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关于风电场的风功率时序预测研究

摘要

随着能源危机、环境污染等问题的日益加重,可再生能源的开发已经引起了全世界的广泛关注。由于 风能是一种清洁、绿色的能源,具有成本低、可再生等优点,风力发电技术近年来发展迅速。但是由 于风能具有随机性、波动性等特点,使得风能发电的输出功率具有不稳定性,对电力系统的正常运行 和调度有较大的影响。本文利用深度学习算法来进行风功率的时序预测,以历史风功率数据作为输入, 建立风力发电功率预测模型,实现对未来一定时间的风力发电功率预测。本文利用多种方式对模型进 行调试,最终得出预测误差和预测趋势拟合度均较高的模型。

关键词

时序预测;深度学习;风功率预测;LSTM;FNN

Abstract

With the growing severity of issues such as the energy crisis and environmental pollution, the development of renewable energy has attracted widespread global attention. Wind energy, being a clean, green energy source with advantages such as low cost and renewability, has witnessed rapid growth in wind power generation technology in recent years. However, due to the inherent randomness and variability of wind energy, wind-generated power output remains unstable, significantly affecting the normal operation and scheduling of power systems. In this paper, we utilize deep learning algorithms to perform time-series forecasting of wind power. Using historical wind power data as inputs, we establish a predictive model for wind power generation to forecast wind power outputs over future time horizons. Through multiple approaches for model tuning, we ultimately achieve a model exhibiting high accuracy in prediction error and strong alignment with observed trends.

Keywords

Time Series Forecasting; Deep Learning; Wind Power Prediction; LSTM; FNN

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