Patent Search

Invention Title	HYBRID DEEP LEARNING SYSTEM FOR PREDICTIVE MAINTENANCE THROUGH THERMAL IMAGING
Publication Number	20/2024
Publication Date	17/05/2024
Publication Type	INA
Application Number	202441036055
Application Filing Date	07/05/2024
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	COMPUTER SCIENCE
Classification (IPC)	G06N0003040000, G06N0003080000, G06K0009620000, G05B0023020000, G01N0025720000

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Abstract:

The Hybrid Deep Learning System for Predictive Maintenance through Thermal Imaging introduces a pioneering approach to predictive maintenance by merging deep learning methodologies with thermal imaging technology. This system amalgamates convolutional neural networks (CNNs) and recurrent neural networks (RNNs) into a hybrid architecture, enabling the analysis of thermal images to forecast potential equipment failures. By harnessing the spatial and temporal intricacies inherent in thermal imaging data, this system enhances predictive maintenance capabilities, facilitating early detection of anomalies and proactive maintenance interventions. This abstract outlines the concept, functionality, and significance of the Hybrid Deep Learning System for Predictive Maintenance through Thermal Imaging. Accompanied Drawing [FIGS. 1-2]

Complete Specification

Description:[001] The field of invention pertains to predictive maintenance technology, specifically focusing on leveraging thermal imaging in conjunction with deep learning methodologies. Predictive maintenance is a critical aspect of various industries, including manufacturing, energy, transportation, and aerospace, where the continuous operation of machinery is essential for productivity and safety. Traditional maintenance approaches often rely on scheduled inspections and reactive responses to equipment failures, leading to downtime, inefficiencies, and increased costs. In contrast, the proposed invention introduces a novel Hybrid Deep Learning System for Predictive Maintenance through Thermal Imaging, which offers a proactive and data-driven approach to equipment maintenance.
[002] The integration of thermal imaging technology with deep learning techniques represents a significant advancement in predictive maintenance capabilities. Thermal imaging provides valuable insights into the thermal behavior of machinery, allowing for the detection of anomalies that may indicate potential failures or performance degradation. However, analyzing thermal data and extracting actionable insights require sophisticated computational methods capable of handling complex spatial and temporal patterns. The Hybrid Deep Learning System addresses this challenge by combining convolutional neural networks (CNNs) for spatial feature extraction with recurrent neural networks (RNNs) for modeling temporal dependencies.
[003] The invention offers several advantages over traditional predictive maintenance approaches. Firstly, by analyzing thermal patterns over time, the system can detect subtle deviations indicative of impending failures, enabling early intervention and prevention of catastrophic breakdowns. Secondly, the non-intrusive nature of thermal imaging allows for continuous monitoring of equipment health without disrupting operations, minimizing downtime and operational disruptions. Additionally, the integration of deep learning techniques enhances predictive accuracy and robustness, leading to more reliable maintenance recommendations and improved asset management strategies.

View Application Status