

## An Evaluation Study of Transformer-Based Dehazing Models on Real World Datasets

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The presence of haze significantly reduces the visibility of outdoor scenes, which not only degrades the performance of many computer vision tasks but also compromises safety and reliable decision-making in practical systems. In recent years, transformer-based models have demonstrated remarkable performance in single-image dehazing by effectively capturing long-range dependencies and global context. However, their effectiveness under real-world haze conditions remains largely unexplored, as most models are trained and evaluated on synthetic or artificially generated datasets. To address this limitation, we evaluate two state-of-the-art transformer-based dehazing models, DehazeFormer and UMWTFFormer, on both real-world datasets (LM-Haze, RW-Haze and RTTS) and synthetic datasets (Dense-Haze, RESIDE-OUT, O-HAZE and NH-HAZE), and analyse their performance using NIQE and BRISQUE scores. Experimental results reveal a substantial performance drop, with average dehazing effectiveness reduced by 40% on real-image datasets compared to synthetic ones. This performance gap highlights a critical limitation in current dehazing models, suggesting overfitting to synthetic data distributions and limited generalisation to real-world complexities. These findings underscore the need for new models or training strategies explicitly designed to cope with the variability and challenges inherent in real-world hazy images.

**Keywords:** Computer vision, Transformer-based architecture, Single-image dehazing