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# Resnet50 with TensorFlow implementation, high level overview.

ResNet50 is a deep learning model for image classification that was introduced by Microsoft researchers in 2015. It is a deep convolutional neural network that can classify images into 1,000 categories, including common objects, animals, and scenes.

The ResNet50 architecture is composed of 50 layers, with skip connections that allow the network to learn residual functions that can be more easily optimized. These skip connections bypass one or more layers, allowing the network to learn the identity function as well as the residual function. This approach can help avoid the problem of vanishing gradients that can occur in deep neural networks.

Here is an implementation of ResNet50 using TensorFlow, a popular deep learning framework:

```
import tensorflow as tf
from tensorflow.keras.applications.resnet50 import ResNet50
from tensorflow.keras.preprocessing import image
from tensorflow.keras.applications.resnet50 import preprocess_input, decode_predictions
import numpy as np

# Load the ResNet50 model
model = ResNet50(weights='imagenet')

# Load and preprocess the image
img_path = 'image.jpg'
img = image.load_img(img_path, target_size=(224, 224))
x = image.img_to_array(img)
x = np.expand_dims(x, axis=0)
x = preprocess_input(x)

# Use the model to classify the image
preds = model.predict(x)
print('Predicted:', decode_predictions(preds, top=3)[0])
```

- [np.expand\\_dims\(x, axis=0\)](#).
- [preprocess\\_input\(x\)](#).
- [preprocess\\_input\(x\)](#).

In this implementation, we first load the ResNet50 model with pre-trained weights on the ImageNet dataset. We then load and preprocess the image we want to classify, and pass it through the ResNet50 model to get the predicted class probabilities. Finally, we use the decode\_predictions function to convert the predicted probabilities to class names.

Note that ResNet50 is a large and complex model, and training it from scratch can be computationally expensive. Therefore, it is common to use pre-trained weights and fine-tune the model on a smaller dataset if needed.

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