Bachelor thesis evaluation
"Federated Learning for Robotic Navigation"

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Review

In this thesis, Federated learning based robotic navigation method is introduced. Based on an existing research paper, this thesis investigated the performance of federated learning-based method more than the existing paper and proposed total four more method to improve the performance of federated learning based robotic navigation method.

In this thesis the required background including deep learning, reinforcement learning and deep reinforcement learning, and federated learning is well introduced. Especially the broad explanation of the concept of federated learning and machine learning for robotic navigation gives more context about the research. The introduction of the original work and the proposed new methods are well explained. The proposed method to improve the federated learning based robotic navigation is novel and they are appropriately explained in the methodology section. The replication process of the original work and the discrepancy between the replication and the works from the original paper is well stated and the reason is also proposed. The results of the experiments with the baseline methods and the proposed methods are clearly illustrated, followed by detailed explanation. The ad-hoc search for the hyperparameters of the original paper improved the credibility of the baselines so that the proposed methods are compared with the best versions of the baselines.

Therefore, I propose to grade the thesis as

A - excellent.

Questions

In have the following questions:

1. What is D_t in the transition sample in line 6 of Algorithm 1?
2. The result with the proposed method shows that GSDDPG outperformed other three proposed methods. GSDDPG, which ensures the stability of the averaged model by adding the proportion of the previous averaged parameters, outperformed the second best method RWDDPG, which allows the parameters more appropriately averaged applying the contribution of

each model. What is the expected result of the combined method of GSDDPG and RWDDPG?

3. For figure 12, 14, 16, it is not clear that the training results from the 8 runs are drawn. Is each line in the figures for training result the averaged results of total 8 runs results or the training result shown in the figure is selectively illustrated?

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