Supplementary Material

Monitoring tropical freshwater fish with underwater videography and deep learning

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Table S1. Summary of fish taxa results from Custom Vision compact model training.

Taxa name	Precision (%)	Recall (%)	Average precision
All taxa in model	98.1	20.2	53.1*
Ambassis agrammus	99.2	26.5	69.0
Ambassis macleayi	98.0	17.7	71.6
Amniataba percoides	99.4	19.1	71.6
Craterocephalus stercusmuscarum	100.0	0.2	36.5
Denariusa australis	100.0	1.1	23.4
Glossamia aprion	100.0	2.2	45.3
Glossogobius spp.	0.0	0.0	0.0
Hephaestus fuliginosus	0.0	0.0	41.4
Lates calcarifer	100.0	5.6	48.4
Leiopotherapon unicolor	0.0	0.0	46.5
Liza ordensis	100.0	2.9	62.4
Megalops cyprinoides	0.0	0.0	72.5
Melanotaenia nigrans	97.2	20.6	76.4
Melanotaenia splendida inornata	98.1	23.4	75.8
Mogurnda mogurnda	0.0	0.0	31.5
Nemetalosa erebi	100.0	12.5	61.5
Neoarius spp.	50.0	2.0	18.7
Neosilurus spp.	97.1	28.4	84.4
Oxyeleotris spp.	0.0	0.0	30.9
Scleropages jardinii	100.0	2.9	53.5
Strongylura kreffti	100.0	8.2	63.4
Syncomistes butleri	100.0	5.7	57.6
Toxotes chatareus	97.4	20.0	78.9

Table S2. Summary of fish taxa, results from thresholds and measures of MaxN precision, recall and F1.

Taxa name	Threshold (%)	MaxN-Precision (%)	MaxN-Recall (%)	MaxN-F1 (%)
Ambassis agrammus	99.9	80.0	30.8	44.4
Ambassis macleayi	99	91.5	87.0	89.2
Amniataba percoides	95	92.5	100.0	96.1
Craterocephalus stercusmuscarum	98	94.1	79.9	86.4
Denariusa australis	98	73.3	36.1	48.4
Glossamia aprion	90	71.6	65.03	68.2
Glossogobius spp.	99.9	A	A	A
Hephaestus fuliginosus	70	100.0	1.8	3.5
Lates calcarifer	80	52.1	82.4	63.8
Leiopotherapon unicolor	99.9	A	A	A
Liza ordensis	99	81.3	32.5	46.4
Megalops cyprinoides	80	50.0	7.1	12.5
Melanotaenia nigrans	99.9	A	A	A
Melanotaenia splendida inornata	98	83.7	80.3	81.9
Mogurnda mogurnda	99.9	A	A	A
Nemetalosa erebi	99.9	100.0	4.0	7.7
Neoarius spp.	99	50.0	8.6	14.6
Neosilurus spp.	98	70.9	79.2	74.8
Oxyeleotris spp.	99.9	A	A	A
Scleropages jardinii	99	62.5	24.7	35.3
Strongylura kreffti	90	69.3	74.5	71.9
Syncomistes butleri	98	73.1	53.5	61.9
Toxotes chatareus	99	81.5	64.2	71.9

[A]No values recorded due to insufficient data.

Table S3. Results from PERMANOVA of the relationship between fish assemblages sampled with different billabongs, methods (deep learning and trained observer), and years.

Source	d.f.	F	P	Unique perms	P(MC)
Method	1	14.977	0.0956	38	0.0002
Billabong	1	3.6648	0.0988	38	0.0244
Year	2	5.6761	0.0001	9924	0.0001
Method × Billabong	1	1.6375	0.3081	2122	0.2101
Method × Year	2	2.7674	0.0005	9923	0.0011
Billabong × Year	2	3.6875	0.0001	9913	0.0002
Method × Billabong × Year	2	1.2342	0.2392	9911	0.2433
Residual	48				
Total	59				