

Willy Fitra Hendria - ICL Graduate Assignment 1

- 1) Due to limited computational power, I ran only 200-500 rounds with a single learning rate for producing the following results. Consequently, I adjusted the target-test accuracy to become 93% and 97% for 2NN and CNN, respectively.

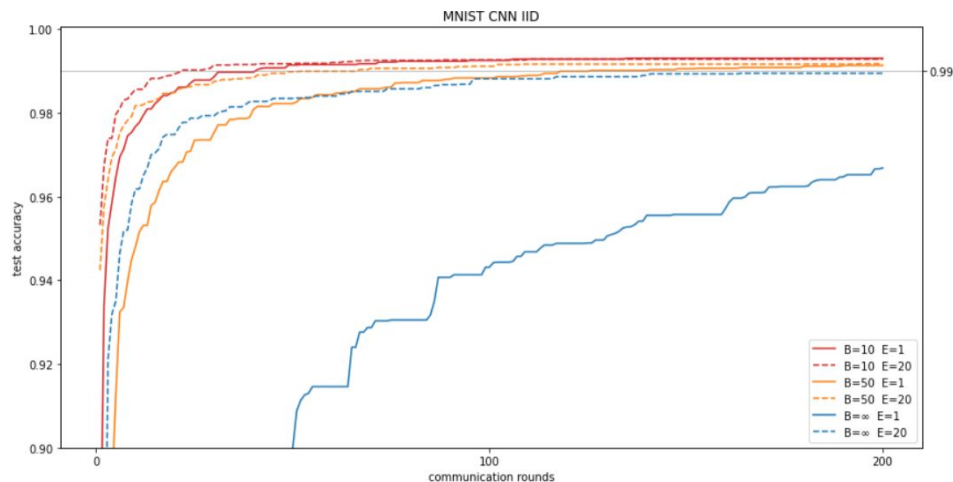
Generally, we can see similar results to the paper. With $B=\infty$, there is only a small advantage in increasing C . Using smaller $B=10$ shows a significant improvement in using $C \geq 0.1$, especially in the non-IID case

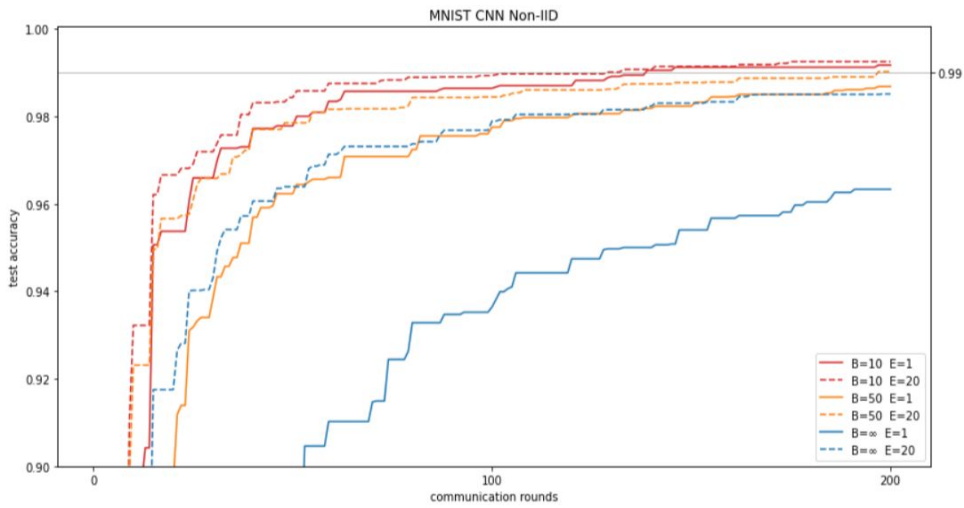
2NN, E=1	IID		NON-IID	
C	$B=\infty$	$B=10$	$B=\infty$	$B=10$
0	345	19	475	415
0.1	348 (0.99X)	7 (2.7X)	339 (1.4X)	46 (9.0X)
1	352 (0.98X)	7 (2.7X)	352 (1.3X)	32 (12.9X)
CNN, E=5				
0	58	7	302	5
0.1	48 (1.2X)	3 (2.3X)	106 (2.8X)	26 (11.5X)
1	49 (1.1X)	3 (2.3X)	108 (2.7X)	15 (20.0X)

Please see the appendix below for accuracy and loss plot for each case in the table above.

- 2) Here, I ran only 200 rounds with a single learning rate for this case due to limited computational power.

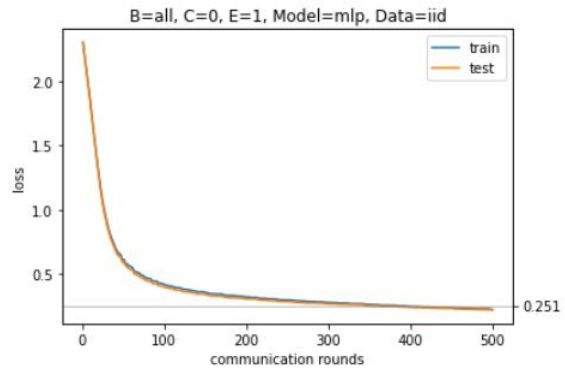
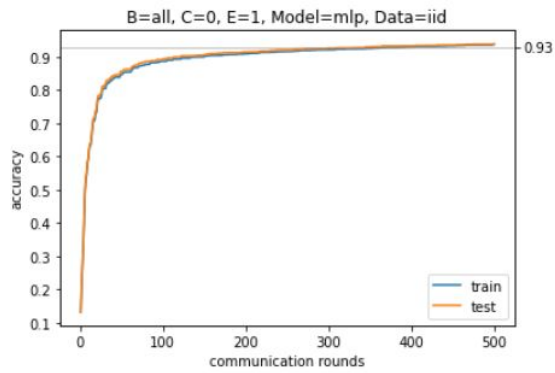
Generally, we also can see similar results to the paper. With $C=0.1$, adding more local updates per round (increase E & decrease B) can produce a significant decrease in communication costs.



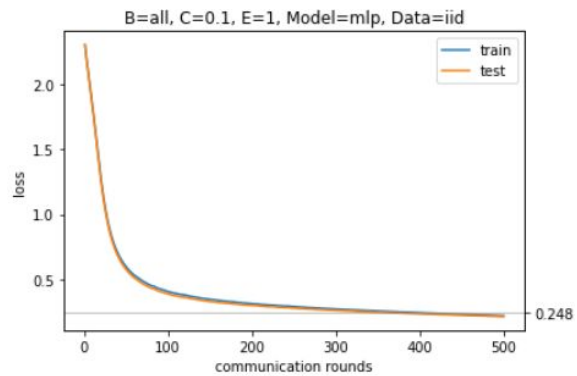
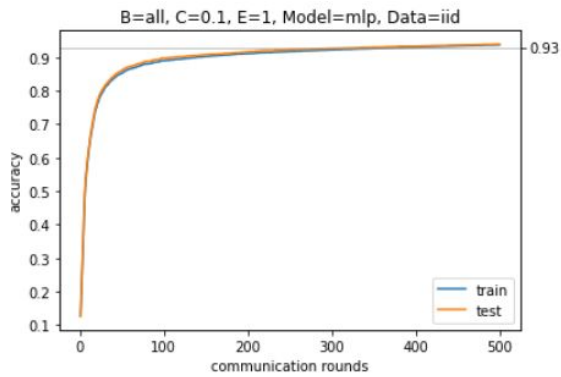


Appendix

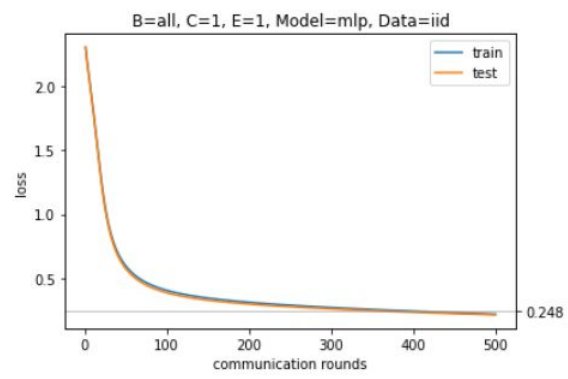
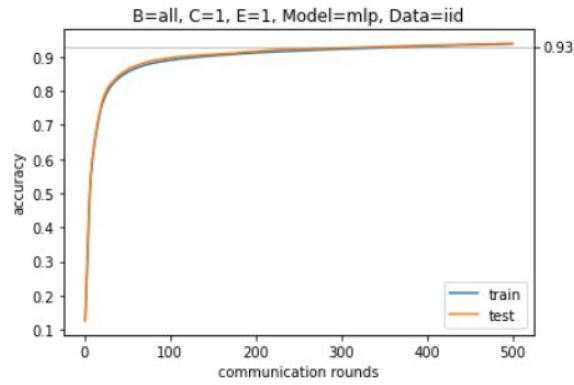
2NN, IID, $E=1$, $B=\infty$, $C=0$



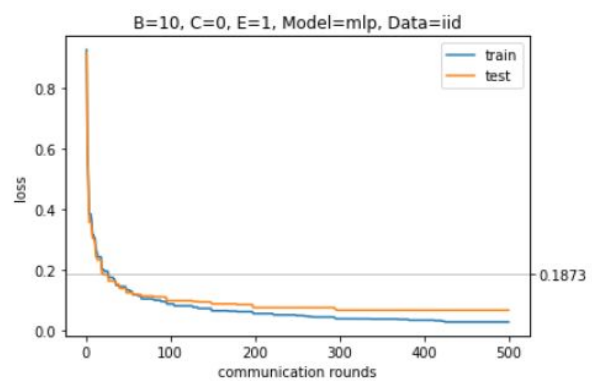
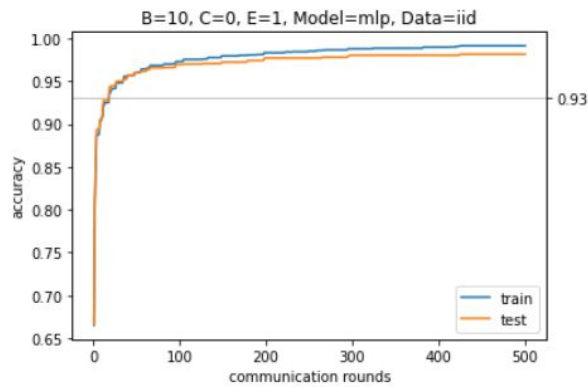
2NN, IID, $E=1$, $B=\infty$, $C=0.1$



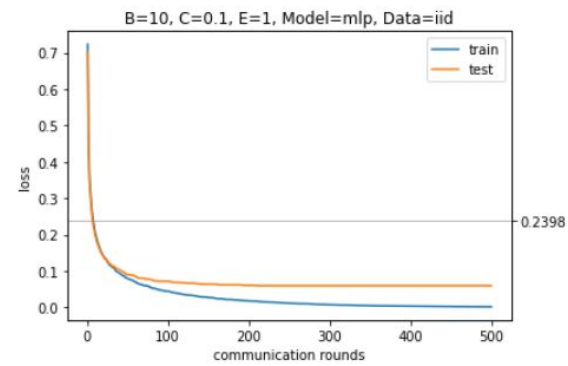
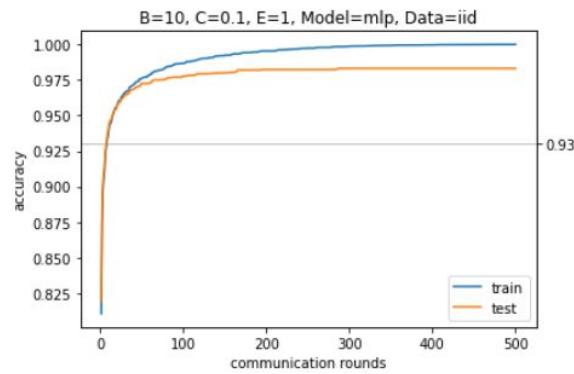
2NN, IID, E=1, B= ∞ , C=1



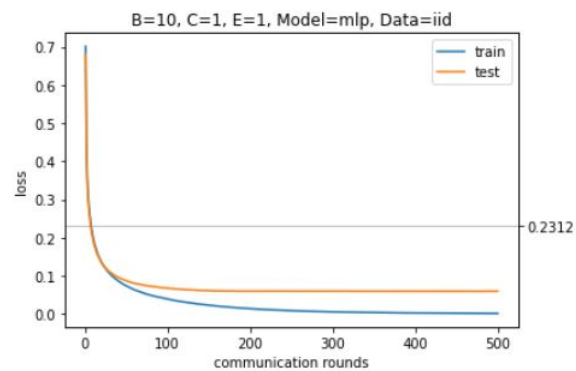
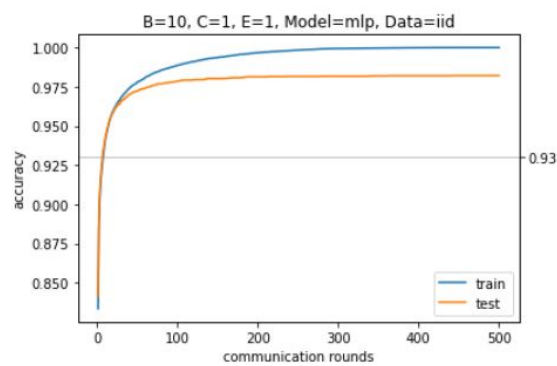
2NN, IID, E=1, B=10, C=0



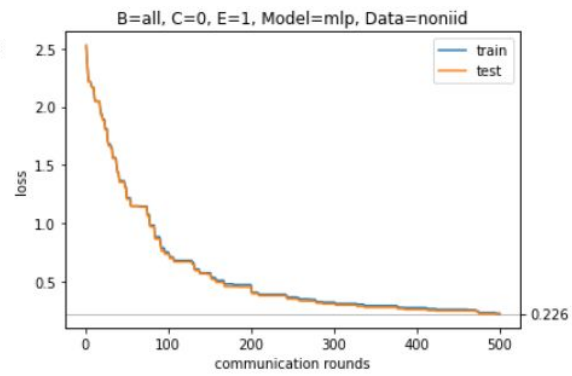
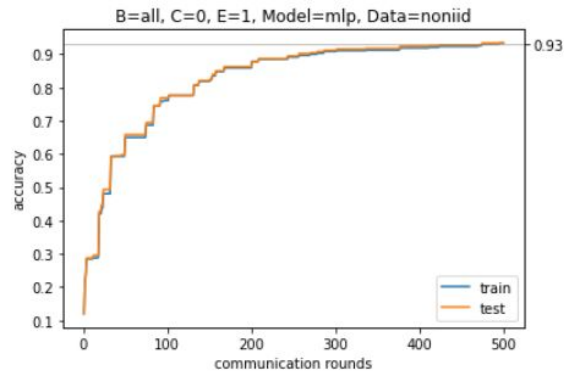
2NN, IID, E=1, B=10, C=0.1



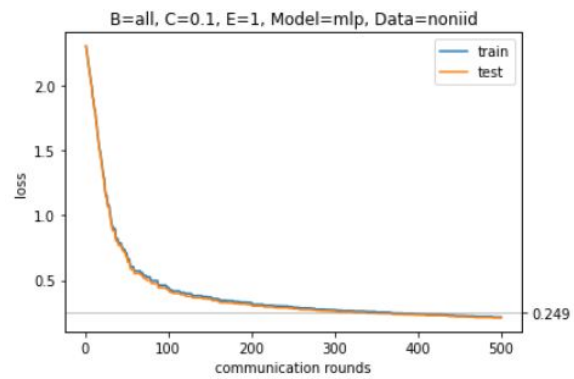
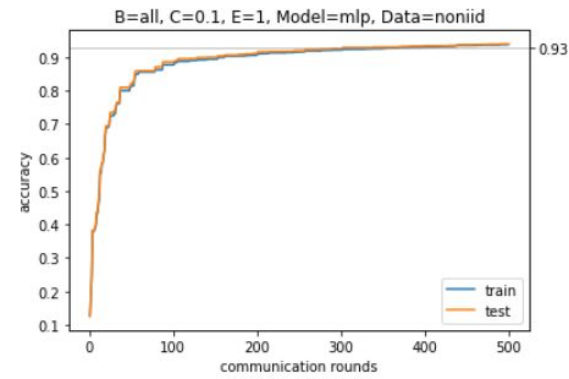
2NN, IID, E=1, B=10, C=1



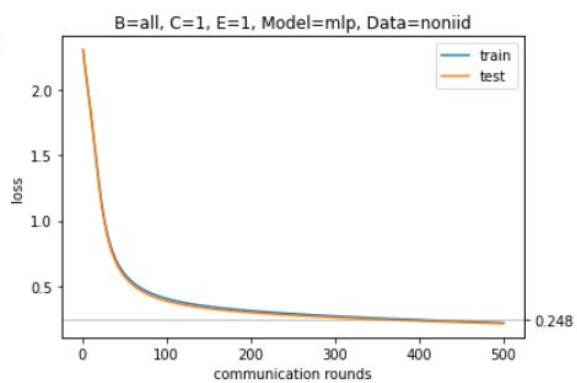
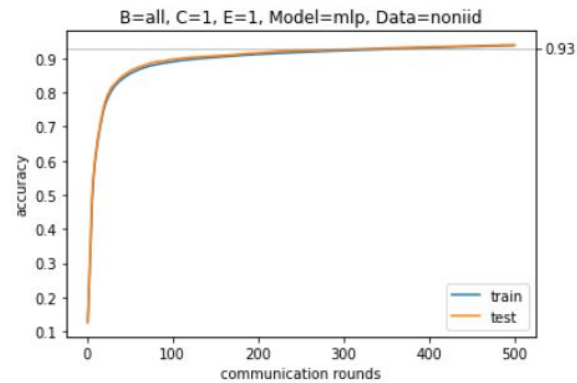
2NN, Non-IID, E=1, B= ∞ , C=0



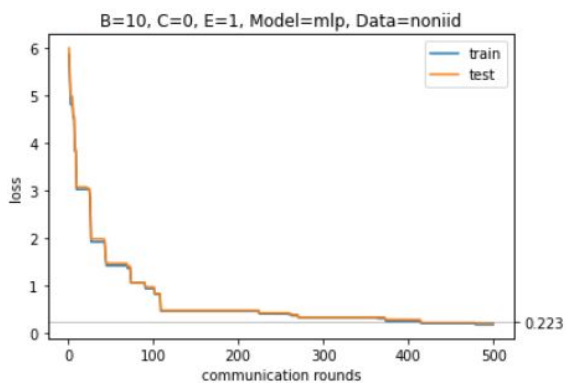
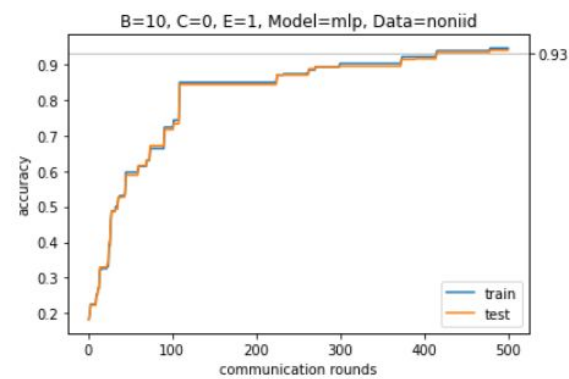
2NN, Non-IID, E=1, B= ∞ , C=0.1



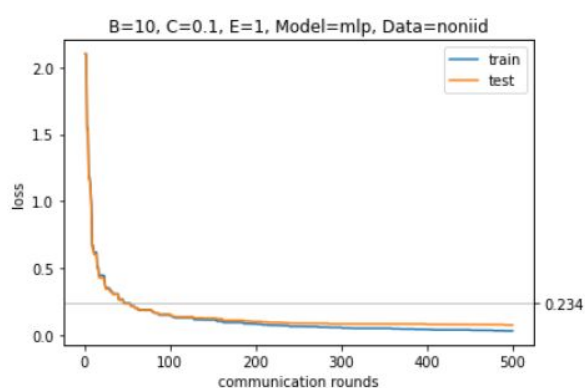
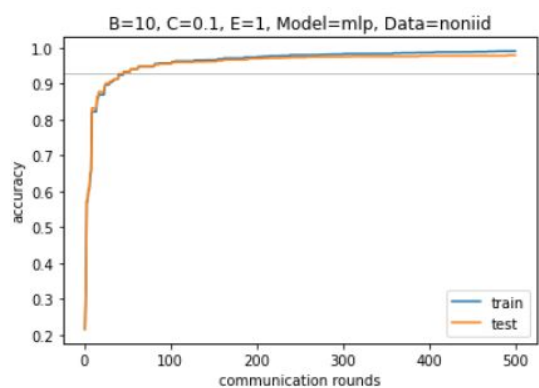
2NN, Non-IID, E=1, B= ∞ , C=1



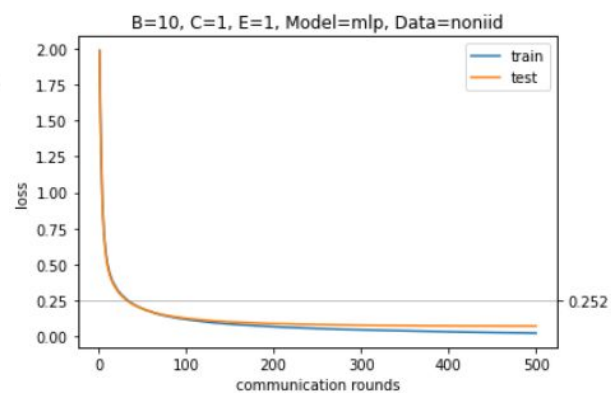
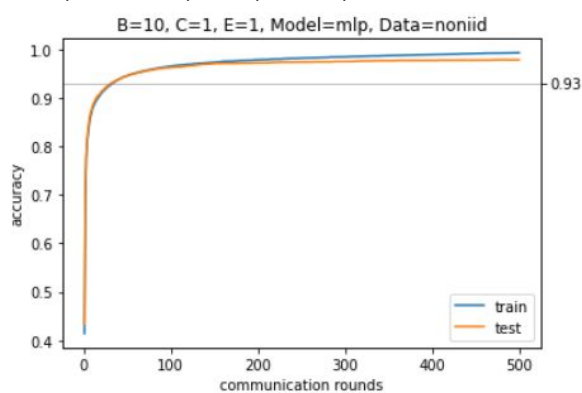
2NN, Non-IID, E=1, B=10, C=0



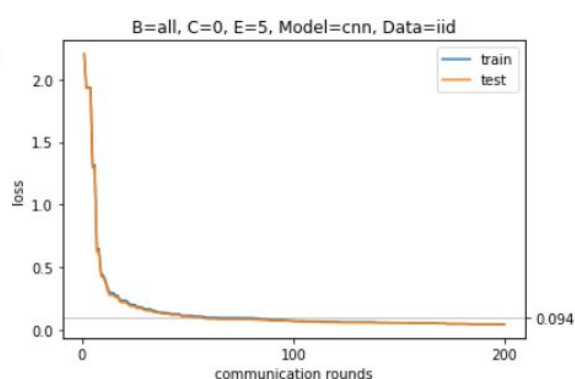
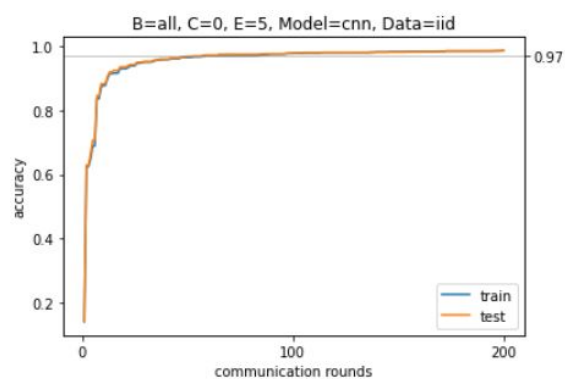
2NN, Non-IID, E=1, B=10, C=0.1



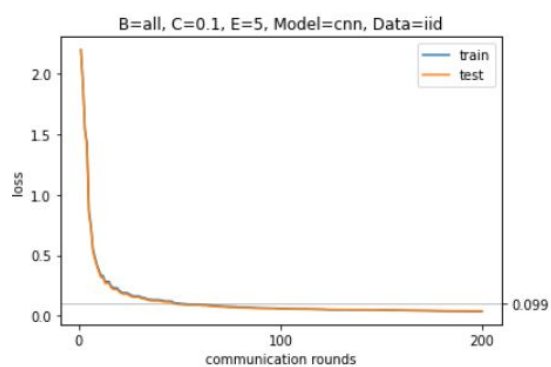
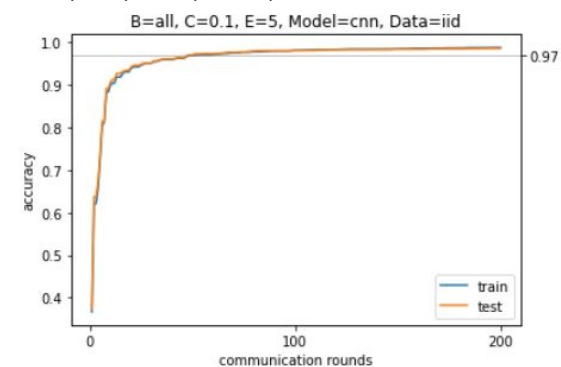
2NN, Non-IID, E=1, B=10, C=1



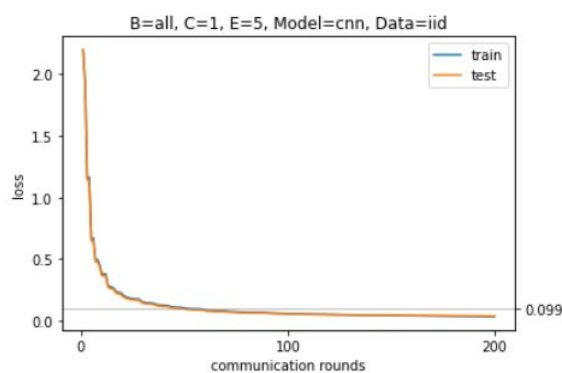
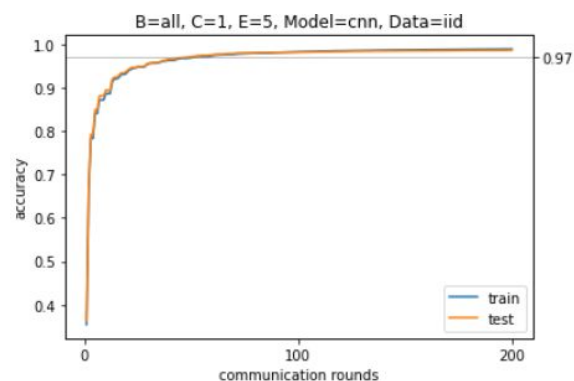
CNN, IID, E=5, B=∞, C=0



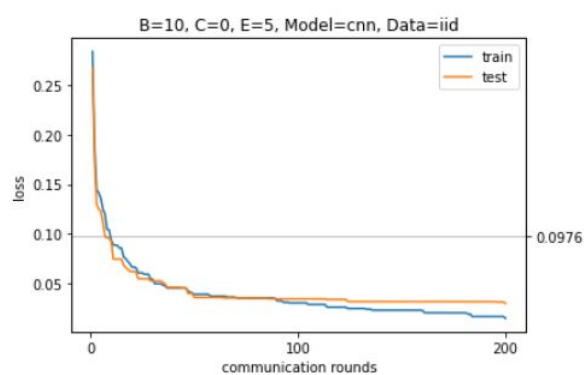
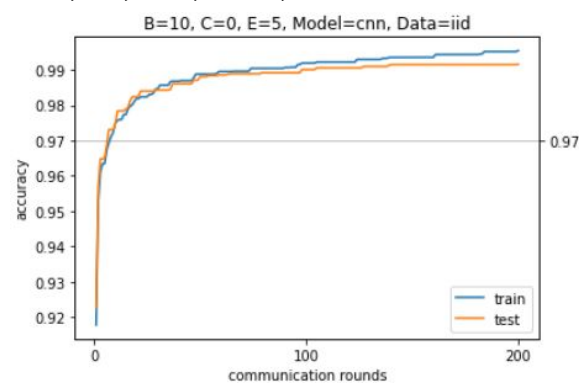
CNN, IID, E=5, B=∞, C=0.1



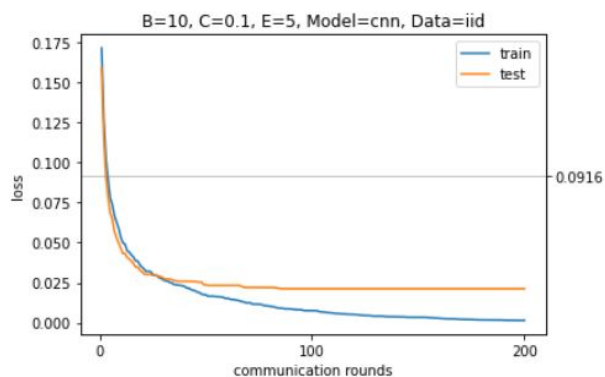
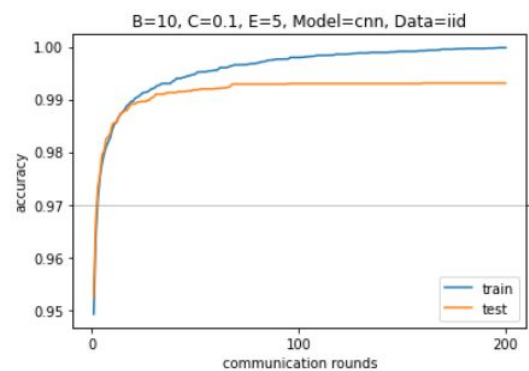
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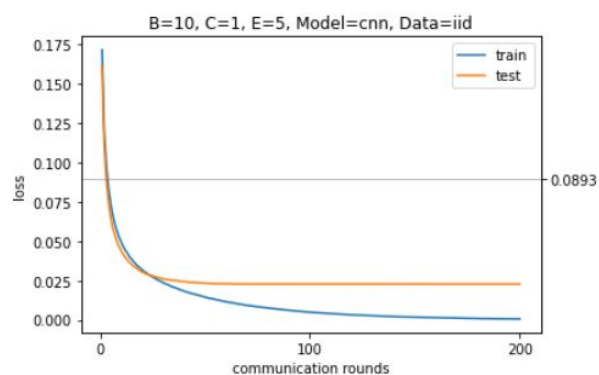
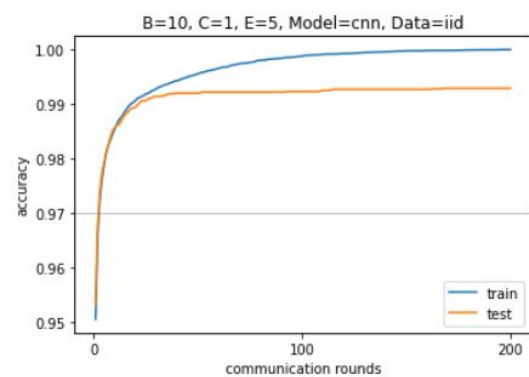
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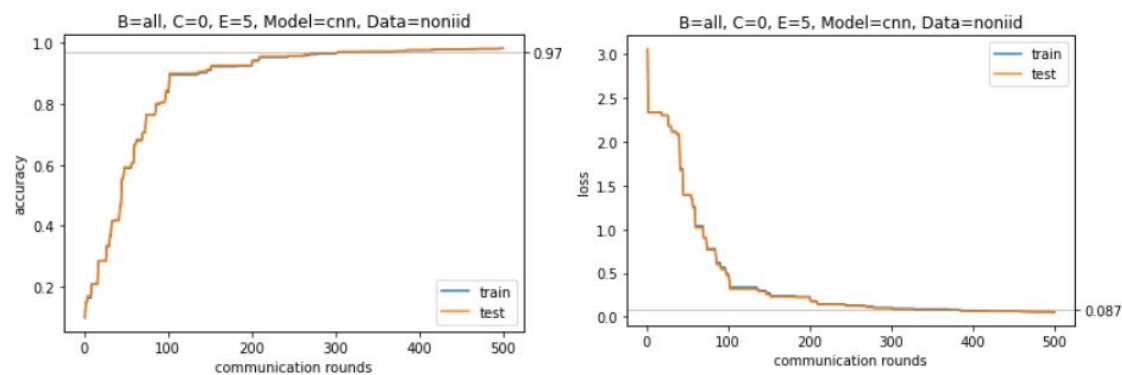
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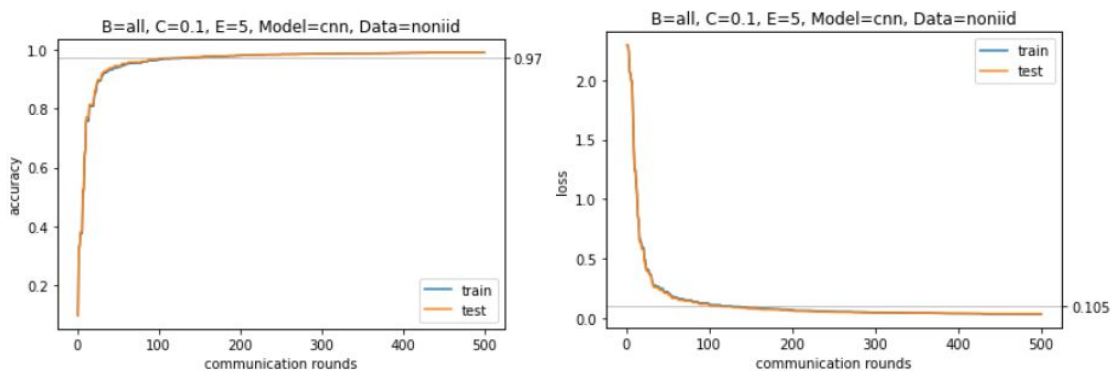
CNN, IID, E=5, B=10, C=1



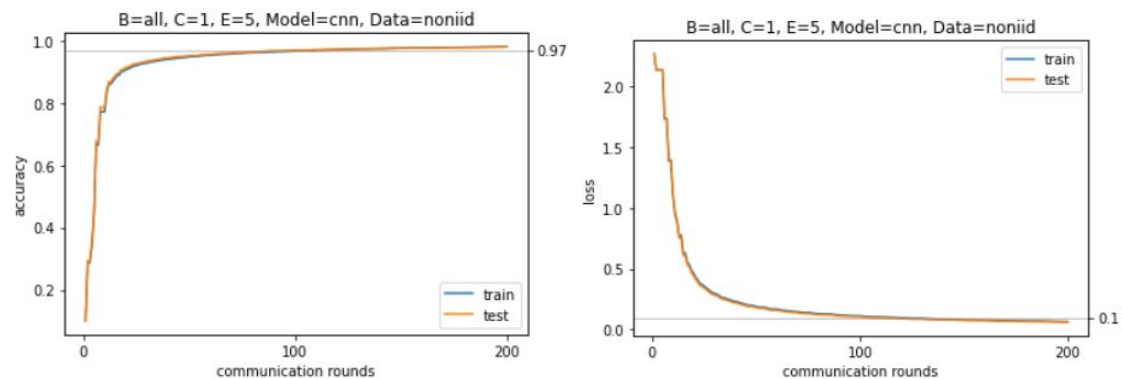
CNN, Non-IID, E=5, B= ∞ , C=0



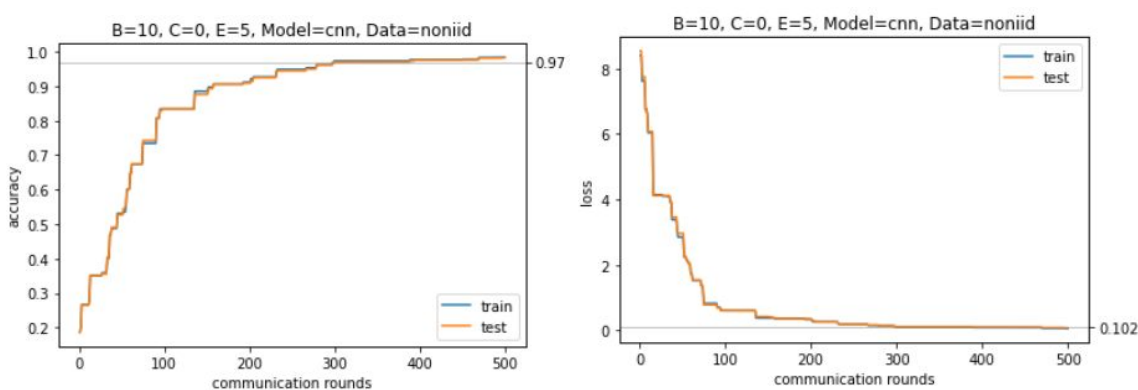
CNN, Non-IID, E=5, B= ∞ , C=0.1



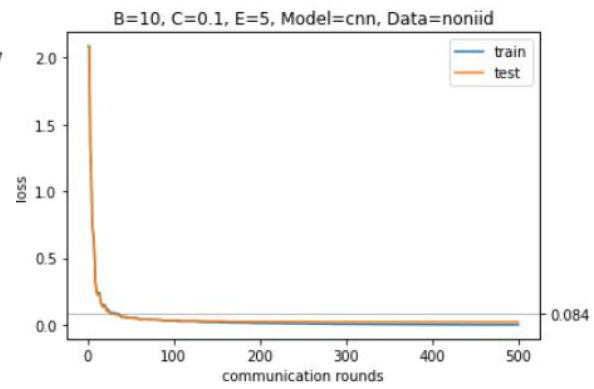
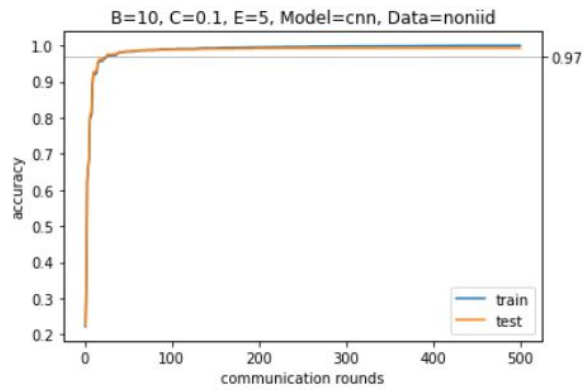
CNN, Non-IID, E=5, B= ∞ , C=1



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