White Referencing System for 3D Object Imaging

A 3D white reference robot accurately generates quality images of complex 3D objects quickly and affordably, replacing time-consuming 2D methods for high-throughput imaging systems.

Image calibration with white referencing is an important step of scientific imaging. It refers to the process of taking a raw image of an object followed by a white tile to generate a scientific image. The goal of the calibration is to eliminate the impact from uneven lighting. Two-dimensional imaging methods are ideal for flat objects, but when the object has complicated 3D features, these methods reveal serious problems collecting quality data. Light intensity can differ at varying distances from the camera and tilted angles severely change the reflectance, not only in intensity, but also in color on the object surface. There is a need for an accurate imaging system to replace 2D white reference imaging.

Researchers at Purdue University have developed a 3D white referencing imaging system to generate quality images from 3D objects. Researchers developed an automatic system "white reference robot" to collect a comprehensive library of white reference images. When a new image arrives at the imager, it is scanned by a 3D scanner. The system uses the library of white reference images to virtually construct the 3D white reference image, which saves both time and resources, by providing a practical 3D white referencing solution for any high-throughput imaging system.

Advantages:

-Image quality

-Efficiency and speed

-Affordable

Potential Applications:

-Collect information on object features

Technology ID

2017-JIN-67864

Category

Robotics & Automation/Perception & Sensing

Artificial Intelligence & Machine Learning/AI-Integrated Imaging Systems & Industrial Vision and Inspection

Artificial Intelligence & Machine Learning/3D Optical Imaging & Industrial Metrology

Authors

Jian Jin

View online

-Quality check

-Plant imaging

TRL: 3

Intellectual Property:

Provisional-Patent, 2017-07-17, United States | Utility Patent, 2018-07-17, United States | DIV-Patent, 2019-12-06, United States | CON-Patent, 2021-04-26, United States | DIV-Patent, 2022-12-08, United States

Keywords: 3D white referencing imaging, image calibration, scientific imaging, uneven lighting elimination, white reference robot, high-throughput imaging system, 3D scanner, quality check imaging, plant imaging, object features collection, 3D Imaging, Agriculture, Imaging, Mechanical Engineering, Plants