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Improvement of river flow estimation accuracy using ensemble learning stacking

Daiju Sakaguchi¹, Kei Ishida², Takeyoshi Nagasato¹, Motoki Amagasaki³, and Masato Kiyama³

¹Graduate School of Science and Technology, Kumamoto University, Kumamoto, Japan

²International Research Organization for Advanced Science and Technology, Kumamoto University, Kumamoto, Japan

³Faculty of Advanced Science and Technology, Kumamoto University, Kumamoto, Japan

In recent years, disasters are more frequent and enormous due to global warming. In the field of hydrology, high-precision rainfall-runoff modeling is required. Recently, deep learning has been applied to rainfall-runoff modeling and shows high accuracy. It is also expected that the accuracy will be improved by using ensemble learning for deep learning. This study tried to improve the accuracy of river flow estimation by performing ensemble learning for deep learning. Stacking was used as the ensemble learning method. For deep learning, LSTM, CNN, and MLP was used and compared. XGBoost was used as the learning device used for ensemble learning. The target area was the Tedoru River basin in Ishikawa Prefecture, Japan. In deep learning, the input data were daily average precipitation and temperature. In deep learning and ensemble learning, the target data was the daily average river flow. RMSE was used as the evaluation index. As a result, the accuracy was the highest after ensemble learning when using LSTM. It shows that the selection of the learning device is important for ensemble learning.