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Survey of Common Challenges in Development of Deep Reinforcement Learning (DRL) Applications

Your email address (optional)

What is your current job title?
Developer, Researcher, ... (For students, please indicate the degree: PhD student, Master)

What is your overal work/research experience with Deep Reinforcement Learning (DRL)?

Which programming languages have you been using to develope DRL applications?
C/C++, Java, Python, ...

Which frameworks have you been using to develope DRL applications?
Tensorflow, keras, PyTorch, Keras-rl, Python-rl, ...

We are concluded with 5 high-level common challenges in DRL development including 1) DRL basic knowledge, 2) DRL library/framework usage, 3) parallel processing & multi-threading, 4) DL knowledge, and 5) general programming issues.

Have you ever encountered challenges related to DRL basic knowledge?

			How severe was the challenge/issue		
	Yes	No	Minor	Major	Critical
Comprehension Challenges in basic knowledge of DRL, such as the needed components in the DRL application.	○	○	○	○	○
Reward Challenges in engineering/configuring reward functions	○	○	○	○	○

	Yes	No	How severe was the challenge/issue: Minor	Major	Critical
Action Challenges in defining action of DRL algorithm	○	○	○	○	○
Environment Challenges in customizing environments.	○	○	○	○	○
Hyperparameters Challenges in identifying/tuning hyperparameters in DRL application like exploration issues, learning rate, Epsilon decay, etc.	○	○	○	○	○
Design problem Challenges in designing a DRL algorithm for a new problem	○	○	○	○	○
Policy Challenges in defining and configuring Policy of DRL algorithm.	○	○	○	○	○
State/Observation Challenges in handling states and/or observations	○	○	○	○	○

Have you ever encountered challenges related to DRL library/framework usage?

	Yes	No	How severe was the challenge/issue: Minor	Major	Critical
Installation Challenges regarding installing/uninstalling relevant libraries/frameworks and issues which can be raised during installation.	○	○	○	○	○
Depenedency challenges regarding mismatched versions of installed libraries. For example, when the version of installed openai-gym is not compatible with Python.	○	○	○	○	○
API usage Challenges about the usage of arguments, attributes, methods, etc. of the DRL framework's API.	○	○	○	○	○
Documentation When people want to use a feature of an DRL library/framework, but there is no documentation about it.	○	○	○	○	○
Bugs inside framworks Challenges which are related to the identified bugs inside DRL framework.	○	○	○	○	○
Best fitted library for a special task When the developer is unsure about the best DRL library/framework for a special DRL algorithm/task .	○	○	○	○	○

Have you ever encountered challenges related to parallel processing & multi-threading?

	Yes	No	How severe was the challenge/issue: Minor	Major	Critical
GPU usage Challenges regarding utilizing GPU for running DRL applications	○	○	○	○	○
Multi-threading Challenges about running DRL applications as a multi-threading software	○	○	○	○	○
Multi-processing Challenges in running DRL applications in a multi-processing maner.	○	○	○	○	○
Distributed systems Challenges in running DRL applications as a distributed systems.	○	○	○	○	○

Have you ever encountered challenges related to DL knowledge?

	Yes	No	How severe was the challenge/issue: Minor	Major	Critical
Model Challenges regarding DL model including model's layer, activation function, load/save model, etc.	○	○	○	○	○
Data preprocessing Challenges in preparing data to train the DL model with.	○	○	○	○	○
DL framework Challenges about usage of DL frameworks in DRL applications.	○	○	○	○	○

Have you ever encountered any challenges/issues related to DRL that have not been mentioned in this survey? If yes, could you please describe them?

Any other comments: