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ARE RECENT ADVANCES IN AUTOMATED BENTHIC MACROINVERTEBRATE TAXA IDENTIFICATION A VIABLE OPTION TO MANUAL KEYING?

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ABSTRACT

The current funding mismatch between growing demands for ecological status assessment and the assets spend on actual biomonitoring call for more cost effective ways to reach set legislative goals. We explored an alternative to the traditional, expert driven, costly, manual keying of macroinvertebrates. In our approach, we trained powerful classification algorithms with simple visual features extracted from single-posture images of macroinvertebrate specimens. All specimens were of expert validated taxa identity (gold standard). In early trials the used imaging equipment was a regular desktop scanner. We attained very accurate results (95% correct) with small datasets containing eight taxa and good results with realistic (i.e. 35 taxa) datasets that mimic taxa numbers typically encountered in routine macroinvertebrate biomonitoring. We also present results achieved with a further developed, low-cost prototype imaging device that is able to use multiple postures and several images / individual specimen. In current testing we assess whether this device using multiple postures and pictures is able to produce adequate accuracies of automated identification for ecological status assessment at a fraction of the current price of either manual or genetic identification.



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