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Thermal feature extraction of servers in a datacenter using thermal image registration☆

Hang Liu[a,*], Jian Ran[a], Ting Xie[a], Shan Gao[b]

[a] *Faculty of Electronic Information and Electrical Engineering, Dalian University of Technology, Dalian 116023, China*
[b] *Network and Information Center, Dalian University of Technology, Dalian 116023, China*

Abstract

Thermal cameras provide fine-grained thermal information that enhances monitoring and enables automatic thermal management in large datacenters. Recent approaches employing mobile robots or thermal camera networks can already identify the physical locations of hot spots. Other distribution information used to optimize datacenter management can also be obtained automatically using pattern recognition technology. However, most of the features extracted from thermal images, such as shape and gradient, may be affected by changes in the position and direction of the thermal camera. This paper presents a method for extracting the thermal features of a hot spot or a server in a container datacenter. First, thermal and visual images are registered based on textural characteristics extracted from images acquired in datacenters. Then, the thermal distribution of each server is standardized. The features of a hot spot or server extracted from the standard distribution can reduce the impact of camera position and direction. The results of experiments show that image registration is efficient for aligning the corresponding visual and thermal images in the datacenter, and the standardization procedure reduces the impacts of camera position and direction on hot spot or server features.

Keywords: datacenter, thermal image, image registration, thermal feature

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*Corresponding author
Email address: liuhang@dlut.edu.cn (Hang Liu)

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