Model Building

Predictions

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Project Name : Emerging Methods for early Detection Of forest fire

```
'''import model building libraries'''

#to define linear initialisation import sequential

from keras.models import  Sequential

#to add layers import Dense

from keras.layers import Dense

#to create Convolution kernel import Covolution2D

from keras.layers import Convolution2D

#import Maxpooling Layer

from keras.layers import Dense

from keras.layers import Convolution2D

#import Flatten Layer

from keras.layers import Flatten

#import  maxpooling layer

from keras.layers import MaxPooling2D

import warnings
warnings.filterwarnings('ignore')

#initializing model
model=Sequential()
```

Adding CNN Layer

Task 1:

```
#add cnn layer

model.add(Conv2D(filters=32,kernel_size=2,padding="same",activation
="relu"))
```

```
model.add(MaxPooling2D(pool_size=2))
model.add(Conv2D(filters=64,kernel_size=2,padding="same",activation="r
elu"))
model.add(MaxPooling2D(pool_size=2))
```

Task 2:

```
#flattening layer
model.add(Flatten())
```

Task 3:

```
#Adding PoolingLayer

model.add(MaxPooling2D(pool_size=(2,2)))
```

Adding Dense Layer

```
#adding DenseLayer

model.add(Dense(500,activation="relu"))

model.add(Dense(2,activation="softmax"))

print("Adding dense layer on top")
model.add(layers.Dense(64, activation='relu'))
model.add(layers.Dense(10))
print("Complete architecture of the model")
model.summary()
```

Configuring the Learning Process

```
#Configuring the learning process


model.compile(loss='binary_crossentrophy',optimizer="adam",
metrices=["accuracy"])
```

Test The Model

```
#importing the required libraries
from tensorflow.keras.datasets import mnist
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D
from tensorflow.keras.layers import MaxPool2D
from tensorflow.keras.layers import Flatten
from tensorflow.keras.layers import Dropout
from tensorflow.keras.layers import Dense

#loading data
(X_train,y_train) , (X_test,y_test)=mnist.load_data()
#reshaping data
```

```
X_train = X_train.reshape((X_train.shape[0], X_train.shape[1],
X_train.shape[2], 1))
X_test =
X_test.reshape((X_test.shape[0],X_test.shape[1],X_test.shape[2],1))
#checking the shape after reshaping
print(X_train.shape)
print(X_test.shape)
#normalizing the pixel values
X_train=X_train/255
X_test=X_test/255
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-
keras-datasets/mnist.npz
11490434/11490434 [==============================] - 0s 0us/step
(60000, 28, 28, 1)
(10000, 28, 28, 1)
```

```
#defining model
model=Sequential()
#adding convolution layer
model.add(Conv2D(32,(3,3),activation='relu',input_shape=(28,28,1)))
#adding pooling layer
model.add(MaxPool2D(2,2))
#adding fully connected layer
model.add(Flatten())
model.add(Dense(100,activation='relu'))
#adding output layer
model.add(Dense(10,activation='softmax'))
#compiling the model
model.compile(loss='sparse_categorical_crossentropy',optimizer='adam',
metrics=['accuracy'])
#fitting the model
model.fit(X_train,y_train,epochs=10)
```

```
Epoch 1/10
1875/1875 [==============================] - 41s 21ms/step - loss:
0.1474 - accuracy: 0.9566
Epoch 2/10
1875/1875 [==============================] - 40s 21ms/step - loss:
0.0534 - accuracy: 0.9837
Epoch 3/10
1875/1875 [==============================] - 39s 21ms/step - loss:
0.0338 - accuracy: 0.9893
Epoch 4/10
1875/1875 [==============================] - 41s 22ms/step - loss:
0.0218 - accuracy: 0.9931
Epoch 5/10
1875/1875 [==============================] - 39s 21ms/step - loss:
0.0149 - accuracy: 0.9952
Epoch 6/10
1875/1875 [==============================] - 41s 22ms/step - loss:
```

```
0.0101 - accuracy: 0.9966
Epoch 7/10
1875/1875 [==============================] - 39s 21ms/step - loss:
0.0084 - accuracy: 0.9973
Epoch 8/10
1875/1875 [==============================] - 43s 23ms/step - loss:
0.0069 - accuracy: 0.9977
Epoch 9/10
1875/1875 [==============================] - 41s 22ms/step - loss:
0.0051 - accuracy: 0.9985
Epoch 10/10
1875/1875 [==============================] - 40s 21ms/step - loss:
0.0045 - accuracy: 0.9985

<keras.callbacks.History at 0x7f3bbd6264d0>
```

Save The Model

```
import tensorflow as tf

from tensorflow.keras import datasets, layers, models
import matplotlib.pyplot as plt

plt.plot(history.history['accuracy'], label='accuracy')
plt.plot(history.history['val_accuracy'], label = 'val_accuracy')
plt.xlabel('Epoch')
plt.ylabel('Accuracy')
plt.ylim([0.5, 1])
plt.legend(loc='lower right')

test_loss, test_acc = model.evaluate(test_images,  test_labels,
verbose=2)
```

Predictions

```
#import the models
from keras.models import load_model

#import image classs from keras

from keras.preprocessing import image

#import numpy
import numpy as np

#import cv2
import cv2

#give any random image path

img=image.load_img('/content/with fire (18).jpg')
x=image.img_to_array(img)
```

```
#expand the image shape
x=np.expand_dims(x,axis=0)

pred=model.predict_classes(x)

pred.
```