Preventive Conservation in Historic Houses and Palace Museums: Assessment Methodologies and Applications

SilvanaEditoriale

Preventive Conservation in Historic Houses and Palace Museums: Assessment Methodologies and Applications

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Mapping the Big Picture: Time Lapse Documentation with GoPro™ Cameras

A Method for Monitoring Light in Historic Interiors

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Abstract
Purpose-built museums often choose specific lighting technology and rotate objects on display. Historic interiors have rooms where objects remain on view indefinitely. The latter is true for the Colonial Williamsburg Foundation (CWF) and Winterthur Museum, Garden & Library. CWF's historic area includes 18th-century structures and period rooms with collections on display. Winterthur's 175-room historic house showcase the founder's collection of American decorative arts.

These two institutions have partnered together in an on-going pilot study for visual monitoring of light in historic interior displays using GoPro™ action cameras. The primary goal of the study is to provide an overview of natural light on the interior over the course of a year. This presentation focused on data collection and the decision-making process for equipment choices. Preliminary results were shared to demonstrate potential for quantitative assessment paired with qualitative visual data.

Keywords
GoPro™ camera, light monitoring, real-time capture, metadata.

This project is implemented at CWF, a living history museum in Virginia and at Winterthur near Wilmington, DE. The case study interiors are described in table 1. This study will inform exhibition guidelines by accounting for seasonal light changes.

The study is inspired by S. Weintraub's c.2000 GoPro™ experiment seeking a location with the least amount of natural light exposure for a painting in the Frick Collection. A literature review found few studies with affordable real-time capture models vs. predictive modeling methodology.

Camera options including surveillance systems and multiband imaging equipment were investigated, but ultimately action cameras were preferable for their built-in wide-angle lenses (fig.1). GoPro™ was chosen specifically for brand reliability. GoPro™ designs offered the smallest footprint for discreet placement within interior displays. These cameras do not require an external WiFi network, but do need a power supply. Most models are compatible with third-party equipment,

	CASE STUDIES / CAMERA PLACEMENT	DATA COLLECTION
COLONIAL WILLIAMSBURG FOUNDATION (CWF), VIRGINIA	**GoPro Hero5 Session™** (38 x 38 x 35 mm) Thomas Everard House, 1718 1st Floor Dining Room • Southern exposure • High quality, reproduction wallpaper and furniture • Evaluate efficacy of blind closure	Conservation technicians download camera data weekly • Incorporated into existing collections care routine • One jpeg image/min 24 hrs/day Integrated Light Metering = averaged ISO max = 400 EV comp = 0.0 f/2.8 fixed aperture White Balance = auto • QP102 card mid gray card placed in interiors across from cameras to assist with white balance and normalization
	GoPro Hero Original™ (42 x 60 x 30 mm) Wetherburn's Tavern, c. 1736 The Porch Room (fig. 1) • Southern exposure • Accessioned furniture/collections • No blinds	
WINTERTHUR MUSEUM, DELAWARE	**GoPro Hero4 Black™** **CamDo Blink™** (41 x 59 x 43 mm Overall) Winterthur Museum Billiard Room (fig. 1), 7th floor (2 cameras placed) • Eastern and western exposure • Views at or above tree line permit direct sunlight • Long-term exhibition of varied collection materials • Monitoring seasonal shifts to inform installation of sensitive materials	SD cards collected and replaced weekly • CamDo Blink controls camera operation • One jpeg image captured every 5 minutes (4:00 am-10:00 pm) Night mode shutter speed max = 2 sec Integrated Light Metering = averaged ISO max = 100 EV comp = 0.0 f/2.8 fixed aperture White Balance = native • X-Rite Color checker placed in interior across from cameras to assist with white balance and normalization

Table 1
Description of installation of cameras and preliminary settings for pilot study.

like the CamDo Blink intervalometer, which powers the camera on and off at preset intervals.

Initially, there were technical issues related to interruptions of the power supply, which left gaps in data collection. The GoPro™ Hero5 Session had some problems with overheating and auto shutoff. These issues were resolved by replacing SD cards, completing a firmware hard factory reset and updating software.

Fig. 1
Wide-angle GoPro™ images showing Wetherburn's Porch Room with E. Wroczynski, D. Brooks, and A. Blake-Howland and the Billiard Room with N. Kaplan.

Image metadata is being analysed with the command line program Exiftool. Of interest specifically is the "light value," which the cameras use to determine automatic functions like shutter speed and is comparable to lux averaged over the camera's field of view. As a year of data is collected, protocol is being developed for processing images into a compressed, stacked view to help identify patterns of exposure. Settings and workflow are described in table 1. Final conclusions will be compared to architectural predictive light modelling.[1]

Endnotes

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