数学与系统科学研究院

计算数学所网络学术报告

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报告题目：

Residual Learning for Effective Demosaicing and Denoising

邀请人： 陈冲 副研究员

报告时间：2021 年 11 月 29 日（周一）

下午 14:30-16:00

报告工具：腾讯会议（ID：689 366 308）

会议链接：

https://meeting.tencent.com/dm/YKl8dXccOS1K

Abstract：

Image demosaicking and denoising are the two key steps for color image production pipeline. The classical processing sequence consists of applying denoising first, and then demosaicking. However, this sequence leads to oversmoothing and unpleasant checkerboard effect. Moreover, it is very difficult to change this order, because once the image is demosaicked, the statistical properties of the noise will be changed dramatically. This is extremely challenging for traditional denoising models that strongly rely on statistical assumptions. In this paper, we attempt to tackle this prickly problem. Indeed, here we invert the traditional CFA processing pipeline by first demosaicking and then denoising. In the first stage, we design a demosaicking algorithm that combines traditional methods and a convolutional neural network (CNN) to reconstruct a full color image ignoring the noise. To improve the performance in image demosaicking, we modify an Inception architecture for fusing the three R, G and B channels information. This stage retains all known information that is the key point to obtain pleasing final results. After demosaicking, we get a noisy full-color image and use another CNN to learn the demosaicking residual noise (including artifacts) of it, which allows to obtain a restored full color image. Our proposed algorithm completely avoids the checkerboard effect and retains more image detail. Experimental results show that our method clearly outperforms state-of-the-art methods both quantitatively as well as in terms of visual quality.

报告人简介：

金其余，内蒙古大学教授、博导。法国南布列塔尼大学应用数学博士，巴黎六大、上海交通大学博士后，巴黎-萨克雷高等师范学校访问学者。长期与国内外多所大学保持合作，包括法国巴黎-萨克雷高等师范学校、巴黎六大、Centre Inria Rennes 等。研究领域包括：图像处理、计算机视觉与最优化。相应成果发表于 SIAM Journal on Imaging Sciences、Cell 子刊 Structure、Journal of scientific computing、Journal of Mathematical Imaging and Vision 等期刊。主持国家自然科学基金、内蒙古自然科学基金等项目多项。

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