

The background is a dark navy blue. In the top-left corner, there are two overlapping geometric shapes: a blue parallelogram and a light green parallelogram. In the bottom-left corner, there is a circular inset showing a close-up of a green printed circuit board (PCB) with various electronic components. In the top-right corner, there is a faint, grey, 3D-rendered pattern of interlocking cubes or a circuit board layout.

# Classifying deforestation

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# Data

- The data used comes from the provided dataset.
- Only the image data from the dataset is being used. The location and year data has been dropped as it shows low correlation with the labels, and, it did not increase the performance of the model.
- Data augmentation is being performed through horizontal and vertical flips of the original images
- The data is also being cached and prefetched so as to increase the tensorflow models speed at processing it

Features Correlation Matrix

	label	latitude	longitude	year
label	1.000000	-0.087783	0.001103	0.066380
latitude	-0.087783	1.000000	-0.439139	-0.076184
longitude	0.001103	-0.439139	1.000000	0.192967
year	0.066380	-0.076184	0.192967	1.000000



# Procedure Used

- 01 Create a Neural Network using Transfer Learning selecting a pre-trained base model, adding Dense and Dropout layers on top to classify correctly avoiding overfitting
- 02 Train the top layers of the model tracking the loss output of the validation data for early stopping and reducing the learning rate of the model through exponential decay.
- 03 Train the entire model with a smaller learning rate to avoid overfitting, implementing the same features as before.
- 04 Repeat the steps above with an 80-20 split of train and validation data tuning the hyperparameters of the model. Once a model is chosen, train it with the entire dataset in order to make future predictions.

# Model structure and results

As base model, we will be using the Inception V3 Network, from tensorflow hub ([https://tfhub.dev/google/inaturalist/inception\\_v3/feature\\_vector/5](https://tfhub.dev/google/inaturalist/inception_v3/feature_vector/5)), pre-trained on the iNaturalist Dataset.

It yields a 0.804 f1\_macro score on the validation data with a 80-20 split

Layer (type)	Output Shape	Param #
input_1 (InputLayer)	[(None, 332, 332, 3)]	0
keras_layer (KerasLayer)	(None, 2048)	21802784
dropout (Dropout)	(None, 2048)	0
dense (Dense)	(None, 100)	204900
dropout_1 (Dropout)	(None, 100)	0
dense_1 (Dense)	(None, 100)	10100
dense_2 (Dense)	(None, 3)	303
Total params: 22,018,087		
Trainable params: 215,303		
Non-trainable params: 21,802,784		