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UniFi: Universal Filter Model for Image Enhancement

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Abstract : Image enhancement is becoming more and more popular, especially on mobile devices. Nowadays, it is a common approach to enhance an image using a convolutional neural network (CNN). Such a network should be of significant size; otherwise, a possibility for the artifacts to occur is overgrowing. The existing large CNNs are computationally expensive, which could be crucial for mobile devices. Another important flaw of such models is they are poorly interpretable. There is another approach to image enhancement, namely, the usage of predefined filters in combination with the prediction of their applicability. We present an approach following this paradigm, which outperforms both existing CNN-based and filter-based approaches in the image enhancement task. It is easily adaptable for mobile devices since it has only 47 thousand parameters. It shows the best SSIM 0.919 on RANDOM250 (MIT Adobe FiveK) among small models and is thrice faster than previous models.

Keywords : universal filter, image enhancement, neural networks, computer vision
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