

9a.028.UL_ - Deep Learning Tool for Automatic Detection of Invasive Tegus from Camera Trap Photos

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Project Start: 1 Sep 2020				End Date: 15 Aug 2021				Project Budget: \$50000				Spent: \$0			
<p>Project Summary: Invasive species are an enormous problem for resource managers concerned with protecting biodiversity and ecosystem function and services. The Argentine Black and White Tegu (<i>Salvator merianae</i>) has emerged as one of the top invasive species threats to Florida and beyond. One challenge in the control of tegus, as well as other invasive reptiles, is the monitoring for the spread of the species into new areas. Using deep learning methods such as convolutional neural networks to process wildlife camera photos is directly aligned with the USGS vision for using AI to advance natural resource management. Our objective is to move from the prototype phase to the point where there is a user interface with a workflow accessible to field biologists and managers to batch scan groups of photos to determine which are likely to contain an image of a tegu. This stage in the project will require overcoming challenges in data processing time as well as producing a stable, web-based platform for uploading photos and retrieving model output. We will use additional training data to assess the accuracy of the algorithm and usefulness of the interface.</p>															
<p>Details of Progress/Achievements: We have developed a deep learning CNN based on transfer learning to examine digital photos typical of these wildlife camera traps and identify portions of the photo that are likely to contain a tegu. These likely "sightings" can be assigned some probability of belief based on the model.</p>															
PROJECT DELIVERABLES															
Deliverable				Achievements				Remaining To Do							
1. Develop a user interface accessible via the internet to allow batch uploading of image files for analysis by established model algorithms				Prototype developed				Test and refine user interface. Deploy.							
2. Fine tune the detection method based on additional input data				Improvement to object detection identified				Implement improvement. Collect more data for model enhancement							
3. Prepare a manuscript for journal submission describing the software and technique.				None				To be done after (1) and (2) are finalized							
4. Offer a webinar to the USGS Energy and Wildlife Community of Practice				None				To be done after (1) and (2) are finalized							