Developing a Fish Image Classification System for Mouse Creek, Cleveland, TN using Machine Learning

Soni, Rishi (School: Cleveland High School)

The classification of fish through visual inspection can often be a time-consuming and fallible process, and thus, there is a necessity for a fish classification method with greater accuracy and efficiency. This study aimed to develop a fish image classification system for 16 species of fish found in Mouse Creek, Cleveland, TN using machine learning. An initial dataset of 189 high-quality images was expanded using data augmentation and modified with color preprocessing, producing a diverse dataset of 1512 images. Multiple machine learning algorithms were tested using random 80/20 splits of the dataset after Wolfram language built-in feature extraction was performed. Ultimately, this study achieved a machine learning model based on SVM classification that can classify 16 species of fish nearly instantaneously with 99.01% accuracy. This model strongly outperforms alternative image classification tools, making it one of the only effective freshwater fish classification systems for urban stream settings. The system was eventually deployed as a public web app in order to make it universally accessible.

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