Automatic Detection of Ditches and Natural Streams from Digital Elevation Models Using Deep Learning

This data contains the digital elevation models and polyline shapefiles with the location of channels from the 12 study areas used in this study. It also has the code to generate the datasets used to train the deep learning models to detect channels, ditches, and streams, and calculate the topographic indices. It also contains the code to train the models along with the models with the highest performance in 0.5 m resolution.

Data

The digital elevation models (DEMs) were derived from the aerial laser scanning data from Lantmäteriet. The channels' polylines were manually digitized by several specialists, being an update to Paul et al. (2023).

DEM.zip – digital elevation models with 0.5 m resolution

channels_shapefiles.zip – polylines with the location and type of channels of all study areas

code.zip – the code used in all steps of the training process, from creating the data to training and evaluating the models. All code information can be found at: https://github.com/mbusarello/Automatic-Detection-of-Ditches-and-Natural-Streams-from-Digital-Elevation-Models-Using-Deep-Learning

models.zip – the best performing models trained by this study

- Channels_HPMF.h5 – highest performing model from the dataset Channels0.5, using the High-Pass Median filter as input data
- Ditches_Hillshade90.h5 – highest performing model from the dataset Ditches0.5, using the Hillshade 90° as input data
- Streams_Combination – highest performing model from the dataset Streams0.5, using the combination of all topographic indices as input data
- DitchesStreams_HPMF.h5 – highest performing model from the dataset Ditches&Streams0.5, using the High-Pass Median Filter as input data
- DitchesStreams_SVF_Slope.h5 – highest performing model from the dataset Ditches&Streams0.5 with a combination of two topographic indices, using the Sky-view Factor and Slope as input data

References

Paul, S.S., Hasselquist, E.M., Jarefjäll, A., Ågren, A.M., 2023. Virtual landscape-scale restoration of altered channels helps us understand the extent of impacts to guide future ecosystem management. Ambio 52, 182–194. https://doi.org/10.1007/s13280-022-01770-8