

Survey on Bugs/Issues in Deep Reinforcement Learning Projects

In this survey, we explore opinions of researcher/practitioners about bugs/issues that we have found and categorize in Deep Reinforcement Learning projects

*** Required**

General Information

1. Your email address (optional)

2. What is your current job title? *

For students, please indicate the degree: PhD student, ...

3. What is your work experience with Machine/Deep Learning? *

Mark only one oval.

- ☐ Less than 1 year
- ☐ 1-3 years
- ☐ 3-5 years
- ☐ More than 5 years

4. What is your work experience with Deep Reinforcement Learning? *

Mark only one oval.

- ☐ Less than 1 year
- ☐ 1-3 years
- ☐ 3-5 years
- ☐ More than 5 years

5. Which programming languages and frameworks have you been using? *

For Example, Java/Python/Tensorflow/Keras/Pytorch/Gym/etc.

Categories of bugs/issues in Deep Reinforcement Learning:

6. 1- Wrong initialization: Problems related to initializing the environment in a wrong way (including parameters, initial state, actions). *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

7. 2- Missing stepping the environment: Failure to timely move the environment to a new state and get the associated reward leading to problems in learning. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

8. 3- Missing terminal state: Problems related to missing or wrongly detected terminal state of the environment. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

9. 4- Missing reset/close environment: Problems related to missing or bad termination (and restarting) of each round of agent interaction with its environment. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

10. 5- Missing exploration: Failure to explore the environment in the case that it is necessary according to the algorithm. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

11. 6- Suboptimal exploration rate: Problems related to suboptimal exploration rate (epsilon) or its decay rate that lead to poor convergence of the algorithm. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

12. 7- Wrong update equation: Issues related to incorrect update formula for value or policy function. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

13. 8- Suboptimal network update frequency: Problems related to suboptimal update frequency of networks' parameters (including the target network) leading to unstable learning and increasing loss value. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

14. 9- Wrong network update: Failure to correctly update the networks or its parameters, including updating wrong network, wrong update statement, and bad update of replay buffer. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

15. 10- Wrong calculation of gradients: Problems related to wrong calculation of gradients for learning, including computation of one network's gradients with respect to another network's (actor-critic). *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

16. 11- Wrong output: Failure to define a correct output layer for the network with respect to the environment and algorithm leading to issues in determination of actions and poor learning. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

17. 12- Wrong activation function for output: Failure to define a correct activation function for the output layer leading to incorrect action determination. *

Mark only one oval.

- ☐ No
- ☐ Yes, it is a minor problem and easy to fix.
- ☐ Yes, it is a minor problem but hard to fix.
- ☐ Yes, it is a major problem but easy to fix.
- ☐ Yes, it is a major problem and hard to fix.

Further comments and participation

18. Have you observed any problems related to deep reinforcement learning that have not been considered in this survey? If yes, please describe them: *

We do not mention bugs/issues related to deep model/network intentionally, our focus is on problems solely related to the reinforcement learning.

19. Are you available for an interview to discuss this topic in detail? *

Mark only one oval.

☐ Yes

☐ No

20. Do you have any comment that helps us?

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