## A Real-Time RGB-NIR Imaging System Using a Single Image Sensor

Kazunori Yoshizaki<sup>1</sup> Munenori Fukunishi<sup>1</sup> Yasuhiro Komiya<sup>1</sup> Yusuke Monno<sup>2</sup> Masayuki Tanaka<sup>2</sup> Masatoshi Okutomi<sup>2</sup> Steven Lansel<sup>3</sup>

> <sup>1</sup>Olympus R&D Group <sup>2</sup>Tokyo Institute of Technology <sup>3</sup>Olympus Communication Technology of America

## Abstract

In recent years, many applications using a pair of RGB and near-infrared (NIR) images have been proposed in computer vision and image processing communities. However, the acquisition of the pair of RGB and NIR images is still a challenging task. In this demonstration, we present a practical real-time RGB-NIR imaging system that can capture RGB and NIR images simultaneously using a single image sensor. Figure 1 shows our developed RGB-NIR imaging system. To acquire high-quality RGB and NIR images, we proposed a novel RGB-NIR filter array [1] that features high sampling density of the G band like the Bayer color filter array. Figure 2 shows our demonstration system that displays the captured RGB and NIR images at 30 fps. In the demonstration, we present several applications including indocyanine green (ICG) measurements. Figure 3 shows example images captured by our developed RGB-NIR imaging system. The bottom example shows the ICG measurements that emit fluorescence in NIR wavelengths. Our developed system can effectively capture both the standard RGB image and the NIR image including the emission of fluorescence, which is very useful for medical applications.



Figure 1. Overview of our developed RGB-NIR imaging system.



Figure 2. Overview of our real-time demonstration system.



Figure 3. Examples of the captured RGB-NIR image.

## References

[1] H. Teranaka, Y. Monno, M. Tanaka, and M. Okutomi. Single-sensor RGB and NIR image acquisition: Toward optimal performance by taking account of CFA pattern, demosaicking, and color correction. *Proc. of IS&T Electronic Imaging*, 2016.

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