

## Frequency domain methods for demosaicking of Bayer sampled color images

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Most digital cameras use a sensor with a color filter array (CFA) to capture the color information of a scene. At each spatial location in the image, only one component is measured. The most common type of CFA is the Bayer array, in which half the sensor elements measure the green component and one quarter of the sensors measure each of the red and blue components respectively. The problem of interpolating the remaining samples in each of the three color planes (demosaicking) has received considerable attention in recent years, especially due to the rapid proliferation of digital cameras. In this seminar, we will show that the spatial multiplexing of red, green and blue components in a Bayer CFA is equivalent to the frequency domain multiplexing of a luma (black and white) component at baseband and two chrominance components at high spatial frequency. This frequency domain representation provides insights that lead to novel algorithms that perform better than other published algorithms. In particular, a least-squares design method and a novel adaptive algorithm that provide state-of-the-art performance are described. Eric Dubois will present the basic theory and algorithms and Brian Leung will present recent results of system optimization.

