Adaptive Compression for Online Computer Vision:

An Edge Reinforcement Learning Approach

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Response to the editor and reviewers

We would like to express our sincere gratitude to the editor and the reviewers for advising minor revision and providing valuable comments. Guided by the comments, we have tried our best to address the comments, and the amendments are highlighted in blue in the revised manuscript. In what follows, we include a detailed response to the reviewer and discuss how we have addressed the comments.

We hope that the revision has satisfactorily addressed all of the concerns raised by the review team. We look forward to hearing back from you soon.

With best wishes,

Sincerely,Zhaoliang He, Hongshan Li, Zhi Wang,

Shutao Xia, and Wenwu Zhu.

Response to Reviewer 1

**Comment** *This paper presented a unique method to select the JPEG configuration adaptively to reduce the upload traffic load, it proves the ability of the RL. The higlights of the paper is to use the RL algorithm to adaptively select the compression quality level, but why can the RL algorithm be applied to this, the author's description is not detailed enough. Especially when calculating the yi in section 3.3, in RL settings yi is calculated in this way because the agent need to perform a series of actions to accomplish a task, so the agent maximize the reward received over the episode. But in the setting of the paper, each compression is a complete task，and the correlation and continuity of the adjacent tasks can not be seen. So the aurthor should go into details about how the RL sttings can be applied to this.*

**Response:** Thanks for your comment. We agree our description is not detailed enough and have added more detailed explanations. In our study, we borrow the reinforcement learning (RL) idea and design our adaption framework, in which each compression is treated as a complete RL task that only has one step, and the agent performs the action only once to accomplish the task. The agent is able to learn across consecutive tasks, because the input sequence (i.e., consecutive images likely to be captured by the same camera) shares similar contextual characteristics (see Sec. 3.6.1)-- is calculated in this way so that the agent maximizes each task’s reward. The similar design has also been used in previous studies, including RL-based cache strategy [1,2,3]. More details of the revision are provided in Section 3.3.

**Comment** *what is s(t+1) in the algorithm 1, the compressed next image to be uploaded or what?*

**Response:** In Algorithm1, is the set of features extracted by the feature extractor from the image . We have clarified this in the revised Algorithm 1.

**Comment** *what is phi in the algorithm 1, the RL network or the parameters of the network, how can phi be stored in the experience if it is the network or the parameters of the network.*

**Response:** In our study, the “RL network” and “parameters of the network” are used exchangeably, and Phi represents the model of the RL network. For the storage of Phi issue, Phi is actually not stored in the experience, and there was a typo by placing Phi in the transition. We have corrected this in the revision: we only store (,,,,) in the experience at each iteration . Sorry about the mistake and we have also carefully proofread this revision.

Response to Reviewer 2

**Comment** *Most of my previous comments are well addressed. I think this paper can be accepted now.*

**Response:** Thanks for your approval.

1. Wang, Fangxin, et al. "Intelligent Video Caching at Network Edge: A Multi-Agent Deep Reinforcement Learning Approach." *IEEE INFOCOM 2020-IEEE Conference on Computer Communications*. IEEE, 2020.
2. Zhong, Chen, M. Cenk Gursoy, and Senem Velipasalar. "A deep reinforcement learning-based framework for content caching." *2018 52nd Annual Conference on Information Sciences and Systems (CISS)*. IEEE, 2018.
3. Sadeghi, Alireza, Gang Wang, and Georgios B. Giannakis. "Deep reinforcement learning for adaptive caching in hierarchical content delivery networks." *IEEE Transactions on Cognitive Communications and Networking* 5.4 (2019): 1024-1033.