```
!pip install keras-tuner
```

Collecting keras-tuner
  Downloading https://files.pythonhosted.org/packages/20/ec/1ef246787174b1e2bb5
    |████████████████████████████████| 71kB 3.9MB/s
Requirement already satisfied: packaging in /usr/local/lib/python3.7/dist-packa
Requirement already satisfied: future in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: numpy in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: tabulate in /usr/local/lib/python3.7/dist-packag
Collecting terminaltables
  Downloading https://files.pythonhosted.org/packages/9b/c4/4a21174f32f8a7e1104
Collecting colorama
  Downloading https://files.pythonhosted.org/packages/44/98/5b86278fbbf250d239a
Requirement already satisfied: tqdm in /usr/local/lib/python3.7/dist-packages (
Requirement already satisfied: requests in /usr/local/lib/python3.7/dist-packag
Requirement already satisfied: scipy in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: scikit-learn in /usr/local/lib/python3.7/dist-pa
Requirement already satisfied: pyparsing>=2.0.2 in /usr/local/lib/python3.7/dis
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-pa
Requirement already satisfied: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/di
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/d
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /usr/
Requirement already satisfied: joblib>=0.11 in /usr/local/lib/python3.7/dist-pa
Building wheels for collected packages: keras-tuner, terminaltables
  Building wheel for keras-tuner (setup.py) ... done
  Created wheel for keras-tuner: filename=keras_tuner-1.0.2-cp37-none-any.whl s
  Stored in directory: /root/.cache/pip/wheels/bb/a1/8a/7c3de0efb3707a1701b36eb
  Building wheel for terminaltables (setup.py) ... done
  Created wheel for terminaltables: filename=terminaltables-3.1.0-cp37-none-any
  Stored in directory: /root/.cache/pip/wheels/30/6b/50/6c75775b681fb36cdfac7f1
Successfully built keras-tuner terminaltables
Installing collected packages: terminaltables, colorama, keras-tuner
Successfully installed colorama-0.4.4 keras-tuner-1.0.2 terminaltables-3.1.0

```
import tensorflow as tf
from tensorflow import keras
import numpy as np
```

```
fashion_mnist=keras.datasets.fashion_mnist
```

```
(train_images,train_labels),(test_images,test_labels)=fashion_mnist.load_data()
```

Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datase
32768/29515 [==============================] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datase
26427392/26421880 [==============================] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datase
8192/5148 [===] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datase
4423680/4422102 [=============================] - 0s 0us/step

```
train_images=train_images/255.0
```

```python
test_images=test_images/255.0

train_images[0].shape
```

```
(28, 28)
```

```python
train_images=train_images.reshape(len(train_images),28,28,1)
test_images=test_images.reshape(len(test_images),28,28,1)


ld_model(hp):
l=keras.Sequential([
eras.layers.Conv2D(
    filters=hp.Int('conv_1_filter', min_value=32, max_value=128, step=16),
    kernel_size=hp.Choice('conv_1_kernel', values = [3,5]),
    activation='relu',
    input_shape=(28,28,1)
,
eras.layers.Conv2D(
    filters=hp.Int('conv_2_filter', min_value=32, max_value=64, step=16),
    kernel_size=hp.Choice('conv_2_kernel', values = [3,5]),
    activation='relu'
,
eras.layers.Flatten(),
eras.layers.Dense(
    units=hp.Int('dense_1_units', min_value=32, max_value=128, step=16),
    activation='relu'
,
eras.layers.Dense(10,activation='softmax')#output layer


l.compile(optimizer=keras.optimizers.Adam(hp.Choice('learning_rate', values=[1e-2,1e-3])),
        loss='sparse_categorical_crossentropy',
        metrics=['accuracy'])
rn model


from kerastuner import RandomSearch
from kerastuner.engine.hyperparameters import HyperParameters


tuner_search=RandomSearch(build_model,
                        objective='val_accuracy',
                        max_trials=3,directory='output',project_name="Mnist Fashion")


tuner_search.search(train_images,train_labels,epochs=3,validation_split=0.1)
```

```
Trial 3 Complete [00h 10m 22s]
val_accuracy: 0.9048333168029785

Best val_accuracy So Far: 0.9106666445732117
Total elapsed time: 01h 05m 08s
INFO:tensorflow:Oracle triggered exit
```

```python
model=tuner_search.get_best_models(num_models=1)[0]


model.summary()
```

```
Model: "sequential"

_____
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 24, 24, 128)       3328
_____
conv2d_1 (Conv2D)            (None, 22, 22, 48)        55344
_____
flatten (Flatten)            (None, 23232)             0
_____
dense (Dense)                (None, 128)               2973824
_____
dense_1 (Dense)              (None, 10)                1290
=================================================================
Total params: 3,033,786
Trainable params: 3,033,786
Non-trainable params: 0
_____
```