**Link:** <https://ieeexplore.ieee.org/abstract/document/9244631>

**Data set link:** [Title (vistalab.ac.cn)](http://www.vistalab.ac.cn/MRFID-for-defogging/)

**Model Used:** Atmospheric degradation model.

**Method Used:** Learning-Based Methods and Fusion-Based Methods

**Summary:**

*Prior-based methods:*

I(x) = J (x)T(x) + A[1 − T (x)]

The prior based algorithm uses a mathematical model to describe the relationship between the foggy image and the fog free image. We take an estimate of the atmospheric light which is denoted by an a in the given mathematical model which represents the maximum intensity of light in the image. The transmission map represented by T(x) is the amount of fog attenuation at each pixel. This value is estimated using the observed fog image I(x) and the atmospheric light A. After the interview process has been executed other techniques can be used to refine the output image which may include contrast enhancement color correction for noise reduction etcetera.

*Fusion-based methods:*

The fusion based algorithm works using multiple images of the same area under various environmental conditions. These images are then fused together to generate a final output image which would have improved visibility and reduce the fog effect.

Multiple images are taken into the application using a camera or multiple cameras with adjustable exposure. The images are taken under foggy conditions ranging in levels off density or distance. Since there's a chance of using multiple cameras, the images must be able to be aligned if needed after which the images are who's using either pixel level fusion or feature level fusion. After this we get the output image which may still have some fog effect upon this, we can apply other fog removal techniques such as color correction or contrast enhancement.

*Learning-Based Methods:*

This method utilizes a machine learning technique to provide the transmission map and atmospheric light in the atmospheric degradation model. It aims to learn the relations between the foggy input image and the fog free output image by estimating the values of T&A.

Originally a large data set is provided to the model with the input images and their desired outputs. After which relevant features are extracted from the input images relating to the foggy effect such as color distortion or decreased or increased sharpness and so on. Normally a conventional neural network or a regression model is used for this purpose at the end of which it will estimate the most effective value of transmission map and atmospheric light. After which we will introduce a brand-new data set to the model so that it will defog the images and give us our desired output.

