题　　目：迁移学习在电网数据分析中的应用研究

摘　　要

随着数据挖掘、人工智能（AI）、机器学习及其深度学习的不断发展进步，越来越多的行业也正在不断探索数据挖掘方法在其工作中的作用及效果，电力系统也不断进入信息化时代。而在电力设备的故障诊断、用户行为分析以及能源调配等问题的研究中，传统的分类、聚类、关联规则等数据挖掘算法都已发挥出重要的作用，并且也取得了不错的效果。但是随着实际应用的不断扩展，传统的数据挖掘方法可能会面临诸多问题，通常情况下，如一般的数据挖掘算法都会要求数据源足够充分，而当所使用的现场实际情况不允许，如某一工作场合并没有大量的原始数据用于分析挖掘其中蕴含的关系，一般的数据驱动方法通常会由于欠拟合的问题很难取得理想的效果。作为一种新兴的机器学习方法，近年来，迁移学习在数据的挖掘分析中已经取得了一定的成果，而电网中节点电压的稳定异常重要，急需快速有效地实现节点电压的异常预测任务，使得电网工作者能够提前应对节点电压的变化，提前生成应急恢复方案，以致保证节点电压维持在稳定的水平。

为此，本文拟基于迁移学习 trAdaboost 算法实现节点电压的异常预测工作，通过仿真研究分析，所提方法的预测准确率达 0.80 以上，说明所构建模型的有效性，同时说明迁移学习在节点电压异常预测中的有效性。

关键词：迁移学习；电网数据；trAdaboost; 电压异常

Abstract

With the continuous development and progress of data mining, artificial intelligence (AI), machine learning and deep learning, more and more industries are constantly exploring the role and effects of data mining methods in their work, and power systems are also constantly entering information. Era. In the research of power equipment fault diagnosis, user behavior analysis and energy allocation, traditional data mining algorithms such as classification, clustering, and association rules have played an important role, and have achieved good results. However, with the continuous expansion of practical applications, traditional data mining methods may face many problems. Generally, data mining algorithms, such as general data mining algorithms, require sufficient data sources, and when the actual site conditions used do not allow, such as a certain There is not a large amount of original data in the workplace to analyze and mine the relationships contained in it. The general data-driven method is usually difficult to achieve the desired results due to the problem of under-fitting. As an emerging machine learning method, in recent years, transfer learning has achieved certain results in data mining and analysis, and the stability of the node voltage in the power grid is extremely important. It is urgent to quickly and effectively implement the task of abnormal prediction of the node voltage. It enables grid workers to respond to changes in node voltage in advance and generate emergency recovery plans in advance, so as to ensure that node voltage is maintained at a stable level.

To this end, this paper intends to implement the abnormal prediction of node voltage based on the transfer learning trAdaboost algorithm. Through simulation research and analysis, the prediction accuracy of the proposed method is more than 0.80, indicating the effectiveness of the constructed model, and at the same time indicating that transfer learning is abnormal at the node voltage Effectiveness in prediction.

Keywords: transfer learning; power grid data; trAdaboost; abnormal voltage

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