

Power Cable Monitoring Method Based on UHF-RFID and Deep Learning in Edge Computing Environment

xiongfeng¹, Jian Shang¹, and changlu shen¹

¹Jiayuan Technology Co.,Ltd., Division of Research and Innovation

August 7, 2023

Abstract

In order to solve the problems of the current wireless cable monitoring effect is not ideal and the prediction method is difficult to deal with the nonlinear data of cables, a power cable monitoring method based on UHF-RFID and deep learning in the edge computing environment is proposed. First, based on edge computing, a power cable monitoring system is designed to migrate the analysis of massive data to the edge of the network to improve the monitoring efficiency. Then, the temperature sensing chip and RFID chip were integrated to design a UHF-RFID temperature tag, which was fixed at the cable temperature measurement point to achieve passive wireless monitoring of the cable. Finally, the parameters of the GRNN model are optimized using the beetle antennae search algorithm, and the EEMD decomposed data is input into the BAS-GRNN model for learning to output temperature prediction results and determine whether it is over temperature. The proposed method was demonstrated, and results showed that the maximum error between UHF-RFID temperature tag temperature measurement results and the thermocouple was within 0.3. The average relative error of the proposed method was only 0.01, and the time was 3.59s, which can meet the actual usage requirements.

Hosted file

Power Cable Monitoring Method Based on UHF-RFID and Deep Learning in Edge Computing Environment.docx available at <https://authorea.com/users/650082/articles/658729-power-cable-monitoring-method-based-on-uhf-rfid-and-deep-learning-in-edge-computing-environment>