

# Application of transfer learning for streamflow prediction by using attention-based Informer algorithm

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## Abstract

Streamflow prediction is a critical task in water resources management and essential for planning and decision-making purposes. However, the streamflow prediction is challenging due to the complexity and non-linear nature of hydrological processes. The transfer learning is a powerful technique that enables a model to transfer knowledge from a source domain to a target domain, improving model performance with limited data in the target domain. In this study, we apply the transfer learning using the Informer model, which is a state-of-the-art deep learning model for streamflow prediction. The model was trained on a large-scale hydrological dataset in the source basin and then fine-tuned using a smaller dataset available in the target basin to predict the streamflow in the target basin. The results demonstrate that transfer learning using the Informer model significantly outperforms the traditional machine learning models and even other deep learning models for streamflow prediction, especially when the target domain has limited data. Moreover, the results indicate the effectiveness of streamflow prediction when knowledge transfer is used to improve the generalizability of hydrologic models in data-sparse regions.

**Keywords:** Deep learning, Informer model, Machine learning, Transfer learning, Water resources management.

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