Analysis of weight initializers

In [1]:
```
import matplotlib.pyplot as plt
import numpy as np
import tensorflow as tf
from tensorflow import keras
from tensorflow.keras.datasets import mnist,cifar10,fashion_mnist
from tensorflow.keras import layers
from tensorflow.keras.layers import Embedding,Dense,SimpleRNN,LSTM,GRU,Dropout,Flatten
from tensorflow.keras.models import Sequential,Model
from tensorflow.keras.applications import VGG19
from tensorflow.image import grayscale_to_rgb,resize
from tensorflow.keras.utils import to_categorical
from tensorflow.keras import regularizers
from tensorflow.keras import optimizers
from tensorflow.keras.initializers import HeNormal,GlorotNormal
```

```
WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\losses.py:2976: The name tf.losses.spa
rse_softmax_cross_entropy is deprecated. Please use tf.compat.v1.losses.sparse_softmax_cross_entropy instea
d.
```

In [2]:
```
(train_images,train_labels),(test_images,test_labels)=cifar10.load_data()
train_images,test_images=train_images/255.0,test_images/255.0
train_labels,test_labels=to_categorical(train_labels),to_categorical(test_labels)
```

In [9]:
```
def create_model(initializer,regularizer,dropout_rate=None):
    model=Sequential([
    Flatten(input_shape=(32,32,3)),
    Dense(256,activation='relu',kernel_initializer=initializer,kernel_regularizer=regularizer),
    Dense(128,activation='relu',kernel_initializer=initializer,kernel_regularizer=regularizer),
    Dense(64,activation='relu',kernel_initializer=initializer,kernel_regularizer=regularizer),
    Dense(10,activation='softmax')
    ])
    if dropout_rate:
        model.add(Dropout(dropout_rate))
    model.compile(metrics=['accuracy'],loss='categorical_crossentropy',optimizer='adam')
    return model
```

In [10]:
```
xavier_model=create_model(GlorotNormal(),regularizers.l2(0.001))
kaiming_model=create_model(HeNormal(),regularizers.l2(0.001))
```

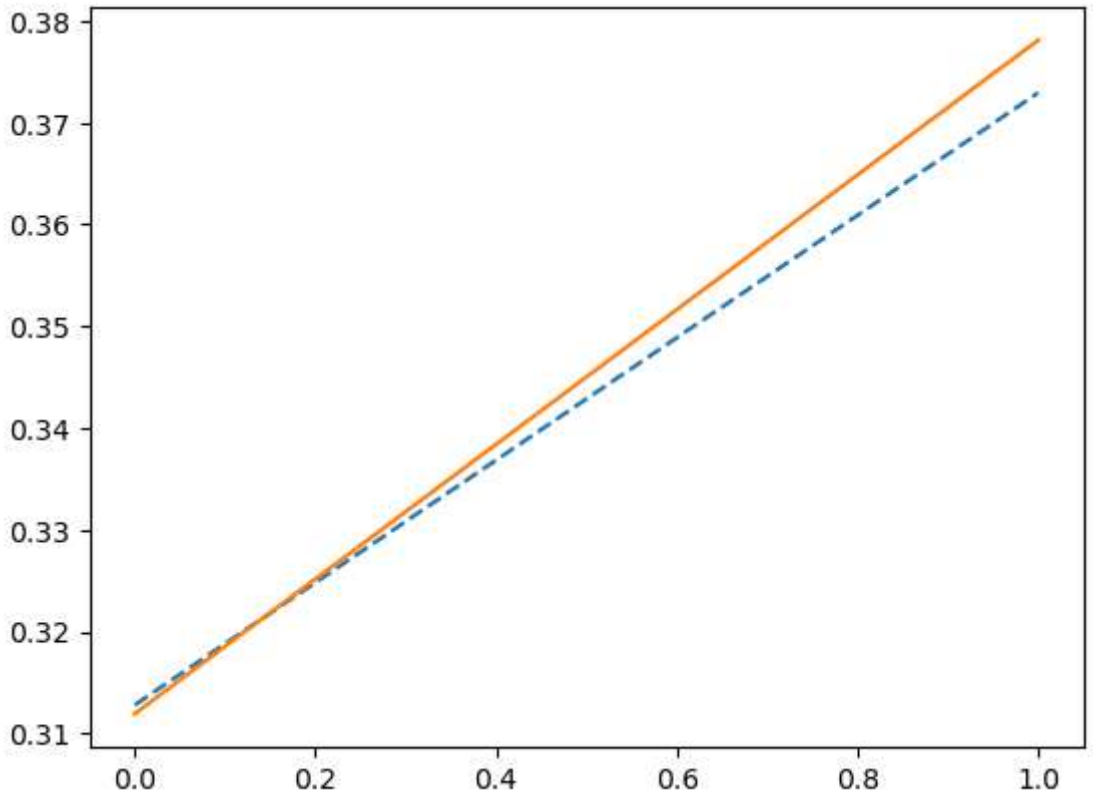
In [11]:
```
xavier_history=xavier_model.fit(train_images,train_labels,epochs=2,validation_data=(test_images,test_labels))
```

```
Epoch 1/2
WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\utils\tf_utils.py:492: The name tf.rag
ged.RaggedTensorValue is deprecated. Please use tf.compat.v1.ragged.RaggedTensorValue instead.

WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\engine\base_layer_utils.py:384: The na
me tf.executing_eagerly_outside_functions is deprecated. Please use tf.compat.v1.executing_eagerly_outside_f
unctions instead.

1563/1563 [==============================] - 15s 9ms/step - loss: 2.0786 - accuracy: 0.3128 - val_loss: 1.89
57 - val_accuracy: 0.3497
Epoch 2/2
1563/1563 [==============================] - 14s 9ms/step - loss: 1.8377 - accuracy: 0.3729 - val_loss: 1.80
70 - val_accuracy: 0.3829
```

In [12]:
```
kaiming_history=kaiming_model.fit(train_images,train_labels,epochs=2,validation_data=(test_images,test_labels
```

```
Epoch 1/2
1563/1563 [==============================] - 15s 9ms/step - loss: 2.1480 - accuracy: 0.3119 - val_loss: 1.91
02 - val_accuracy: 0.3574
Epoch 2/2
1563/1563 [==============================] - 15s 9ms/step - loss: 1.8480 - accuracy: 0.3781 - val_loss: 1.76
52 - val_accuracy: 0.4018
```

In [13]:
```
plt.plot(xavier_history.history['accuracy'],label='xavier',linestyle='dashed')
plt.plot(kaiming_history.history['accuracy'],label='kaiming')
plt.show()
```



In [ ]: