CS-E4740 - Federated Learning D, Lectures, 28.2.2024-29.5.2024

Started on	Thursday, 4 April 2024, 6:02 PM
State	Finished
Completed on	Thursday, 4 April 2024, 8:00 PM
Time taken	1 hour 57 mins
Grade	**11.00** out of 11.00 (**100**%)

Question 1

Flag question Mark 2.00 out of 2.00 Correct

How does the amount of computation required by one iteration ("per-iteration complexity") of Algorithm 5.2 (FedGD for Local Linear Models) from the lecture notes (found here) depend on the empirical graph?

- a. The per-iteration complexity does not depend at all on (the edges in) the empirical graph.
- b. The per-iteration complexity increases if we remove edges from the empirical graph.
- c. The per-iteration complexity increases with the increased node degrees. ✔

Your answer is correct.

See Section 7.2 of the lecture notes (found here).

The correct answer is: The per-iteration complexity increases with the increased node degrees.

Question 2

Flag question Mark 3.00 out of 3.00 Correct

Assume you have to place a fixed number of edges between nodes of an empirical graph. Regarding the statistical properties of GTVMin-based methods, where would you place those edges?

- a. It does not matter where (between which nodes) these edges are placed.
- b. We should place edges between two nodes if they carry local datasets with similar statistical properties. ✔
- c. We should place an edge between two nodes who carry local datasets with significantly different statistical properties.

Your answer is correct.

See Section 7.4 in the Lecture Notes (found here).

The correct answer is:
We should place edges between two nodes if they carry local datasets with similar statistical properties.

Question 3

Flag question Mark 3.00 out of 3.00 Correct

*This question refers to **the student tasks #1-3** in the "Graph Learning" assignment.*

For which *node_degree* values (*node_degree* parameter in the *add_edges* function) the graphs ($\mathcal{G}^{(I)}$, $\mathcal{G}^{(II)}$, and $\mathcal{G}^{(III)}$) are connected?

P.S. The empirical graph notation corresponds to the Section 7.5 in the Lecture Notes.

- a. The connectivity of $\mathcal{G}^{(II)}$ depends on the random seed. ✔
- b. The connectivity of $\mathcal{G}^{(II)}$ does not depend on the random seed.
- c. $\mathcal{G}^{(III)}$ is connected for **some** *node_degree* < 2.
- d. $\mathcal{G}^{(I)}$ is connected for **all** *node_degree* ≥ 8. ✖
- e. $\mathcal{G}^{(I)}$ is connected for for **some** *node_degree* values < 8. ✖
- f. $\mathcal{G}^{(III)}$ is connected for **all** *node_degree* ≥ 2.

Your answer is correct.

Unfortunately, the correctness of $\mathcal{G}^{(I)}$ and $\mathcal{G}^{(III)}$ connectivity cannot be checked due to the different environments. Meanwhile, $\mathcal{G}^{(II)}$ connectivity depends on the random seed - for different seeds the minimum node degree required for a graph to be connected is different (from 30 to 70).

Please, join Slack channel (link) if you have any questions regarding the coding assignment.

The correct answer is:
The connectivity of $\mathcal{G}^{(II)}$ depends on the random seed.

Question 4

Flag question Mark 3.00 out of 3.00 Correct

*This question refers to **the student tasks #1-3** in the "Graph Learning" assignment.*

What interval contains training and validation errors of $\mathcal{G}^{(I)}$, $\mathcal{G}^{(II)}$, and $\mathcal{G}^{(III)}$ graphs ($2 * 3 = 6$ errors in total).

P.S. The empirical graph notation corresponds to the Section 7.5 in the Lecture Notes.

- a. [51, 55]
- b. [27, 31]
- c. [15, 19]
- d. [23, 27]
- e. [19, 23] ✔
- f. [43, 47]
- g. [55, 59]
- h. [35, 39]
- i. [39, 43]
- j. [59, 63]
- k. [31, 35]
- l. [47, 51]

Your answer is correct.

Please, join Slack channel (link) if you have any questions regarding the coding assignment.

The correct answer is:
[19, 23]

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