Geophysical Research Abstracts
Vol. 19, EGU2017-7932, 2017
EGU General Assembly 2017

Advances of FishNet towards a fully automatic monitoring system for fish migration

Frederik Kratzert and Helmut Mader

University of Natural Resources and Life Sciences, Vienna, Watermanagement, Hydrology and Hydraulic Engineering, Vienna, Austria (frederik.kratzert@boku.ac.at)

Restoring the continuum of river networks, affected by anthropogenic constructions, is one of the main objectives of the Water Framework Directive. Regarding fish migration, fish passes are a widely used measure. Often the functionality of these fish passes needs to be assessed by monitoring.
Over the last years, we developed a new semi-automatic monitoring system (FishCam) which allows the contact free observation of fish migration in fish passes through videos. The system consists of a detection tunnel, equipped with a camera, a motion sensor and artificial light sources, as well as a software (FishNet), which helps to analyze the video data. In its latest version, the software is capable of detecting and tracking objects in the videos as well as classifying them into "fish" and "no-fish" objects. This allows filtering out the videos containing at least one fish (approx. 5 % of all grabbed videos) and reduces the manual labor to the analysis of these videos. In this state the entire system has already been used in over 20 different fish passes across Austria for a total of over 140 months of monitoring resulting in more than 1.4 million analyzed videos.
As a next step towards a fully automatic monitoring system, a key feature is the automatized classification of the detected fish into their species, which is still an unsolved task in a fully automatic monitoring environment. Recent advances in the field of machine learning, especially image classification with deep convolutional neural networks, sound promising in order to solve this problem.
In this study, different approaches for the fish species classification are tested. Besides an image-only based classification approach using deep convolutional neural networks, various methods that combine the power of convolutional neural networks as image descriptors with additional features, such as the fish length and the time of appearance, are explored. To facilitate the development and testing phase of this approach, a subset of six fish species of Austrian rivers and streams is considered in this study.
All scripts and the data to reproduce the results of this study will be made publicly available on GitHub* at the beginning of the EGU2017 General Assembly.

* https://github.com/kratzert/EGU2017_public/