1. Create a mamba environment on the NVIDIA Jetson Nano Machine.
   a. Download Miniforge on NVIDIA Terminal using this link: GitHub - conda-forge/miniforge: A conda-forge distribution.

   ## Unix-like platforms (Mac OS & Linux)

   Download the installer using curl or wget or your favorite program and run the script. For eg:

   ```
   curl -L -O "https://github.com/conda-forge/miniforge/releases/lat
   bash Miniforge3-$(uname)-$(uname -m).sh
   ```

   b. Once finally downloaded, create a mamba environment and activate it on the NVIDIA Terminal using this link: Mamba User Guide — documentation
      - What can your mamba environment be used for?
        o Managing necessary libraries and dependencies for your model.
        o Isolating your project environment so that you ensure that all packages and versions are specific to that project.
        o Training your model.
        o Developing and Running Scripts.
        o Deploying your model.

2. Create the Image Classification Model on Google Colab.
   a. Step-by-Step Process: Available in (HTML, PDF, IPYNB) the SCI_skunks github page under sidatasciencelab.
   b. Preparing the dataset: This involved creating a train folder, which contained around 60% of the images and a validation folder, which contained around 40% of the images.
      i. To get access to these images (camera traps) use this link: Channel Islands Camera Traps - LILA BC
         - Note: You will need to download the 86 GB set of images on your laptop.
           o Tip: What I did was download it on my old laptop that I don't use and then started to organizing it by going through most of the images and sorting which are (Bird, Empty Species Frames, Fox, and Skunk) while of course keeping in mind my train & validation folder setup.
           o Tip: Should download through Google Cloud Storge (GSUTIL) following this link instructions: https://lila.science/image-access
             ▪ Note: You will need to download GSUTIL application to your computer (it will look like a terminal).

- Note: It will take around 5 hours or more for every image to download so ensure that your computer is on throughout the entire process.

Images are also available (unzipped) in the following cloud storage folders:

- gs://public-datasets-lila/channel-islands-camera-traps/images (GCP)

To download the entire data set to the folder c:\blah, I can do this with gsutil:

```
gsutil -m cp -r "gs://public-datasets-lila/missouricameratraps/images"
"c:\blah"
```

3. Deploy the Finished End-Product Model.
   a. Set Up the Mamba Environment. (of course should have Miniforge3 already downloaded)
      i. Create and activate a Mamba Environment.

```
mamba create -n my_tf_lite_env python=3.9

mamba activate my_tf_lite_env
```

      ii. Install TensorFlow Lite Dependencies which include TensorFlow and TensorFlow Lite runtime.

```
pip install tflite-runtime
```

```
pip install tensorflow==2.15.0
```

      iii. Install additional necessary packages/libraries needed to run the model.
         - Note: You can look back at the PDF or HTML model version to see the required packages/libraries used for it to ensure that you've installed them within your environment.
         - List of Packages I wrote down:
            1. import os
            2. from tensorflow.keras import layers
            3. from tensorflow.keras import Model
            4. !wget --no-check-certificate \
               https://storage.googleapis.com/mledu-datasets/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5 \-
               O/tmp/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5
            5. from tensorflow.keras.applications.inception_v3 import InceptionV3

6. local_weights_file = '/tmp/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5'
7. from tensorflow.keras.optimizers import RMSprop
8. from tensorflow.keras.preprocessing.image import ImageDataGenerator
9. import tensorflow as tf

b. Ensure the model is within the folder titled "SCI_skunks" on the github page for the tflite_model folder.

c. Modify the rpiClassify.py script to fit your model's standards.
   i. When done, go back to the terminal on the NVIDIA which should still have your mamba environment activated used for model and if not then ensure you reactivate it again. ← EX: mamba activate my_tf_lite_env
   ii. Then, navigate to the directory where your rpiClassify.py script (modified) is located/saved. ← EX: cd /home/user/my_project/
   iii. Lastly, once you are in the correct directory and your Mamba environment is activated, run your script with the following command: python run_inference.py

d. Additional Deployment Guide:
   i. Ensure you have the class_names.txt fille which is located within the SCI_skunks github page.
   ii. Need more help on deploying, look at this path from the SCI_skunks github page: SCI_skunks/tech_documents/**Tensorflow_Lite_on_RPI_end_to_end-2.pdf.**
   iii. Any questions on the official_model.tflite which I created and deployment, email me: dcontrerasmartinez08@gmail.com (personal) or dcontrerasmartinez@ucsb.edu (school).