Optics and Photonics Group Lunchtime Seminar

“Evaluation of an inverse rendering solution for the calibration of a projector’s extrinsic parameters in fringe projection using CAD data”

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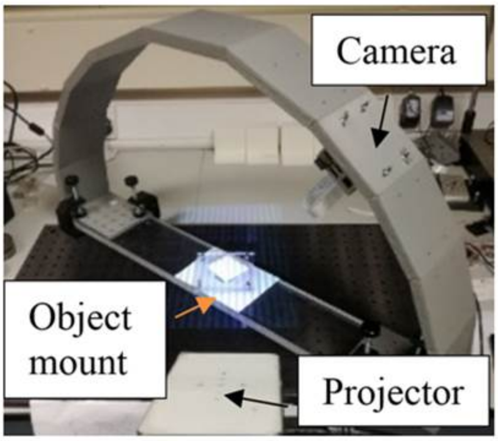

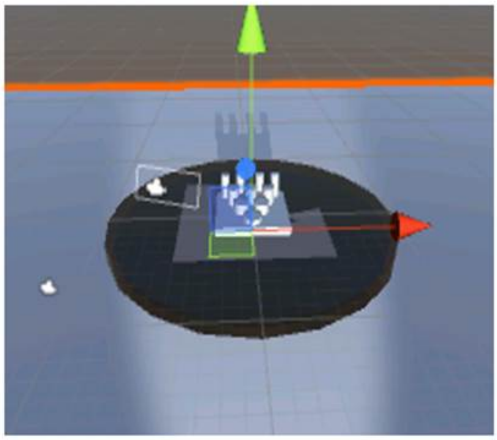

1:00pm Thursday 19th October 2017
203 Tower Building
All Welcome

http://optics.nottingham.ac.uk/wiki/Talks_2017

Abstract

“Evaluation of an inverse rendering solution for the calibration of a projector’s extrinsic parameters in fringe projection using CAD data”

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In order to calibrate a fringe projection setup, knowledge of the relative distance and pose between the camera and the projector are required. Once the setup is calibrated, the relative positions and poses of the camera and projector are assumed invariant during the measurement as they do not move with respect to each other. The calibration step usually requires a calibration plate placed within the measurement area and a set of calibration images is projected onto the plate to determine the correspondence with the camera pixels. This step is time consuming and frequently needs repeating if the calibration is unsuccessful thus wasting measurement time. In this work, we computationally evaluate a new inverse rendering approach to calibrating the projector’s position whereby no calibration plane or targets are required. Instead, the illuminated object is rendered and compared to the image acquired from the camera. The position of the light source is optimised until the rendered and target images are within tolerance. To accelerate convergence and to avoid converging to false local minima, a fast deep learning coarse classification algorithm of the projector’s azimuth and elevation is performed on the image before the optimisation begins. The proposed inverse rendering calibration method allows the extrinsic parameters of the projector to be quickly calibrated without any prior setup and can be performed after the measurement images have been taken, thus saving time during the acquisition of the measurements.