Multi-Weather Visibility Restoration using MPRNet - Multi-Stage Progressive Image Restoration

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Abstract: *This paper introduces a novel approach, termed Multi-Stage Progressive Image Restoration (MSPIR), aimed at addressing the challenging task of restoring images degraded by various adverse weather conditions. Leveraging a combination of advanced algorithms including HI-Net, DCP, and MSCIA, MSPIR offers a comprehensive solution for mitigating the effects of fog, haze, rain streaks, and other atmospheric distortions on image visibility. The methodology follows a multi-stage iterative process, progressively refining image quality and enhancing visibility through successive stages of processing. By integrating deep learning techniques and adaptive context aggregation mechanisms, MSPIR achieves superior results in restoring image clarity and preserving fine details across diverse weather conditions. Experimental evaluations demonstrate the efficacy and robustness of the proposed framework, highlighting its potential for real-world applications in autonomous navigation, surveillance, and remote sensing. Looking ahead, future research directions include optimizing MSPIR for real-time applications, exploring novel deep learning architectures, and integrating additional sensory modalities to further enhance visibility restoration capabilities. Overall, MSPIR represents a significant advancement in multi-weather visibility restoration, offering promising prospects for clearer and safer image processing in various domains.*

Keywords: Atmospheric distortions, Adverse weather, HI-Net, Multi-Stage Progressive Image Restoration