Automated bird and amphibian species identification computer program

09-345

Background:

Our understanding of biological systems is inadequate because our knowledge is based on very limited spatial and temporal coverage. This restricts our ability to understand large-scale ecological processes and to properly manage large areas. To collect and process biological data over large areas, there is a need for new sensors, and new data management and analytical approaches.

Objective:

To meet this challenge, during the third year of funding, the main objectives of this project were to improve the reliability of the biodiversity monitoring stations (hardware) and improve the species identification component of the project website (software).

Figure 1. The Koolau permanent recording station at Schofield Barracks, Oahu, Hawaii.

Summary of Approach:

During the first year of the project we developed the hardware prototype and the dynamic website and data management software. During the second year, we installed biodiversity monitoring stations at three DOD installations: Schofield Barracks-Oahu, Hawaii, Pohakuloa Training Area-Hawaii, Hawaii, and Ft. Huachuca, Arizona (Fig. 1). During the third year we have continued to work on improving the reliability of the hardware and making the website and its different components, particularly the species identification interface, intuitive for the user.

Benefit:

The project will benefit the military mission by reducing the costs of biodiversity monitor and at the same time improve the quantity and quality of the data. In addition, the information produced by the system, could easily be incorporated into public outreach and education activities at each installation.

Accomplishments:

In terms of hardware, our most important accomplishment was replacing the netbook computer with an iPod Touch and a router. Now both the portable and permanent recording systems use the same recording device. In addition, this change in the permanent station reduced energy use by 57%, and the addition of the router allows us to incorporate other wireless sensors (e.g. camera traps and weather stations). In terms of software development, the two major activities that dominated this period were:

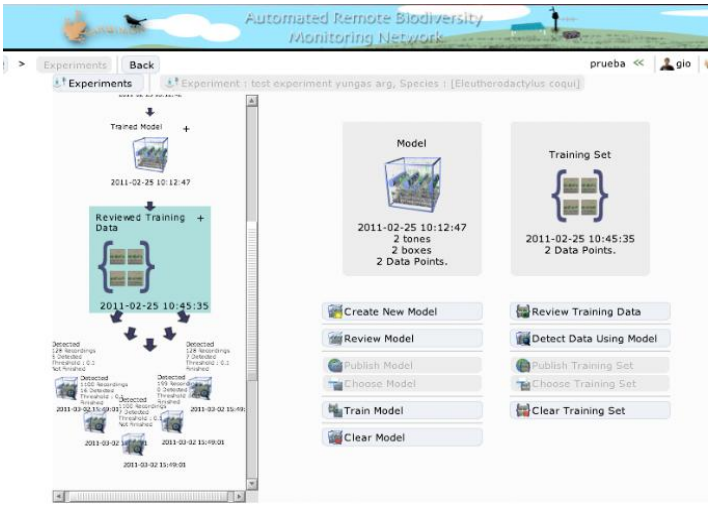

Figure 2. A screenshot of the species identification module showing the experiment history, the model, and training data.

1) redeveloping all existing interactive tools as well as new tools in a new web application programmed with a Flash framework called OpenLaszlo. The major motivation for this change was to reduce the number of conflicts among different web browsers, particularly, Internet Explorer, and 2) having the software programmer work closely with biologists to improve the species identification component (Fig.2). Presently, all software components have been redeveloped in OpenLaszlo and their five biologists in the laboratory that are conducting the final testing of the species identification software.

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