









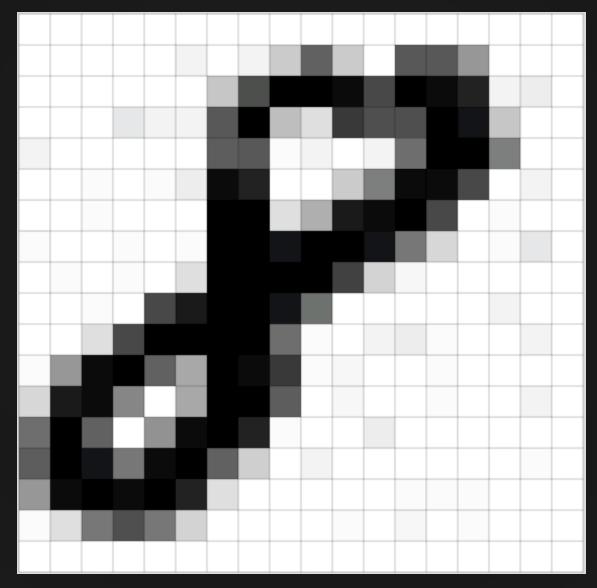
Smithsonian

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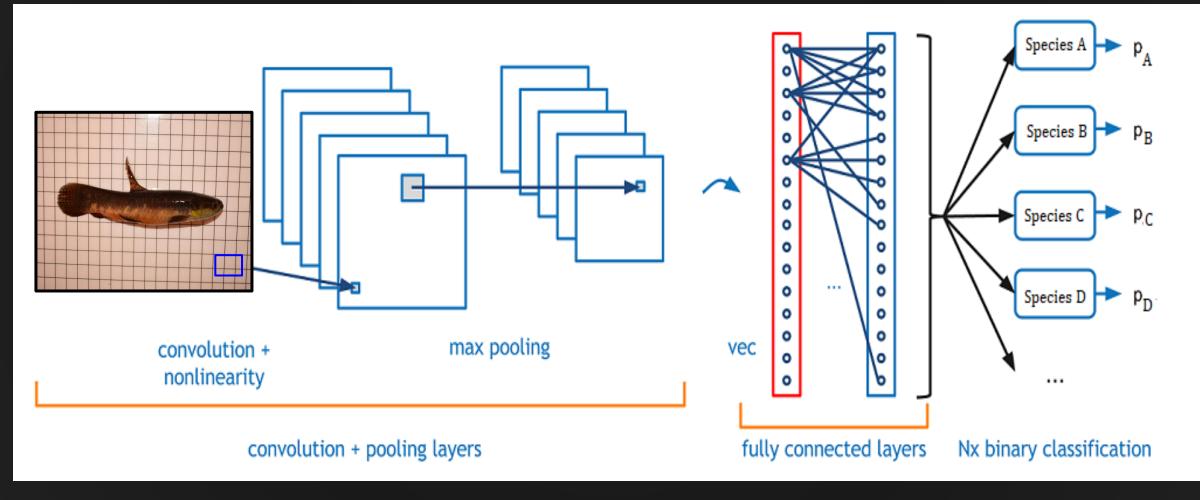
Machine Learning



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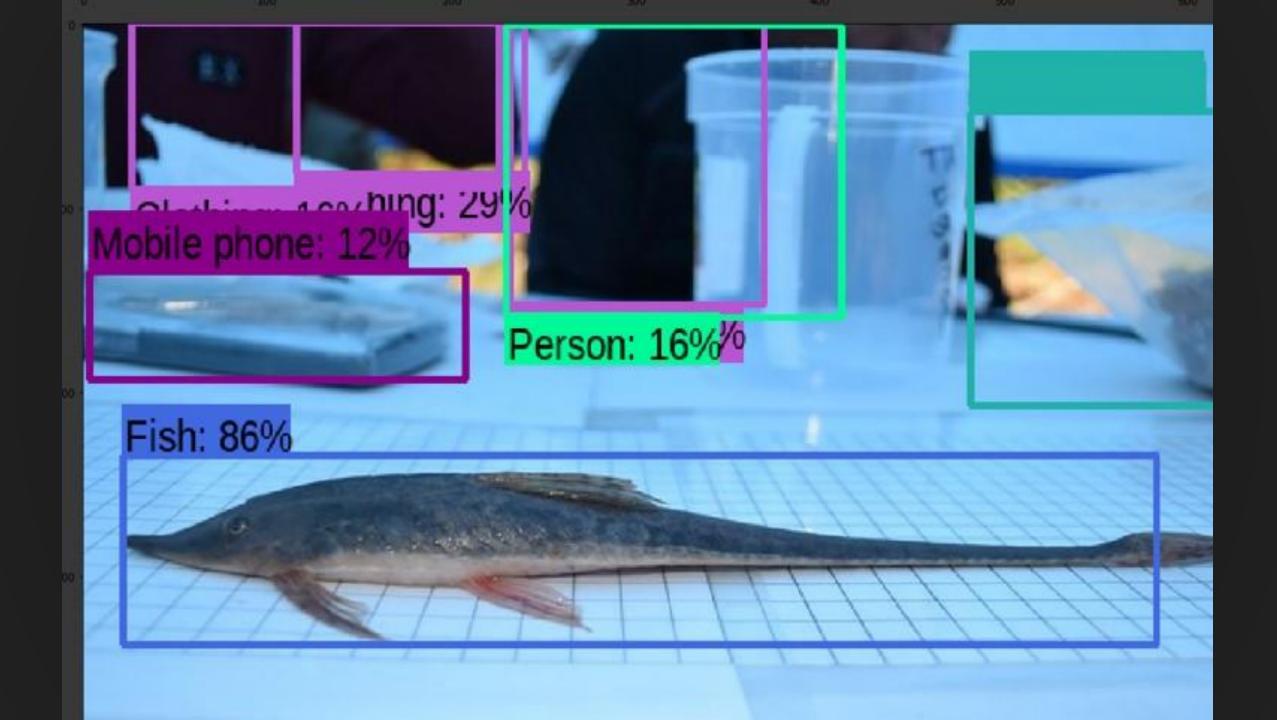
Image Credit Adam Geitgey

Convolutional Neural Networks



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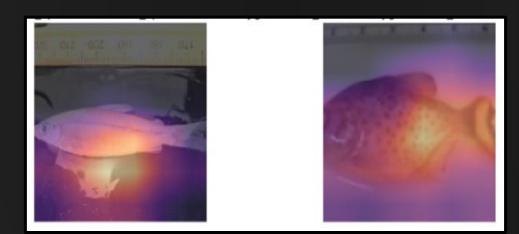
Image Credit Adit Deshpande





Results

- 3,144 images
- 33 genera
- 88-99% accuracy



Ancistrus 1	10	0	0	0	0	0	0	0	0	Cor	fus	ion	ma	trix	0	0	0	٥	0	0	0	0	-0-
Apistogramma -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ō
Astyanax -	0	0	4	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0
Bujurquina -	0	0	0	9	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Characidium -	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Copella -	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corydoras -	0	0	0	0	0	0	6	0	0	1	1	0	1	0	0	0	0	0	0	0	2	0	0
Curimata -	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Doras -	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erythrinus -	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	1	0	0	0	0	0	0
Hemigrammus -	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
Hyphessobrycon -	0	0	0	0	1	0	0	0	0	0	1	15	0	1	0	0	0	0	0	0	0	0	0
≪ Moenkhausia -	0	0	0	0	0	0	1	0	0	0	1	2	11	0	0	2	0	0	0	1	0	0	0
Otocinclus -	0	0	0	0	2	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	1	0	0
Oxyropsis -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Phenacogaster -	0	0	0	0	1	0	1	0	0	0	0	2	0	0	0	4	0	0	0	0	0	0	0
Pimelodella -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	1	2	0	0
Prochilodus -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0
Pygocentrus -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0
Pyrrhulina -	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10	0	0	0
Rineloricaria -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Tatia -	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2	3	0
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	Ancistrus	Apistogramma	Astyanax	Bujurquina	Characidium	Copella	Corydoras	Ourimata	Doras	Erythrinus	Hemigrammus	Hyphessobrycon	A Moenkhausia	Otocinclus	Oxyropsis	Phenacogaster	Rimelodella	Prochilodus	Pygocentrus	Pyrrhulina	Rineloricaria	Tatia	Tyttocharax.

Benefits

- Standardized community monitoring approaches
- Reduces bias in species identification
- Considerations
- Take more photos, please!
- Requires technical capacity to develop model

Questions

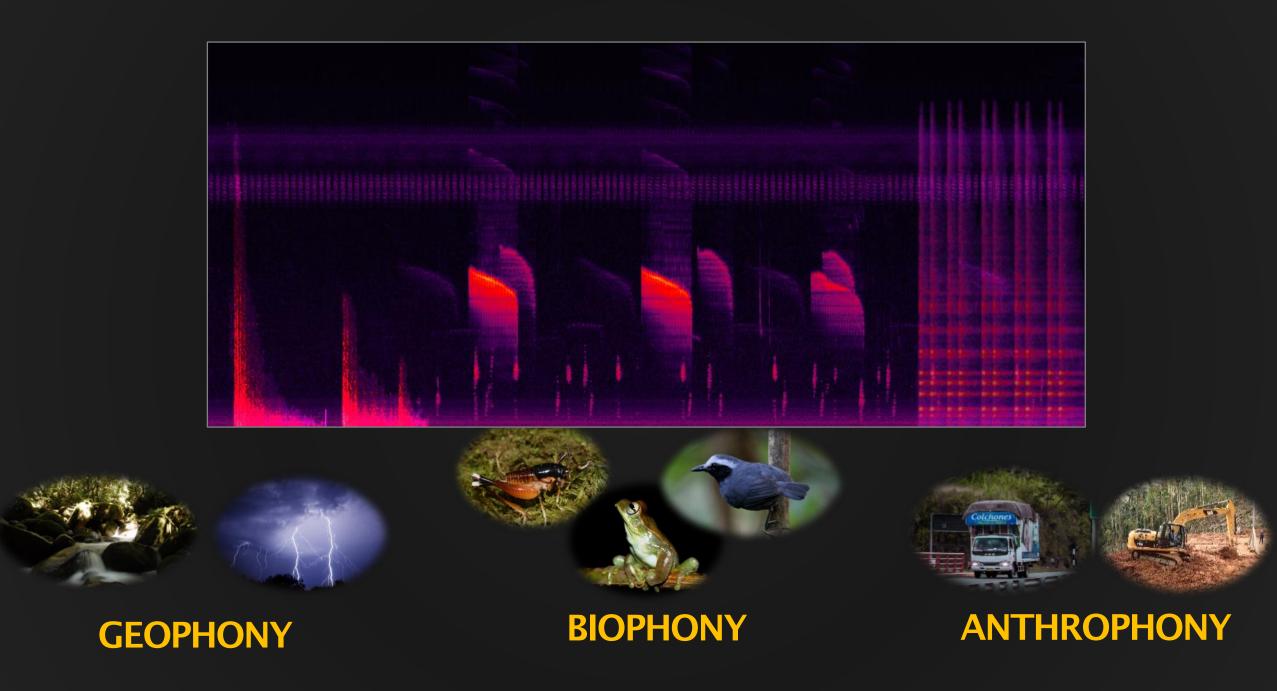
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Sound Classification

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Passive Acoustic Monitoring







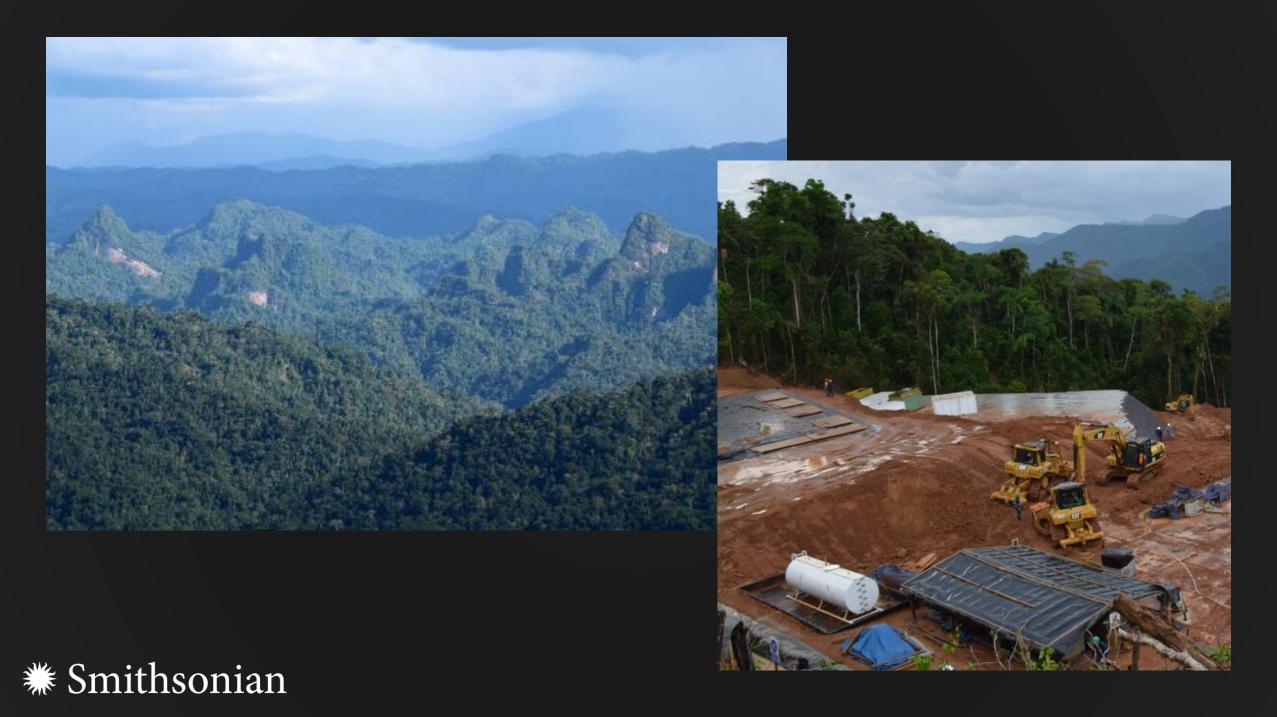


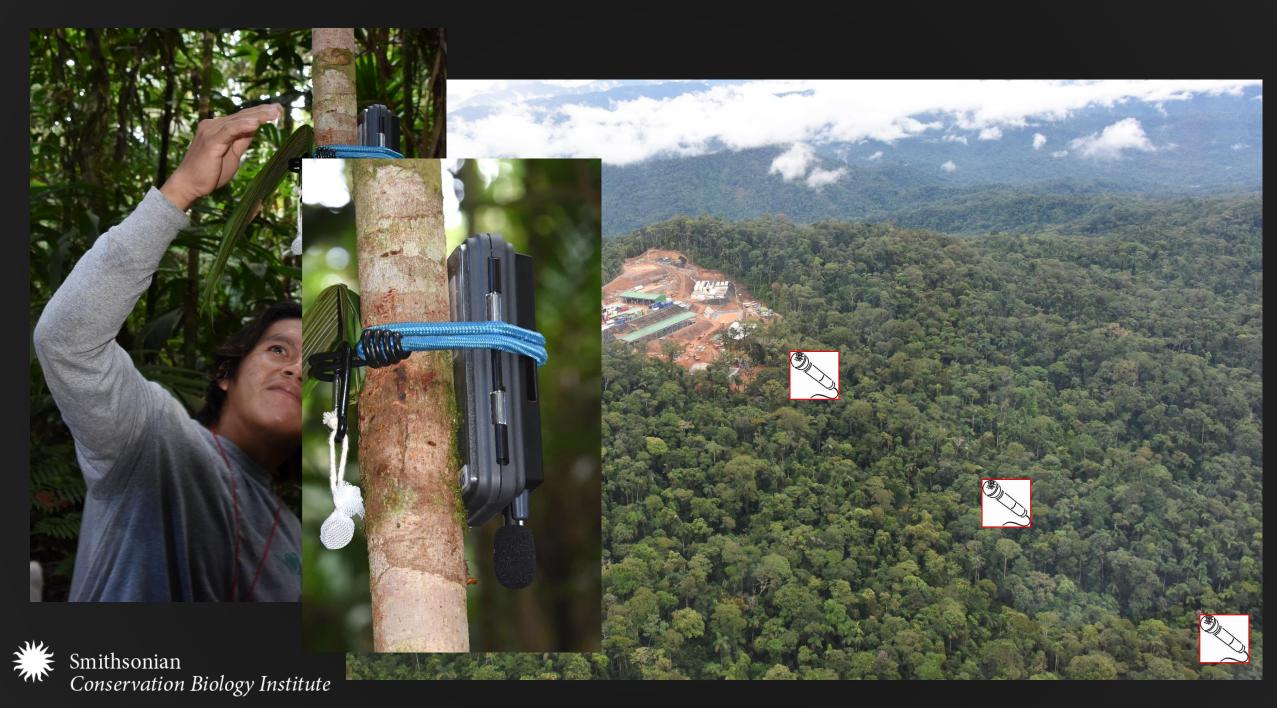


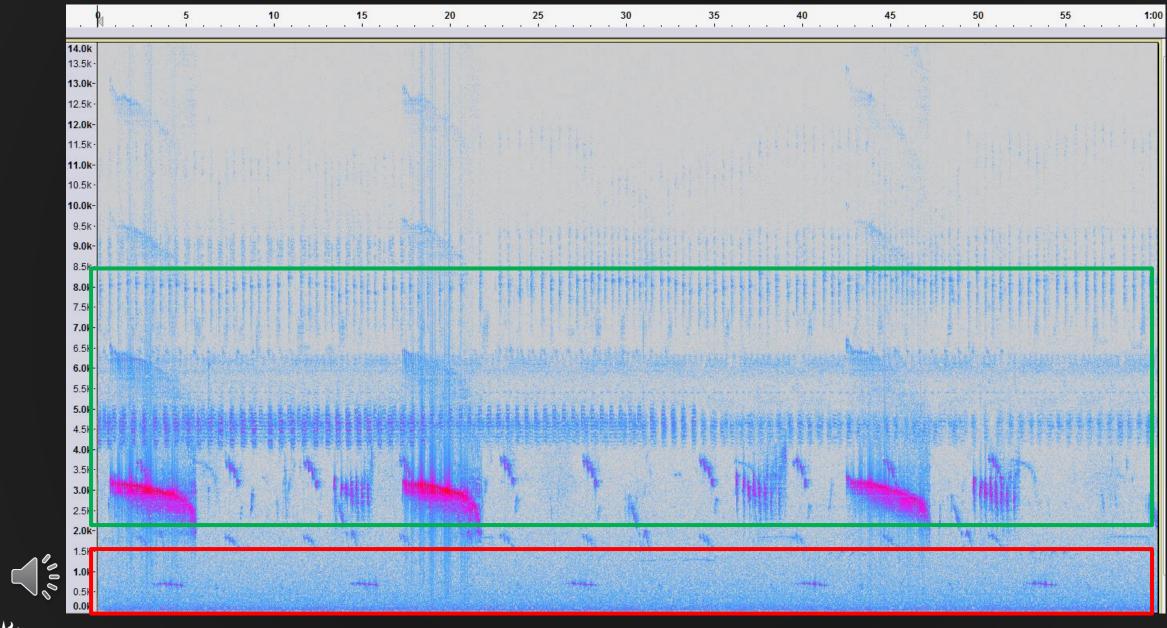


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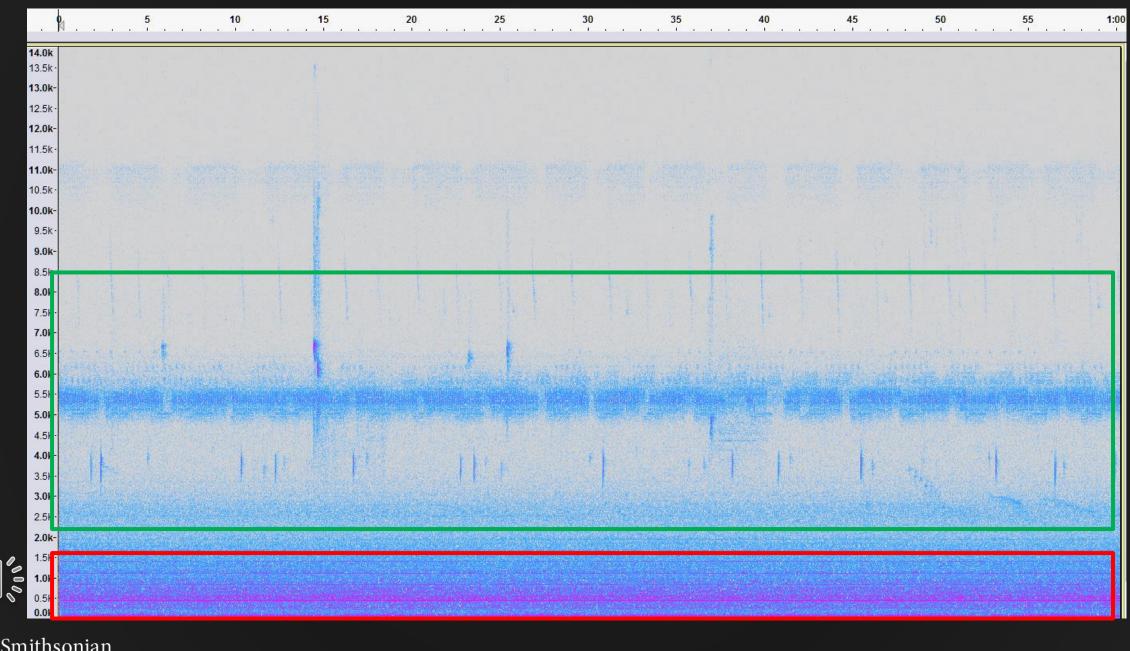
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Smithsonian Conservation Biology Institute



Smithsonian Conservation Biology Institute

Analysis

- >100,000 recordings
- Storage, visualization and analysis with Arbimon
- Manual revision
- Classification and focal species analysis
- Soundscape

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Templates (Pattern Matching Analysis)							Ti	me(s)					

https://arbimon.rfcx.org/

Results - Manual



- 12 amphibian species (600 dusk recordings)
- Distance from platform

