Fog removal in single images using deep learning

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Abstract: With the rapid development of artificial intelligence, computer vision systems based on image recognition, object detection, target tracking are widely used in aviation, military industry, agriculture and other fields. However, due to bad weather conditions, such as fog and haze , the quality of the images collected by this type of system is impaired, which directly causes its performance to decline, causing serious losses to related fields. Therefore, the research on removing rain and fog on images has attracted the attention of many scholars. In recent years, deep learning has shined in the field of computer vision. Hence, many scholars have combined deep learning methods to remove fog on degraded images and have achieved certain results. In order to gain a deeper understanding of the research progress of the single image fog removal algorithm based on deep learning, In this research study we find the different type of deep learning architectures and analysed how they worked on different density of fog. Dataset have been collected with different type of fog density of FRIDA and FRIDA2 are benchmark datasets of numerical images easily usable to evaluate in a systematic way the performance of visibility and contrast restoration algorithms. FRIDA, FRIDA2 comprises synthetic images of urban road scenes. Those contain the foggy images as well as crosponding fog free image. These scenes can be used to test visibility and contrast restoration algorithms. The images without fog are generated using SIVIC Software. SIVIC is a software platform designed for processing and visualizing magnetic resonance spectroscopy (MRS). We have done in U_net++ Architecture with GAN (Generative adversarial Network). We got an average PSNR value 17.91 and average SSIM 0.771. This outcome serves as compelling evidence of the superior performance of deep learning techniques.

Keywords: Atmospheric Scattering Model, Convolutional Neural Network, Deep learning, GAN, Image defog,U_net++.

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