Learned Transcoding for Neural Image Compression

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ABSTRACT

Transcoding plays a fundamental role in enabling interoperability across multimedia systems by converting compressed data from one format to another without full decompression. While traditional transcoding techniques have been extensively studied for classical codecs, the rapid emergence and growing adoption of learned image compression (LIC) paradigms introduce new challenges and opportunities. In this work, we explore, for the first time, the feasibility of transcoding between heterogeneous LIC codecs, as well as from conventional formats like JPEG to modern LIC models.

Specifically, we propose a lightweight adapter module that transforms latent representations from a source encoder into a format compatible with a target decoder (see Fig. 1). This process requires no access to the original image and leaves the pre-trained model weights of both codecs unchanged. To further enhance performance, we also introduce and investigate optional modulation strategies for the decoder (and potentially the encoder) that significantly improve reconstruction quality while preserving computational efficiency.

Experiments across multiple LIC pairs confirm that our approach achieves strong rate–distortion performance and computational efficiency, establishing neural transcoding as a viable and practical solution for next-generation compression interoperability.

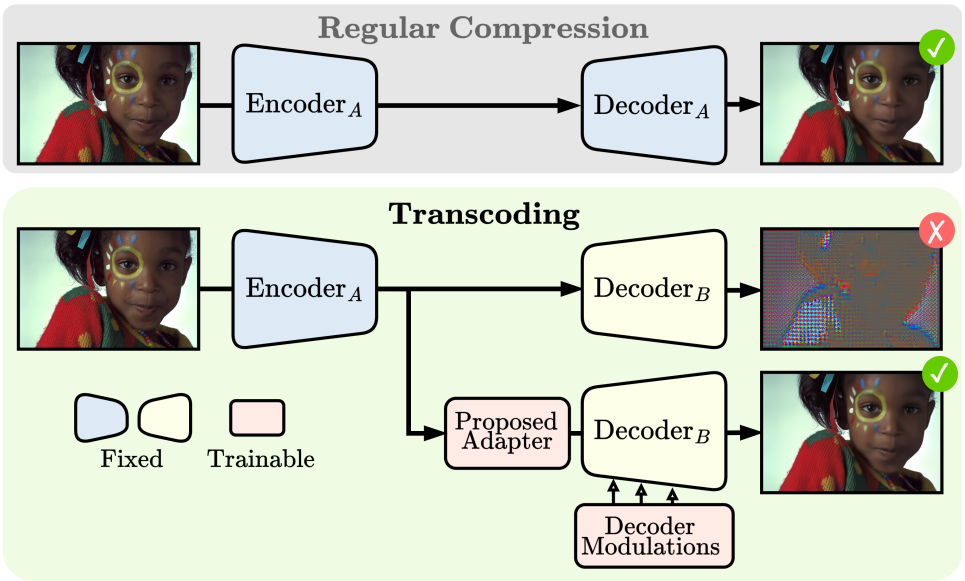

Fig. 1. Overview of the proposed transcoding approach. A latent adapter enables accurate reconstruction when decoding latents from Encoder$_A$ with Decoder$_B$, with decoder modulations included to enhance adaptation.