Adaptive Compression for Online Computer Vision:

An Edge Reinforcement Learning Approach

(Manuscript ID: TOMM-2020-0161)

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.*

*Is the treatment of the subject complete?: No*

*If not, What important details / ideas/ analyses are missing?:*

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

*2.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:** Thanks for your suggestion. We agree our description is not detailed enough. We have amended algorithm 1 carefully and added more illustrations. Our algorithm is not a traditional reinforcement learning method. We borrow RL ideas and design a unique adaption framework. We regard each compression as a complete RL task that only has one step. The agent only needs to perform the action once to accomplish the task. In section 3.3, is calculated in this way, because the agent maximizes each task’s reward. Besides, the image and the next image both belong to the same contextual group , i.e., there are some correlations between them because they are from the same scenery. Our agent based Deep Q-learning Network is a deep convolution neural network. In the training phase, each compression is one training data. Our agent can perform gradient descent to update its parameter through each mini-batch training data. In the algorithm1, is the next image’s features that the feature extractor extracts it form the next image . We amend phi, and we store (,,,,) in the experience at each iteration , where is the image’s features, is the compression quality, is the reward feedback, is the next image’s features, and is the inference accuracy.

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.