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<u>Diploma Thesis</u>
Dehazing Techniques for Image Enhancement.

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Abstract

Image processing is a very important field in machine vision as it can help significantly in various applications. A rapidly growing field of image processing is the haze removal from a foggy image. This process is rather difficult as the available information about the structure of a scene is minimal and each image is different. Therefore finding a universal solution is almost impossible. For the above reasons but also due to the randomness of the dehazing in each image, a different approach is required, which will allow us to achieve the best possible visibility of the scene.

It is known that several efforts have been made to dehaze an image are many, with varying results - some results are good while others are worse. Nevertheless, all of them conclude that they need further improvement in order to achieve the best possible outcome. In the present thesis, an attempt is made to improve an existing algorithm, using innovative methods and algorithms. More specifically, the present method is divided into three phases: (i) the region division and the creation of superpixels using the SLIC algorithm, (ii) the calculation of the local atmospheric light for each produced region and (iii) the application of an iterative optimization algorithm which is adapted to the needs of each image through the use of specific methods.

Furthermore, This thesis extensively analyses the theoretical background of the field of image processing and of the individual methods of dehazing that have been implemented in the past. The thesis continues by considering the theoretical background of the specific dehazing method hereby used and concludes with the presentation of the examined method, including a number of examples for each stage. In the end of the thesis, we propose a couple of future improvements which can produce one more complete version of our method.