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ABSTRACT
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Lydia Sin Yau Chiu is a bachelor of science and a PhD student at the Department of Land Surveying and Geo-Informatics of the The Hong Kong Polytechnic University. She is currently working on infrared thermography and BIM for developing quantitative building health record.

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SELECTION OF THRESHOLDING FOR DEFECT DETECTION AND SIZE ESTIMATION OF BUILDING EXTERIOR WALL USING PASSIVE INFRARED THERMOGRAPHY

Passive Infrared Thermography (IRT) is one of the non-destructive testing methods which is commonly used in building health monitoring. However, since the interpretation of thermal images and image enhancement require extensive knowledge of IRT, building inspection reports with the use of IRT prepared by the inspectors from the industry normally indicate the presence of defects only, without further information such as defect sizes. This paper proposes a straightforward approach by using selected image thresholding methods including global thresholding and adaptive thresholding for defect detection. A west-facing sample wall embedded with 10 low-density polystyrene foam plates (acted as defects) was constructed in outdoor environment. Each foam plates were covered with reddish-brown wall tiles and rendering, and embedded in cover depths ranging from 8 mm to 34 mm. The experiments were conducted in a 24-hr cycle, which thermal images of the sample wall were taken once in every 5 minutes. Image thresholding methods were applied to the collected thermal images to obtain a binary image, which can be used for defect size estimation. This paper evaluates the accuracy of the proposed method by comparing the defects' estimated sizes with actual sizes, and the effects of the wall finishing materials and defect cover depths on defect detection and size estimation. The selection of suitable thresholding method is also discussed.