



Automated Biodiversity Monitoring in Real Time

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Introduction

To understand the impact of large-scale anthropogenic changes like...

global warming or the species extinction crisis

and to create solutions to mitigate these impacts, we need reliable long-term data over large spatial scale.

Fortunately, the technology exists to improve our knowledge of the distribution, abundance, and activity patterns of the fauna.



Goals

The overall goal of the project is to provide a broad user community with the hardware and software tools to process in real-time a continuous stream of biodiversity data from hundreds of biodiversity monitoring stations. To accomplish this we have:

- designed portable and permanent monitoring stations, and we are in the process of adding new sensors.

- designed an interface for developing algorithms for automating species identification



Hardware

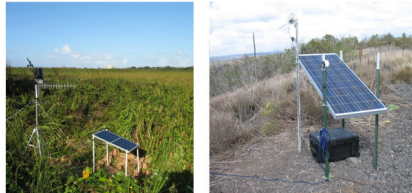
Portable Recorders

A single board Computer or an iPod Touch, with a preamp on a 12v12amp battery.



Permanent Recorders

The recorder unit with a solar panel, a battery, and an antenna collects 1 minute of audio every 10 minutes for 144 recordings/day. The recordings in Hawaii are sent >40 km to the base station at the Hawaii Preparatory Academy.



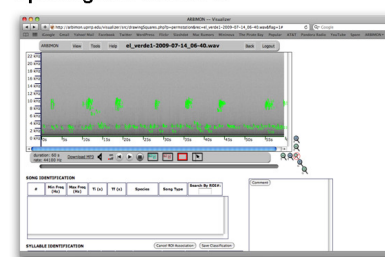
Camera traps

Cameras with infrared flash and motion sensor send images in real-time to the project website



Software

Spectrogram Visualizer



- This is the web application for the analysis and annotations of audio recordings.
- "regions of interest" (area of high energy, green boxes) are generated automatically when a recording arrives to the project server.
- These boxes can be associated to represent different notes of a call.

Species identification component



- In this web application the user can develop a species identification algorithm to automate species identification.
- The steps include developing training data, creating an initial model, applying model to recordings, reviewing results (above), retraining the model and repeating the process.

Sites

Legacy

- Ft. Huachuca, Arizona
- Schofield Barracks, HI
- Pohakuloa Training Area, HI

NSF

- Puerto Rico
- Costa Rica



Future Plans

- Broadband recording systems for bats, fish, and marine mammals, and cameras for coral reef communities.



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