

ECO²SCAPE Co-design of ecologically and economically efficient policy instruments and measures for conserving biodiversity and ecosystem services in cultural landscapes

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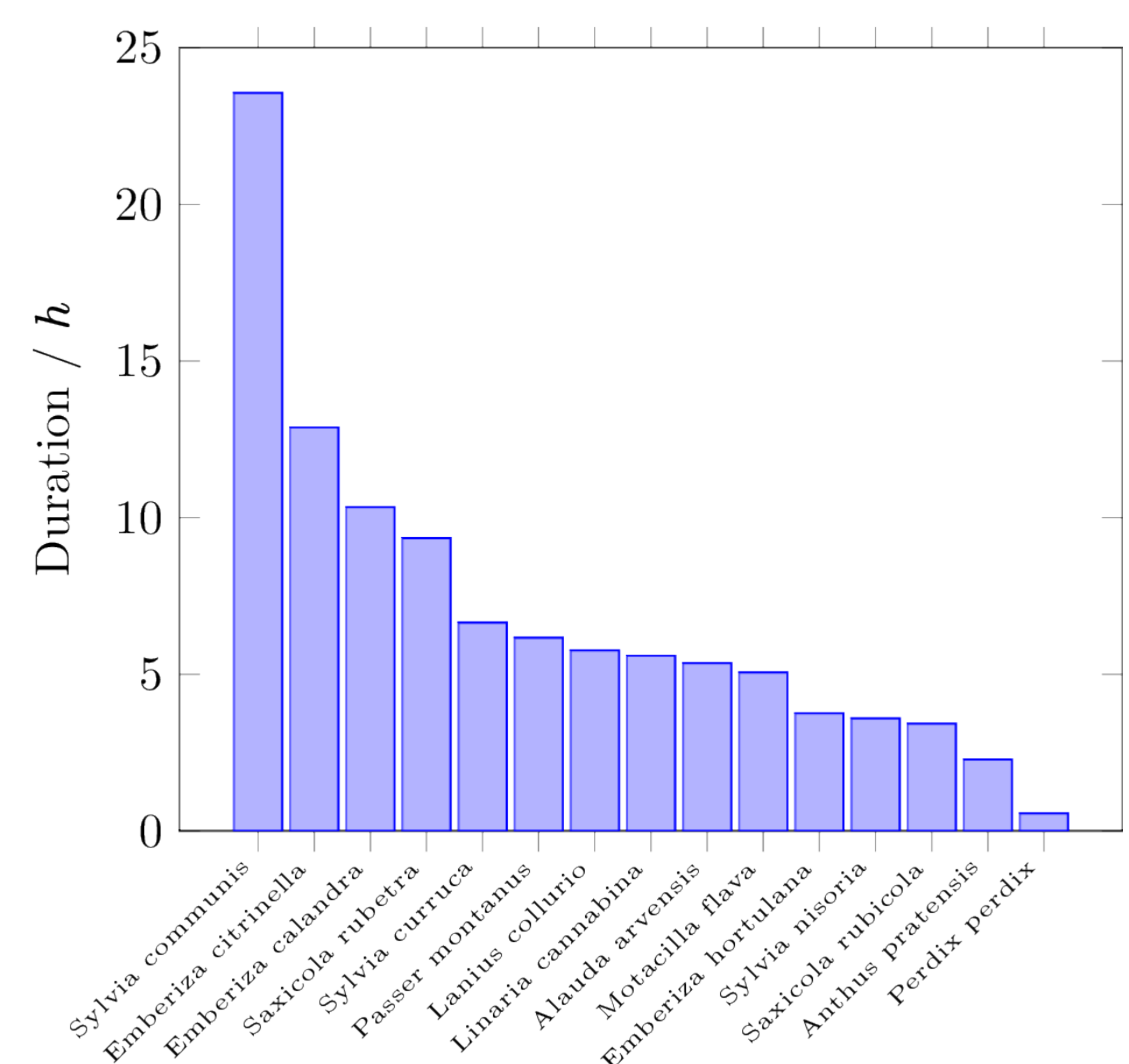
Machine Learning for Biodiversity Monitoring

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To evaluate biodiversity in the model region using audio data, a list of 15 indicator species was compiled. For these species audio data from xeno-canto was used and machine learning models were trained for the task of classification.

Methods of machine learning for classification of bird songs or bird calls use in particular algorithms for pattern recognition in images. The audio signal is converted to a spectrogram, where the time dimension is shown on the x-axis and the frequency dimension is shown on the y-axis

As part of the project, we trained the ResNet-50 architecture for image classification on spectrograms. To increase the accuracy of these models, different kinds of augmentations were systematically studied.



Distribution of training data per species



Song of a Common Skylark as Spectrogram

Name	Precision	Recall	Accuracy
Normal	79.6	69.6	68.2
Tempo Change	79.7	68.6	67.4
Time Shift	80.1	68.8	67.0
Pitch Shift	77.7	71.2	69.3
SpecAugment	81.1	70.0	68.9
WhiteNoise	80.3	71.6	70.2
AllAugments	85.4	71.0	70.0

Precision and Recall of ResNet-50 on 15 indicator species with different kinds of augmentations.