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SUSAN角点检测和匹配算法在高温变形测量中的应用

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Application of SUSAN Corner Detection and Matching Algorithm in High Temperature Deformation Measurement

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摘要

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摘要

高温变形测量是材料力学性能实验方法研究中的重点和热点之一。为了能够在高温环境下精确地进行变形测量,将最小核值相似区(SUSAN)角点检测和光流跟踪匹配技术应用到位移和应变测量方面,设计了基于SUSAN角点特征的高温变形测量算法。该算法充分发挥了SUSAN角点特征的优点,具有测量精度高、抗干扰能力强等优点。在普通环境下,经过模拟散斑图数据的验证,利用该算法进行变形测量,误差在1%以内,精度高、稳定性好。通过高温力学实验发现,该算法能够适用于高温变形测量。本研究扩展了图像识别等技术在非接触测量技术中的应用。

关键词: 高温 应变测量 机器视觉 图像匹配 特征提取

Abstract:

Deformation measurement at high temperatures is one of the hot and important issues in the study of the methods of mechanical properties experiments. In order to achieve accurate deformation measurements in a high temperature environment, this paper applies smallest univalue segment assimilating nucleus (SUSAN) corner detection and optical flow tracking matching techniques and proposes a method of high temperature deformation measurement based on SUSAN corner features. This method makes full use of the advantages of SUSAN corner features, and maintains the high accuracy, strong anti-interference ability, etc. By testing the simulated speckle images, the paper finds that the error is kept within 1%, and the algorithm has not only high accuracy, but also good stability. High temperature mechanics experiments show that this method can be applied to high temperature deformation measurements. This study extends the application of image recognition technology in the field of non-contact measurement technology.

Keywords: high temperature strain measurement machine vision image matching feature extraction

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