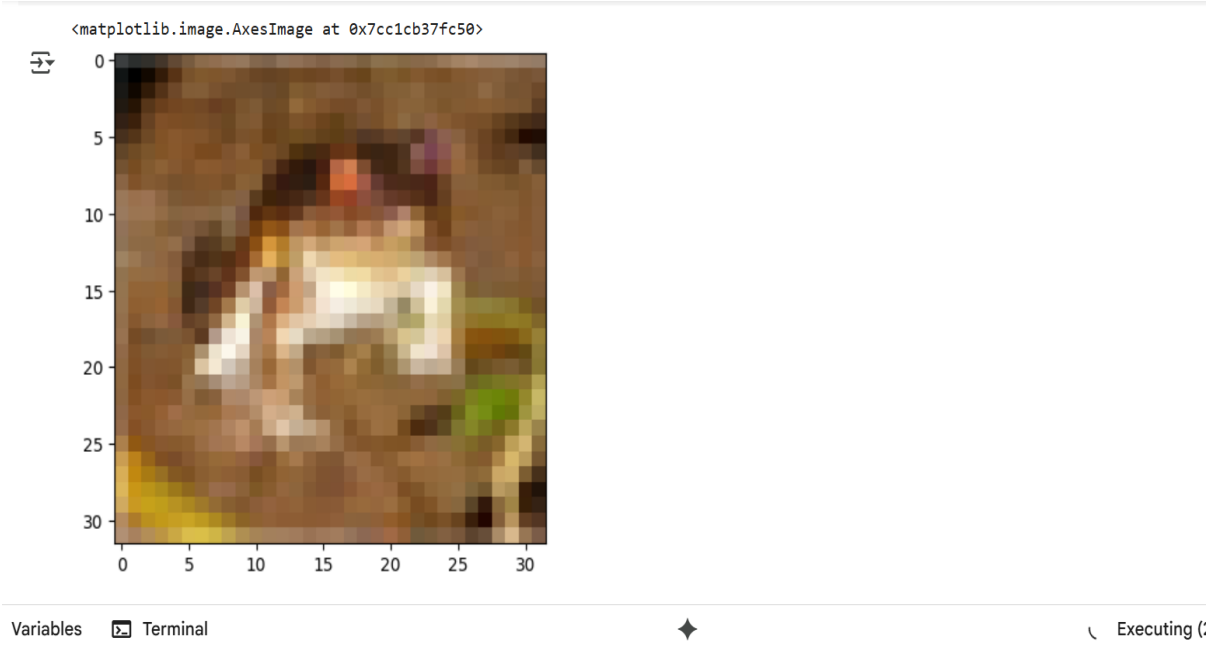
Activity 5

In this activity, we implemented a convolutional neural network using the CIFAR-10 dataset in Python on Google Colab. The model achieved a test accuracy of 67% after just 6 training epochs, demonstrating a strong baseline performance given the limited training duration. To evaluate the model qualitatively, we fed a few test images into the model, and it was able to correctly classify them—highlighting its ability to generalise even with minimal training.



Adding Early stopping

```
[31] from tensorflow.keras.callbacks import EarlyStopping
```

```
[32] early_stop = EarlyStopping(monitor='val_loss',patience=2)
```

```
history = model.fit(x_train,y_cat_train,epochs=25,validation_data=(x_val,y_val_cat),callbacks=[early_stop])
```

```
Epoch 1/25
1250/1250 ━━━━━━━━━━━━━━━━━━━━ 57s 44ms/step - accuracy: 0.3529 - loss: 1.7734 - val_accuracy: 0.5076 - val_loss: 1.3369
Epoch 2/25
1250/1250 ━━━━━━━━━━━━━━━━━━━━ 52s 41ms/step - accuracy: 0.5297 - loss: 1.3100 - val_accuracy: 0.5710 - val_loss: 1.2033
Epoch 3/25
1250/1250 ━━━━━━━━━━━━━━━━━━━━ 80s 40ms/step - accuracy: 0.5901 - loss: 1.1543 - val_accuracy: 0.6083 - val_loss: 1.1141
Epoch 4/25
1250/1250 ━━━━━━━━━━━━━━━━━━━━ 83s 41ms/step - accuracy: 0.6325 - loss: 1.0361 - val_accuracy: 0.6253 - val_loss: 1.0750
Epoch 5/25
1250/1250 ━━━━━━━━━━━━━━━━━━━━ 80s 39ms/step - accuracy: 0.6714 - loss: 0.9391 - val_accuracy: 0.6270 - val_loss: 1.0709
Epoch 6/25
1250/1250 ━━━━━━━━━━━━━━━━━━━━ 82s 40ms/step - accuracy: 0.7006 - loss: 0.8542 - val_accuracy: 0.6285 - val_loss: 1.0842
Epoch 7/25
1250/1250 ━━━━━━━━━━━━━━━━━━━━ 83s 41ms/step - accuracy: 0.7299 - loss: 0.7782 - val_accuracy: 0.6312 - val_loss: 1.1111
```

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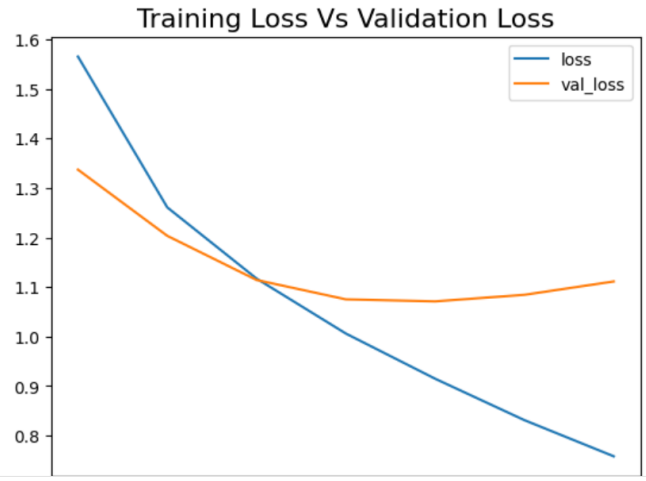
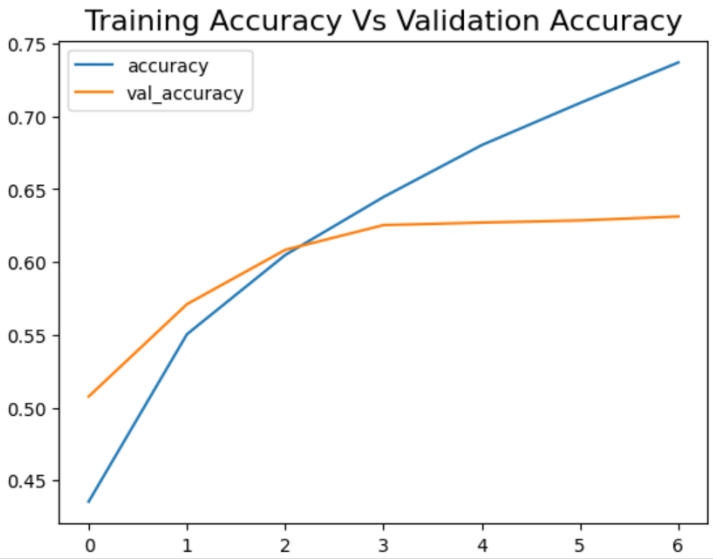
```
plt.title('Training Loss Vs Validation Loss', fontsize=16)
plt.show()
```



Variables Terminal

0s [38] plt.show()

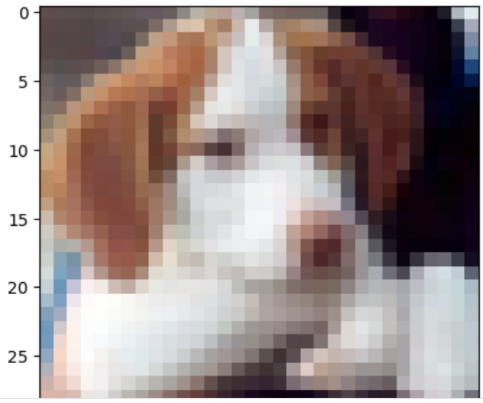


Variables Terminal

Predicting on single image

0s [44] plt.imshow(x_test[16])

```
<matplotlib.image.AxesImage at 0x7cc1655ed710>
```



{} Variables Terminal