**Open Rstudio**

**Helpful websites:**

**Main website:**

https://github.com/mikeyEcology/MLWIC2

**Online book with a chapter on using mlwic2**

https://ai-camtraps.netlify.app/mlwic2-machine-learning-for-wildlife-image-classification.html

**Install stringi package, install reticulate package**

**Install MLWCI2**

devtools::install\_github("mikeyEcology/MLWIC2")

**Set up MLWCI2 structure (need to have first a python 3.7 environment installed in anaconda, here we installed and called it mlwci2 using**

conda create -n mlwci2 python=3.7

library(MLWIC2)

MLWIC2::setup(python\_loc = "/home/rbcer10/anaconda3/envs/mlwic2/bin/python")

This will install the mlwic2 shiny application and create a r-reticulate environment in anaconda where the mlwic2 packages and libraries will be installed

**Test that classify is installed:**

MLWIC2::classify(python\_loc = "/home/rbcer10/anaconda3/envs/r-reticulate/bin/python")

**Test classify with example files:**

MLWIC2::classify(python\_loc = "/home/rbcer10/anaconda3/envs/r-reticulate/bin/python", path\_prefix = "/home/rbcer10/rstudio-projects/testimages/images", # path to where your images are stored

data\_info = "/home/rbcer10/rstudio-projects/testimages/image\_labels.csv", # path to csv containing file names and labels

model\_dir = "/home/rbcer10/rstudio-projects/MLWIC2\_helper\_files", # path to the helper files that you downloaded in step 3, including the name of this directory (i.e., `MLWIC2\_helper\_files`). Check to make sure this directory includes files like arch.py and run.py. If not, look for another folder inside this folder called `MLWIC2\_helper\_files`

save\_predictions = "model\_predictions.txt", # how you want to name the raw output file

make\_output = TRUE, # if TRUE, this will produce a csv with a more friendly output

output\_name = "MLWIC2\_output.csv", # if make\_output==TRUE, this will be the name of your friendly output file

num\_cores = 3 # the number of cores you want to use on your computer. Try runnning parallel::detectCores() to see what you have available. You might want to use something like parallel::detectCores()-1 so that you have a core left on your machine for accomplishing other tasks.

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THIS COMMAND BELOW RUNS EXAMPLE

MLWIC2::classify(python\_loc = "/home/rbcer10/anaconda3/envs/r-reticulate/bin/", path\_prefix = "/home/rbcer10/rstudio-projects/testimages/images", # path to where your images are stored

data\_info = "/home/rbcer10/rstudio-projects/testimages/image\_labels.csv", # path to csv containing file names and labels

model\_dir = "/home/rbcer10/rstudio-projects/MLWIC2\_helper\_files", # path to the helper files that you downloaded in step 3, including the name of this directory (i.e., `MLWIC2\_helper\_files`). Check to make sure this directory includes files like arch.py and run.py. If not, look for another folder inside this folder called `MLWIC2\_helper\_files`

save\_predictions = "model\_predictions.txt", # how you want to name the raw output file

make\_output = TRUE, # if TRUE, this will produce a csv with a more friendly output

output\_name = "MLWIC2\_output.csv", # if make\_output==TRUE, this will be the name of your friendly output file

num\_cores = 3

)

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Follow the instructions in <https://github.com/mikeyEcology/MLWIC2> to install the helper files and set up the running environment:

Download the zip file:

<https://drive.google.com/file/d/1VkIBdA-oIsQ_Y83y0OWL6Afw6S9AQAbh/view?usp=sharing>

INSTRUCTIONS FROM GITHUB REPOSITORY

* Unzip the folder and then store this folder in a location where you can find it on your computer (e.g., Desktop). Note the location, as you will specify this as model\_dir when you run the functions classify, make\_output, and train. (optional) If you want to check md5sums for this file, the value should be 14432A502FB78943890751608A8DAECC.
* If you are on a Windows computer, some unzipping software will add extra folders. When you need to specify this folder at later steps (as the model\_dir), be sure that you are using the directory that actually contains the helper files. The correct directory will contain a file called arch.py and run.py, among others. Specifically Windows sometimes puts the files in a location .../MLWIC2\_helper\_files/MLWIC2\_helper\_files instead of simply MLWIC2\_helper\_files, as you would expect.

###### **Before running models on your own data, I recommend you try running using the** [**example provided**](https://github.com/mikeyEcology/MLWIC_examples/tree/master)**.**

EXAMPLE PROVIDED: <https://github.com/mikeyEcology/MLWIC_examples/tree/master>

CREATE INPUT FILE

## **Step 4: Create a properly formatted input file using make\_input**

###### **Shiny option: MLWIC2::runShiny('make\_input')**

* Option 1: If you have labels for your images and you want to test the model on your images (set images\_classified=TRUE), you need to have an input\_file csv that has at least two columns and one of these must be "filename" and the other must be "class\_ID".
  + class\_ID is a column containing a number for the label for each species. If you're using the "species\_model", you can find the class\_ID associated with each species in [this table](https://github.com/mikeyEcology/MLWIC2/blob/master/speciesID.csv) and put them in this column.
* Option 2: This is the same as option 1, excpet instead of having a column class\_ID containing the number associated with each species, you have a column called class containing your classifications as words (e.g., "dog" or "cattle", "empty"), the function will find the appropriate class\_ID associated with these words (class\_IDs can be found in [this table](https://github.com/mikeyEcology/MLWIC2/blob/master/speciesID.csv)).
* Option 3: If you do not have your images classified, but you have all of the filenames for the images you want to classify, you can have an input\_file csv in your with a column called "filename" and whatever other columns you would like.
* Option 4: MLWIC2 can find the filenames of all of your images and create your input file. For this option, you need to specify your path\_prefix which is the parent directory of your images. If you have images stored in sub-folders within this directory, specify recursive=TRUE, if not, you can specify recursive=FALSE. You also need to specify the suffixes (e.g., ".jpg") for your filenames so that MLWIC2 knows what types of files to look for. By default (if you don't specify anything), it will look for ".JPG" and ".jpg".
* Option 5: If you are planning to train a model, you will want training and testing sets of images. This function will set up these files also, see ?make\_input for more details.

SEE STEPS 5 6 7 to run model and classify images