

基于 Hough 变换的挡键丢失故障识别方法

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摘 要: 为了检测货车运行故障动态检测系统(Trouble of Moving Freight Car Detection System, TFDS)中的挡键丢失故障, 提出一种基于 Hough 变换的挡键丢失故障识别方法. 首先采用改进的随机 Hough 变换提取轮轴和端点的特征, 依据轮轴、端点、挡键之间的几何关系建立数学模型标定感兴趣区域(ROI), 然后计算 ROI 的相对梯度直方图特征, 利用角度距离相似性度量实现挡键丢失故障的识别. 实验结果表明, 该方法可以识别不同类型转向架的挡键丢失故障, 同时平均故障识别率达到 94%.

关键词: TFDS; 挡键; Hough 变换; 相对梯度直方图特征; 故障识别

Fault Recognition Method for Bogie Block Key

Losing Based on Hough Transform

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Abstract: In order to detect the losing fault of the bogie block key(BBK) in trouble of moving freight car detection system (TFDS), an fault recognition method for BBK losing was proposed based on Hough transform. Firstly, the improved randomized Hough transform is used to extract the feature of the axle and the endpoint. Based on the geometric relationship between the axle, the endpoint and the BBK, the mathematical model is established to calibrate the region of interest (ROI). Then the relative gradient histogram features of ROI are calculated, and the recognition of the losing fault of the BBK is realized by using the angular distance similarity measure. Experiment results demonstrate that the proposed method can recognize the fault of BBK losing on different types of bogie, and the average fault recognition accuracy reaches 94%.

Key words: TFDS; BBK; Hough transform; relative gradient histogram feature; fault recognition

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