9783), (65, 0.9686), (66, 0.9693), (67, 0.9785), (68, 0.9686), (69, 0.9722), (70, 0.9664), (71, 0.9796), (72, 0.9733), (73, 0.9711), (74, 0.9779), (75, 0.9684), (76, 0.9737), (77, 0.9756), (78, 0.9721), (79, 0.9768), (80, 0.9686), (81, 0.9741), (82, 0.9778), (83, 0.9793), (84, 0.9742), (85, 0.9795), (86, 0.9738), (87, 0.9785), (88, 0.9761), (89, 0.9744), (90, 0.9777), (91, 0.9778), (92, 0.9791), (93, 0.9799), (94, 0.9772), (95, 0.9715), (96, 0.9741), (97, 0.9793), (98, 0.975), (99, 0.9781), (100, 0.976)]

Giam lr

FedAvg

Test: commun\_round: 100 | global\_acc: 0.96 | global\_pre: 0.9939334096574804 | global\_rec: 0.96 | global\_f1s: 0.9600107497482427

[(0, 0.1233), (1, 0.1036), (2, 0.1427), (3, 0.2021), (4, 0.1117), (5, 0.365), (6, 0.4412), (7, 0.4886), (8, 0.4983), (9, 0.5402), (10, 0.7099), (11, 0.6619), (12, 0.5715), (13, 0.8018), (14, 0.7375), (15, 0.689), (16, 0.7879), (17, 0.7305), (18, 0.7861), (19, 0.6031), (20, 0.8183), (21, 0.8386), (22, 0.86), (23, 0.8458), (24, 0.8596), (25, 0.9091), (26, 0.8447), (27, 0.8812), (28, 0.8712), (29, 0.7973), (30, 0.8293), (31, 0.8637), (32, 0.824), (33, 0.9083), (34, 0.8462), (35, 0.8528), (36, 0.7983), (37, 0.8578), (38, 0.8658), (39, 0.8588), (40, 0.9211), (41, 0.8651), (42, 0.8767), (43, 0.9096), (44, 0.8114), (45, 0.9272), (46, 0.9078), (47, 0.89), (48, 0.9353), (49, 0.9031), (50, 0.9235), (51, 0.8696), (52, 0.9025), (53, 0.8882), (54, 0.8626), (55, 0.8818), (56, 0.9305), (57, 0.9215), (58, 0.9283), (59, 0.9238), (60, 0.9139), (61, 0.9028), (62, 0.9162), (63, 0.9217), (64, 0.8706), (65, 0.9241), (66, 0.9345), (67, 0.9389), (68, 0.918), (69, 0.9322), (70, 0.9275), (71, 0.9532), (72, 0.9232), (73, 0.9367), (74, 0.8848), (75, 0.8551), (76, 0.9432), (77, 0.9354), (78, 0.9176), (79, 0.9153), (80, 0.9354), (81, 0.9422), (82, 0.946), (83, 0.9558), (84, 0.9531), (85, 0.9284), (86, 0.9408), (87, 0.9519), (88, 0.9321), (89, 0.923), (90, 0.9445), (91, 0.8916), (92, 0.8958), (93, 0.9323), (94, 0.9197), (95, 0.9392), (96, 0.9325), (97, 0.9332), (98, 0.8986), (99, 0.9225), (100, 0.96)]

FedWL2

[(0, 0.129), (1, 0.1009), (2, 0.2089), (3, 0.1873), (4, 0.2439), (5, 0.3761), (6, 0.4998), (7, 0.6), (8, 0.6559), (9, 0.7222), (10, 0.7657), (11, 0.7557), (12, 0.811), (13, 0.8148), (14, 0.7932), (15, 0.7502), (16, 0.8417), (17, 0.8492), (18, 0.8332), (19, 0.8166), (20, 0.8423), (21, 0.7885), (22, 0.8671), (23, 0.8995), (24, 0.8529), (25, 0.8584), (26, 0.9034), (27, 0.8111), (28, 0.888), (29, 0.8768), (30, 0.9161), (31, 0.8948), (32, 0.8877), (33, 0.9046), (34, 0.922), (35, 0.9085), (36, 0.901), (37, 0.9125), (38, 0.9081), (39, 0.9207), (40, 0.9226), (41, 0.8912), (42, 0.9166), (43, 0.9273), (44, 0.9277), (45, 0.9407), (46, 0.872), (47, 0.8757), (48, 0.9362), (49, 0.9421), (50, 0.9248), (51, 0.8477), (52, 0.9165), (53, 0.9135), (54, 0.9323), (55, 0.9265), (56, 0.9221), (57, 0.9167), (58, 0.9443), (59, 0.9478), (60, 0.9399), (61, 0.9449), (62, 0.9187), (63, 0.9407), (64, 0.9473), (65, 0.9097), (66, 0.9292), (67, 0.9443), (68, 0.9532), (69, 0.9411), (70, 0.953), (71, 0.9294), (72, 0.9173), (73, 0.9319), (74, 0.9459), (75, 0.9446), (76, 0.9467), (77, 0.9532), (78, 0.9319), (79, 0.9509), (80, 0.9491), (81, 0.9364), (82, 0.9572), (83, 0.9507), (84, 0.9345), (85, 0.9533), (86, 0.9593), (87, 0.9596), (88, 0.9545), (89, 0.9602), (90, 0.9639), (91, 0.9546), (92, 0.9577), (93, 0.9247), (94, 0.9505), (95, 0.9584), (96, 0.9579), (97, 0.9523), (98, 0.9543), (99, 0.9624), (100, 0.9616)]

FedImp

[(0, 0.1688), (1, 0.1908), (2, 0.1035), (3, 0.2115), (4, 0.4763), (5, 0.3729), (6, 0.5115), (7, 0.5799), (8, 0.6277), (9, 0.6494), (10, 0.6827), (11, 0.5017), (12, 0.753), (13, 0.7098), (14, 0.8057), (15, 0.8391), (16, 0.8724), (17, 0.6875), (18, 0.8778), (19, 0.7744), (20, 0.8978), (21, 0.8823), (22, 0.8244), (23, 0.8436), (24, 0.8503), (25, 0.8036), (26, 0.9071), (27, 0.8827), (28, 0.8207), (29, 0.9068), (30, 0.8332), (31, 0.8637), (32, 0.8709), (33, 0.8954), (34, 0.8924), (35, 0.8105), (36, 0.9198), (37, 0.9267), (38, 0.9096), (39, 0.8929), (40, 0.9298), (41, 0.897), (42, 0.8774), (43, 0.7962), (44, 0.909), (45, 0.9381), (46, 0.9231), (47, 0.9096), (48, 0.9437), (49, 0.932), (50, 0.9328), (51, 0.9193), (52, 0.9386), (53, 0.8088), (54, 0.9166), (55, 0.9127), (56, 0.9218), (57, 0.9205), (58, 0.9305), (59, 0.9295), (60, 0.9123), (61, 0.917), (62, 0.9405), (63, 0.9261), (64, 0.943), (65, 0.9399), (66, 0.9472), (67, 0.9383), (68, 0.9394), (69, 0.9498), (70, 0.9024), (71, 0.939), (72, 0.9241), (73, 0.9194), (74, 0.9035), (75, 0.9502), (76, 0.917), (77, 0.9447), (78, 0.9351), (79, 0.9445), (80, 0.9452), (81, 0.9371), (82, 0.9184), (83, 0.9105), (84, 0.9454), (85, 0.9279), (86, 0.9372), (87, 0.9446), (88, 0.9487), (89, 0.959), (90, 0.9212), (91, 0.9519), (92, 0.9556), (93, 0.9584), (94, 0.9521), (95, 0.9432), (96, 0.9172), (97, 0.932), (98, 0.9592), (99, 0.9521), (100, 0.9488)]

FedAvg nhưng khác epochs

Test: commun\_round: 100 | global\_acc: 0.9711 | global\_pre: 0.9719358590308369 | global\_rec: 0.9711 | global\_f1s: 0.9710797828303545

[(0, 0.0581), (1, 0.1483), (2, 0.3581), (3, 0.4591), (4, 0.5856), (5, 0.565), (6, 0.5712), (7, 0.6646), (8, 0.554), (9, 0.7483), (10, 0.7601), (11, 0.7617), (12, 0.7869), (13, 0.8431), (14, 0.791), (15, 0.807), (16, 0.8177), (17, 0.8133), (18, 0.8333), (19, 0.7969), (20, 0.8781), (21, 0.9037), (22, 0.7927), (23, 0.7507), (24, 0.8586), (25, 0.832), (26, 0.9105), (27, 0.909), (28, 0.8371), (29, 0.9208), (30, 0.9478), (31, 0.902), (32, 0.9305), (33, 0.9278), (34, 0.8707), (35, 0.9175), (36, 0.9154), (37, 0.8818), (38, 0.8819), (39, 0.9478), (40, 0.9156), (41, 0.8782), (42, 0.9401), (43, 0.8942), (44, 0.9414), (45, 0.9403), (46, 0.8965), (47, 0.882), (48, 0.905), (49, 0.9355), (50, 0.9524), (51, 0.9305), (52, 0.9232), (53, 0.9361), (54, 0.9102), (55, 0.9427), (56, 0.9518), (57, 0.9575), (58, 0.9348), (59, 0.9346), (60, 0.9492), (61, 0.9006), (62, 0.9108), (63, 0.9518), (64, 0.9545), (65, 0.9434), (66, 0.9421), (67, 0.9336), (68, 0.9514), (69, 0.9398), (70, 0.9624), (71, 0.9296), (72, 0.9344), (73, 0.9656), (74, 0.9584), (75, 0.9255), (76, 0.9269), (77, 0.9231), (78, 0.9597), (79, 0.9571), (80, 0.9469), (81, 0.9057), (82, 0.9449), (83, 0.9603), (84, 0.9545), (85, 0.962), (86, 0.9604), (87, 0.9628), (88, 0.9641), (89, 0.952), (90, 0.9303), (91, 0.9393), (92, 0.9711), (93, 0.9587), (94, 0.9668), (95, 0.9321), (96, 0.964), (97, 0.9565), (98, 0.9475), (99, 0.9528), (100, 0.909)]