

A Nonfrontal Imaging Camera

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ABSTRACT

This talk will describe a new approach to visual imaging called nonfrontal imaging. This has led to the design of a new type of camera which has three salient characteristics:

- It can provide panoramic images of upto 360 degree views of a scene.
- Each object is in complete focus regardless of its location.
- The camera also delivers the coordinates of each focusable, visible scene point, in addition to and registered with a sharp image.

The Nonfrontal Imaging Camera eliminates the need for mechanical adjustments required for focusing in the conventional technology. Panning, which is necessary to view different parts of the scene anyway, suffices as the sole mechanical action. This performance is achieved by exploiting a novel combination of optics and imaging geometry. The properties of the camera can be exploited in various ways to achieve novel functionalities. For example, the range estimates can be combined with the focused images to obtain stereo-viewable, focused, panoramic, 3D views of a scene using only one camera as the sensor. The talk will also review other results from our recent research in analysis, processing, synthesis and communication of video sequences.