

# Machine Learning test

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## Contents

Testing Tabak *et al* Nth America deep learning model on desert camera trap data. Model trained on Nth American species and as is from paper. Testing to see if it can pick up animals, vehicles, people and empty photos in general.

For setup and example see:

[https://github.com/mikeyEcology/MLWIC\\_examples/tree/master](https://github.com/mikeyEcology/MLWIC_examples/tree/master)

[https://github.com/mikeyEcology/MLWIC\\_examples/tree/master](https://github.com/mikeyEcology/MLWIC_examples/tree/master)

and setting up Python on windows:

[https://github.com/mikeyEcology/MLWIC\\_examples/blob/master/MLWIC\\_Windows\\_Set\\_up.md](https://github.com/mikeyEcology/MLWIC_examples/blob/master/MLWIC_Windows_Set_up.md)

Resizing images: <https://github.com/VwakeM/MLWIC/blob/master/ResizeImages.Rmd>

```
confusionMatrix(confusion.matrix)
```

```
## Confusion Matrix and Statistics
##
##           Actual
## pred      Human Vehicle animal Empty
## Human         3         1         9         1
## Vehicle        0         2         0         0
## animal         0         0        44        18
## Empty         3         0        27        39
##
## Overall Statistics
##
##           Accuracy : 0.5986
##           95% CI : (0.5147, 0.6785)
##       No Information Rate : 0.5442
##       P-Value [Acc > NIR] : 0.1068
##
##           Kappa : 0.3093
##
##  McNemar's Test P-Value : NA
##
## Statistics by Class:
##
##           Class: Human Class: Vehicle Class: animal Class: Empty
## Sensitivity           0.50000           0.66667           0.5500           0.6724
## Specificity           0.92199           1.00000           0.7313           0.6629
## Pos Pred Value        0.21429           1.00000           0.7097           0.5652
## Neg Pred Value        0.97744           0.99310           0.5765           0.7564
## Prevalence            0.04082           0.02041           0.5442           0.3946
## Detection Rate        0.02041           0.01361           0.2993           0.2653
## Detection Prevalence  0.09524           0.01361           0.4218           0.4694
## Balanced Accuracy     0.71099           0.83333           0.6407           0.6677
```

```
summary.table
```

```
##      pred.group actual.group      pred.species actual.species
## 1      Human      Human      Human      Human
## 2      Human      Human      Human      Human
```

## 3	Empty	Human	Empty	Human
## 4	Vehicle	Vehicle	Vehicle	Vehicle
## 5	Vehicle	Vehicle	Vehicle	Vehicle
## 6	Human	Vehicle	Human	Vehicle
## 7	animal	animal	Elk	Camel
## 8	Empty	Empty	Empty	Empty
## 9	Empty	Empty	Empty	Empty
## 10	animal	animal	Elk	Camel
## 11	animal	animal	Mule deer	Camel
## 12	Empty	animal	Empty	Camel
## 13	animal	animal	Fox	fox
## 14	Empty	Empty	Empty	Empty
## 15	Empty	Empty	Empty	Empty
## 16	Empty	animal	Empty	cat
## 17	Empty	animal	Empty	cat
## 18	Empty	animal	Empty	cat
## 19	Empty	Empty	Empty	Empty
## 20	Empty	Empty	Empty	Empty
## 21	Empty	Empty	Empty	Empty
## 22	Empty	Empty	Empty	Empty
## 23	Empty	Empty	Empty	Empty
## 24	Empty	Empty	Empty	Empty
## 25	Empty	Empty	Empty	Empty
## 26	Empty	Empty	Empty	Empty
## 27	Empty	Empty	Empty	Empty
## 28	Empty	Empty	Empty	Empty
## 29	Empty	Empty	Empty	Empty
## 30	Empty	Empty	Empty	Empty
## 31	Empty	Empty	Empty	Empty
## 32	Empty	Empty	Empty	Empty
## 33	Empty	Empty	Empty	Empty
## 34	animal	Empty	Cattle	Empty
## 35	animal	Empty	Cattle	Empty
## 36	animal	Empty	Cattle	Empty
## 37	animal	Empty	Cattle	Empty
## 38	animal	Empty	Cattle	Empty
## 39	animal	Empty	Cattle	Empty
## 40	Empty	animal	Empty	cattle
## 41	Empty	animal	Empty	cattle
## 42	Empty	animal	Empty	cattle
## 43	animal	animal	Rabbits	cattle
## 44	animal	animal	Black Bear	cattle
## 45	Empty	Empty	Empty	Empty
## 46	Empty	animal	Empty	cattle
## 47	Human	animal	Human	cattle
## 48	animal	animal	Elk	cattle
## 49	Empty	animal	Empty	cattle
## 50	Human	animal	Human	cattle
## 51	animal	animal	Elk	cattle
## 52	Empty	animal	Empty	cattle
## 53	Human	Empty	Human	Empty
## 54	animal	Empty	Cattle	Empty
## 55	animal	Empty	Cattle	Empty
## 56	animal	Empty	Cattle	Empty
## 57	animal	animal	Cattle	cattle
## 58	Empty	animal	Empty	cattle
## 59	Empty	animal	Empty	cattle
## 60	Empty	animal	Empty	cattle
## 61	animal	animal	Elk	cattle

## 62	Empty	Empty	Empty	Empty
## 63	Empty	Empty	Empty	Empty
## 64	Empty	animal	Empty	cattle
## 65	animal	animal	Cattle	cattle
## 66	animal	animal	Cattle	cattle
## 67	Human	animal	Human	cattle
## 68	animal	animal	Elk	cattle
## 69	animal	animal	Rabbits	cattle
## 70	animal	animal	Cattle	cattle
## 71	animal	animal	Cattle	cattle
## 72	animal	animal	Cattle	cattle
## 73	animal	animal	Mule deer	cattle
## 74	animal	animal	Mule deer	cattle
## 75	Empty	Empty	Empty	Empty
## 76	animal	animal	Mule deer	cattle
## 77	Empty	Empty	Empty	Empty
## 78	Empty	Empty	Empty	Empty
## 79	Human	animal	Human	cattle
## 80	Empty	animal	Empty	cattle
## 81	Human	animal	Human	cattle
## 82	Empty	animal	Empty	cattle
## 83	Empty	Empty	Empty	Empty
## 84	Empty	Empty	Empty	Empty
## 85	animal	animal	Cattle	cattle
## 86	animal	animal	Cattle	cattle
## 87	Empty	Empty	Empty	Empty
## 88	animal	animal	Cattle	cattle
## 89	animal	animal	Cattle	cattle
## 90	Empty	Empty	Empty	Empty
## 91	animal	Empty	Cattle	Empty
## 92	animal	Empty	Cattle	Empty
## 93	animal	Empty	Cattle	Empty
## 94	animal	Empty	Cattle	Empty
## 95	animal	Empty	Cattle	Empty
## 96	animal	Empty	Cattle	Empty
## 97	animal	Empty	Cattle	Empty
## 98	animal	Empty	Cattle	Empty
## 99	animal	Empty	Cattle	Empty
## 100	Empty	Empty	Empty	Empty
## 101	Empty	Empty	Empty	Empty
## 102	Empty	Empty	Empty	Empty
## 103	animal	animal	Wild pig	cattle
## 104	Empty	Empty	Empty	Empty
## 105	Empty	Empty	Empty	Empty
## 106	animal	animal	Cattle	cattle
## 107	animal	animal	Cattle	cattle
## 108	animal	animal	Cattle	cattle
## 109	Empty	animal	Empty	Camel
## 110	animal	animal	Elk	Camel
## 111	Human	animal	Human	Camel
## 112	Human	animal	Human	Camel
## 113	Human	animal	Human	Camel
## 114	Human	animal	Human	Camel
## 115	animal	animal	Elk	Camel
## 116	Empty	animal	Empty	Camel
## 117	Empty	Empty	Empty	Empty
## 118	animal	animal	Elk	Camel
## 119	Empty	animal	Empty	Camel
## 120	Empty	Empty	Empty	Empty

## 121	animal	animal	Elk	Camel
## 122	animal	animal	Elk	Camel
## 123	animal	animal	Elk	Camel
## 124	animal	animal	Cattle	cattle
## 125	animal	animal	White-tailed deer	cattle
## 126	animal	animal	White-tailed deer	cattle
## 127	Empty	animal	Empty	cattle
## 128	animal	animal	Cattle	cattle
## 129	animal	animal	Wild pig	cattle
## 130	Empty	animal	Empty	cattle
## 131	animal	animal	Elk	cattle
## 132	animal	animal	Elk	cattle
## 133	animal	animal	Elk	Camel
## 134	animal	animal	Elk	Camel
## 135	animal	animal	Mustelidae	Camel
## 136	Empty	animal	Empty	Camel
## 137	Empty	animal	Empty	Camel
## 138	Empty	animal	Empty	Camel
## 139	Empty	Empty	Empty	Empty
## 140	Empty	Empty	Empty	Empty
## 141	Empty	Empty	Empty	Empty
## 142	Empty	animal	Empty	Camel
## 143	Empty	animal	Empty	Camel
## 144	Empty	animal	Empty	Camel
## 145	Empty	Human	Empty	Human
## 146	Empty	Human	Empty	Human
## 147	Human	Human	Human	Human