Deep Learning-Based Flood Prediction of River Tisza

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Precise prediction of flood level of river Tisza can save lives and valuable resources. The current forecasting methodology, implemented at the water management directorates, is based on physical models and expert judgements. However, historical data on daily water levels along the river are available and provide an opportunity for a data-driven solution.

Our new data-driven solution is based on deep learning models aiming to recognize complex patterns in past observations. We focus on the water level prediction at Szeged and present our results using two state-of-the-art model architectures: encoder-decoder type recurrent neural network (LSTM-LSTM) and Temporal Fusion Transformer (TFT). Since temporal component of the data requires advanced concepts in the architectures, we elaborate and develop the models from aspect of interpretability, which relies on mathematical foundations of time series.

The presented results are from an ongoing collaboration between the Bolyai Institute (University of Szeged) and the regional water management directorate (ATIVIZIG) and a joint work with Luca Rátki and Zsolt Vizi from the Bolyai Institute.