Qeios

Peer Review

Review of: "Remote Inference Over Dynamic Links via Adaptive Rate Deep Task-Oriented Vector Quantization"

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This study presents an approach to enable remote inference on edge devices when communication bandwidth changes due to several factors such as mobility and fluctuations, to name a few. Their approach enables starting the inference even when the first bits are received. The performance of the proposed approach may fall behind state-of-the-art methods. Yet, ensuring an acceptable inference quality before the whole codebook is downloaded is an advantage of the proposed method.

The experiments section definitely needs to be revised as follows:

- In the paper, three ARTOVEQ types are presented, but which type of ARTOVEQ is used in each experiment should be mentioned in the text and clearly shown in the figure labels.

- Parameter tuning and train/test setups need to be mentioned.

- The sizes of the codebooks are not mentioned in the manuscript. Only the progression of the codebooks of CIFAR-100 for d=2 is shown in Figure 5. This does not show the size of the codebook for each experiment type. A comparison of codebook sizes against those of SOTA methods in related experiments is missing.

- In Figure 6, we see that ARTOVEQ performs slightly worse than Single Rate VQ-VAE. In Table 1, Single Rate VQ-VAE is worse than ARTOVEQ at all channel bandwidths. What is more confusing is that the performance of Single Rate VQ-VAE worsens when channel bandwidth increases. Here, two questions arise: 1. At which bandwidth is Single Rate VQ-VAE better than ARTOVEQ (refer to Figure 6)? 2. Why does Single Rate VQ-VAE worsen though channel bandwidth increases (refer to Table 1)?

- How long does it take for Progressive ARTOVEQ to achieve the mentioned accuracy metrics at the channel bandwidths specified for Single Rate VQ-VAE? What is the size of the codebook to achieve this accuracy?

- The manuscript sets forth compression of codebooks by tuning a parameter. This property of the proposal is not demonstrated.

Finally, the reviewer is satisfied with the organization of the paper. There are some minor editing errors which the authors can easily correct with a spell-checker.

Declarations

Potential competing interests: No potential competing interests to declare.