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Nearest-neighbor techniques for automated monitoring of nocturnal flight calls

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Flight-calls are short vocalizations used primarily during nocturnal flight. Their observation provides a means for studying the timing, location, and composition of nocturnal migrations. As part of a three-year study the Cornell Lab of Ornithology is using autonomous recorders to sample flight-calls of nocturnal migrants in the Northeastern US. The resulting tens of thousands of hours of recording, make software-assisted detection and classification essential.

Automatic processing and human evaluation have yielded a considerable collection of flight-calls, 5-1000 examples for ∼100 species. The many-class classification problem, along with the availability of many examples from most of the classes, and established (condensation and editing) and recent (metric-trees) techniques used in prototype-based classification nearest-neighbor techniques, have led us to develop nearest-neighbor based techniques and software to assist in the analysis of this data.

We will present classification results on two examples, a set of thrushes (genera Catharus and Hylocichla, family Turdidae) consisting of six species and wood-warblers (family Parulidae) consisting of 48 species. The thrush flight-calls are visually and aurally distinctive, usually 100-400 ms in duration and occupy and the 2-5 kHz band. Wood-warbler flight-calls are typically between 20-100 ms in duration and occupy the 5-10 kHz, and are difficult for many experienced observers to distinguish.