Harmonized Abstract Color Knowledge: A Novel Approach for Enhancing Image Segmentation ★

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Abstract. The paper proposes a new approach for image segmentation using abstract color modeling derived from the latent space of a Variational Autoencoder (VAE) model. By training the VAE to compress and reconstruct multi-class color features while simultaneously correlating the latent space with the RGB color model, we introduce a robust perceptual color model that aligns machine vision with human perception by achieving a perceptive color nexus. Unlike traditional RGB-based segmentation methods that are limited by the constraints of three-dimensional color space, which does not capture the full range of human perceptual experiences, the proposed approach leverages an enriched abstract color model that classifies RGB pixels using a diverse set of objective and subjective color criteria into higher dimensional representation. This approach allows for a more comprehensive understanding of color attributes and their relationships, leading to more precise and meaningful segmentations.

★ award-winning abstract