PURDUE INNOVATES | Office of Technology Commercialization

Method and Apparatus for Determining the Stray-Light Point-Spread Function of an Imaging System

This new method determines the point-spread function of an optical system using analytical models and computer-based apparatus, simplifying the process by eliminating the need for extensive laboratory testing.

When an optical system acquires an image, some portion of the light (stray light) entering the system is misdirected to undesirable locations resulting in degradation of the image. The stray light point-spread function (PSF) of an optical system is used to eliminate stray light, which results in improved contrast, sharpened details, and more vivid color. Currently, the PSF is manually determined by characterizing the optical lens system in a laboratory setting.

Purdue University researchers have developed a new method employing a class of analytical models, a computer apparatus, a computer program, and an optical apparatus to be employed together to determine the PSF. This new method is much simpler compared to current methods used because it does not require extensive tests in a lab setting, while still accounting for relevant physical effects of the device.

Advantages:

-Does not require the design information of the lens system

-Does not assume shift variance of the PSF

-Computer Technology

-Optics

TRL: 7

Intellectual Property:

Technology ID
64764

Category
Robotics & Automation/Perception & Sensing
Artificial Intelligence & Machine Learning/3D Optical Imaging & Industrial Metrology
Computing/Photonic & Optical Computing Technologies

Authors
Jan Allebach
Burak Bitlis
Peter Jansson

Further information
Matt Halladay
MRHalladay@prf.org

Erinn Frank
EEFrank@prf.org

View online

Provisional-Patent, 2007-01-19, United States

NATL-Patent, 2008-01-18, United States

PCT-Patent, 2008-01-18, WO

Keywords: stray light, point-spread function (PSF), optical systems, image degradation, image contrast improvement, stray light mitigation, optical lens characterization, analytical models, computer apparatus, Purdue University PSF method, Computer Technology, Electrical Engineering, Optics