Sprint-2

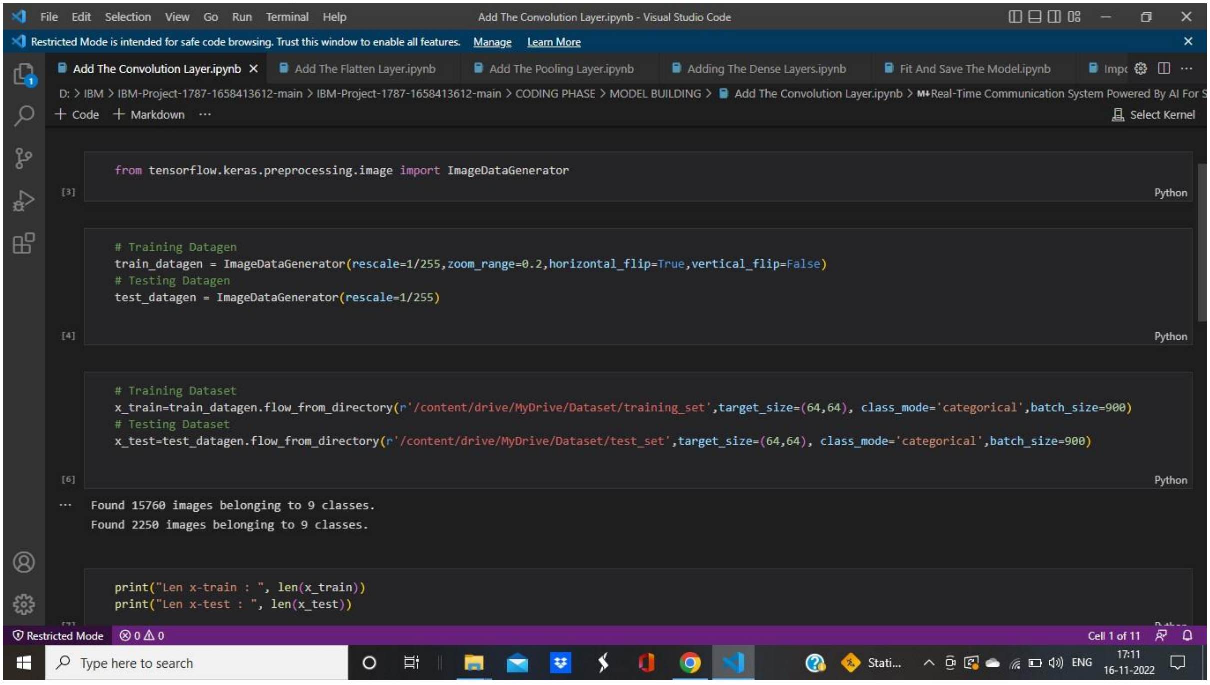
Project Development Phase

Date	18 November 2022
Team ID	PNT2022TMID29406
Project Name	Real – Time Communication system powered by AI for Specially Abled

DESCRIPTION : As the next part of developing phase we have completed building and testing the model

MODEL BUILDING :

The convolution layer :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Add The Convolution Layer.ipynb - Visual Studio Code
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Add The Pooling Layer.ipynb
Adding The Dense Layers.ipynb
Fit And Save The Model.ipynb
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```
[3]
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

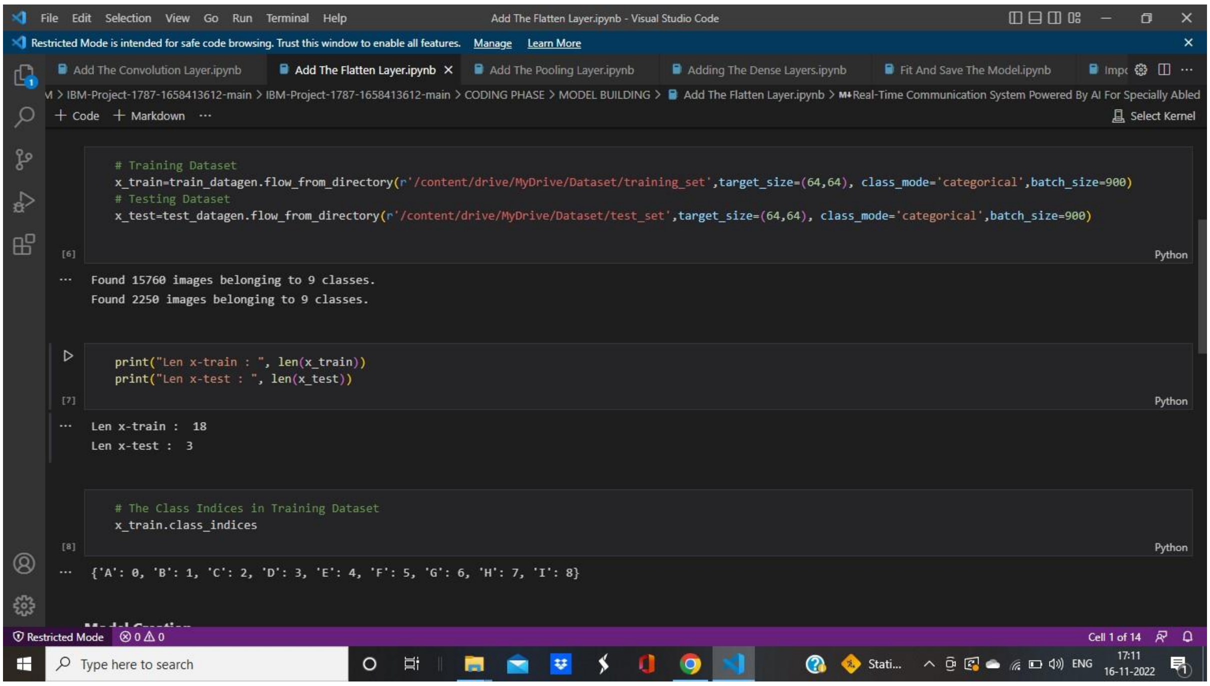
```
[4]
# Training Datagen
train_datagen = ImageDataGenerator(rescale=1/255,zoom_range=0.2,horizontal_flip=True,vertical_flip=False)
# Testing Datagen
test_datagen = ImageDataGenerator(rescale=1/255)
```

```
[6]
# Training Dataset
x_train=train_datagen.flow_from_directory(r'/content/drive/MyDrive/Dataset/training_set',target_size=(64,64), class_mode='categorical',batch_size=900)
# Testing Dataset
x_test=test_datagen.flow_from_directory(r'/content/drive/MyDrive/Dataset/test_set',target_size=(64,64), class_mode='categorical',batch_size=900)
```

```
Found 15760 images belonging to 9 classes.
Found 2250 images belonging to 9 classes.
```

```
print("Len x-train : ", len(x_train))
print("Len x-test : ", len(x_test))
```

The flatten layer :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```
# Training Dataset
x_train=train_datagen.flow_from_directory(r'/content/drive/MyDrive/Dataset/training_set',target_size=(64,64), class_mode='categorical',batch_size=900)
# Testing Dataset
x_test=test_datagen.flow_from_directory(r'/content/drive/MyDrive/Dataset/test_set',target_size=(64,64), class_mode='categorical',batch_size=900)
```

```
Found 15760 images belonging to 9 classes.
Found 2250 images belonging to 9 classes.
```

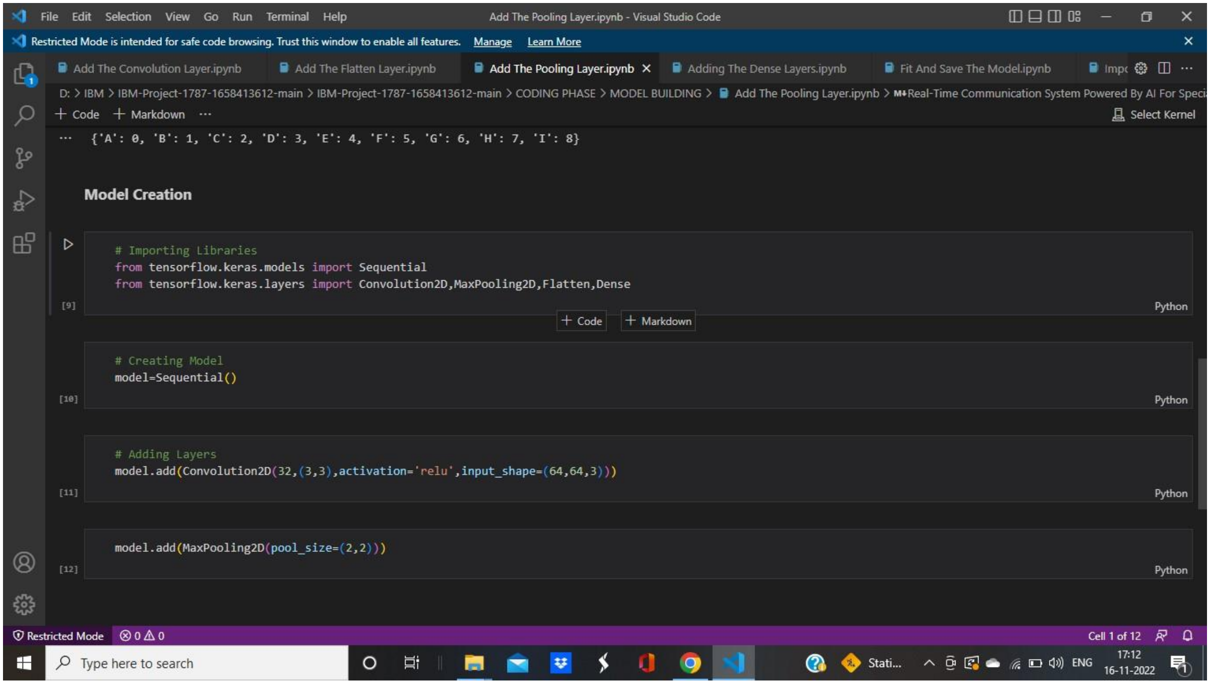
```
print("Len x-train : ", len(x_train))
print("Len x-test : ", len(x_test))
```

```
Len x-train :  18
Len x-test :  3
```

```
# The Class Indices in Training Dataset
x_train.class_indices
```

```
{'A': 0, 'B': 1, 'C': 2, 'D': 3, 'E': 4, 'F': 5, 'G': 6, 'H': 7, 'I': 8}
```

The pooling layer :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Add The Pooling Layer.ipynb
Adding The Dense Layers.ipynb
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```
{'A': 0, 'B': 1, 'C': 2, 'D': 3, 'E': 4, 'F': 5, 'G': 6, 'H': 7, 'I': 8}
```

Model Creation

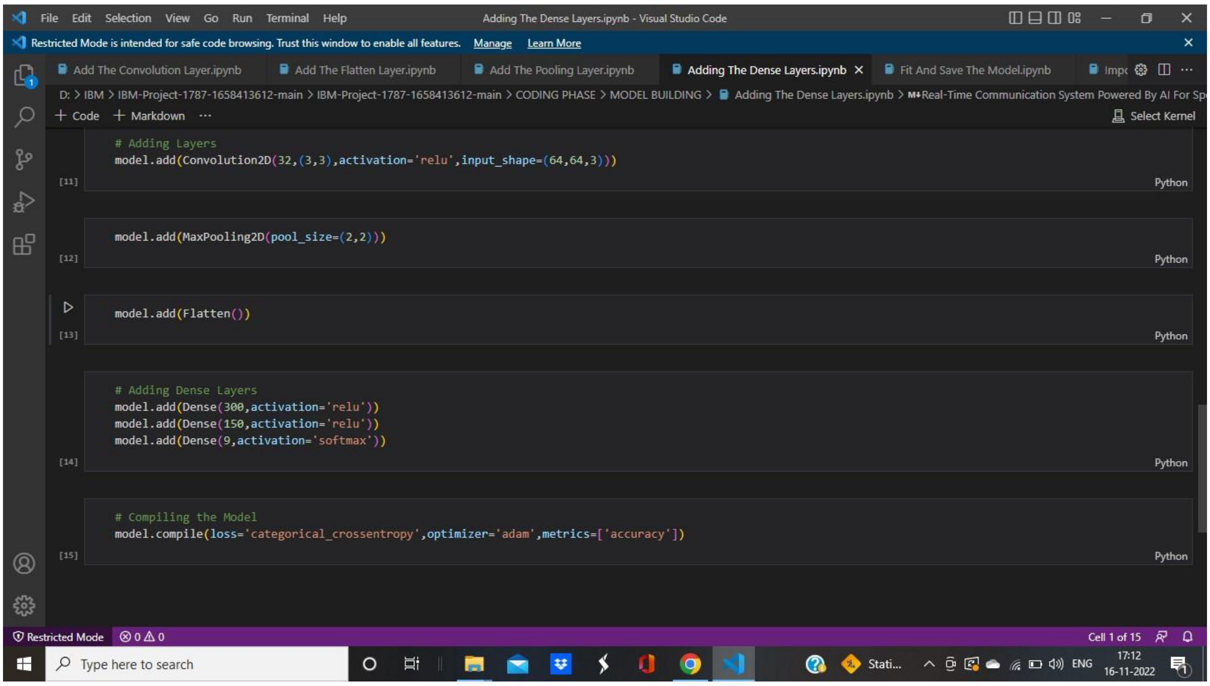
```
# Importing Libraries
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
```

```
# Creating Model
model=Sequential()
```

```
# Adding Layers
model.add(Convolution2D(32,(3,3),activation='relu',input_shape=(64,64,3)))
```

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

The dense layer :



```
# Adding Layers
model.add(Convolution2D(32,(3,3),activation='relu',input_shape=(64,64,3)))
```

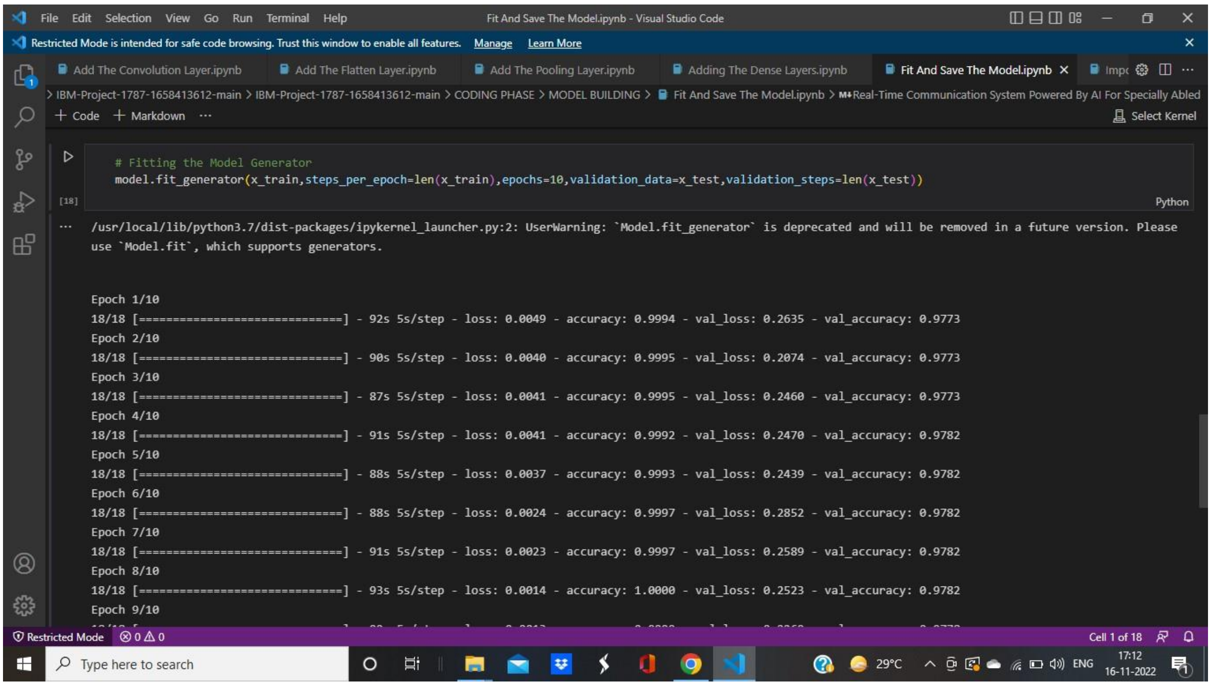
```
model.add(MaxPooling2D(pool_size=(2,2)))
```

```
model.add(Flatten())
```

```
# Adding Dense Layers
model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))
model.add(Dense(9,activation='softmax'))
```

```
# Compiling the Model
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
```

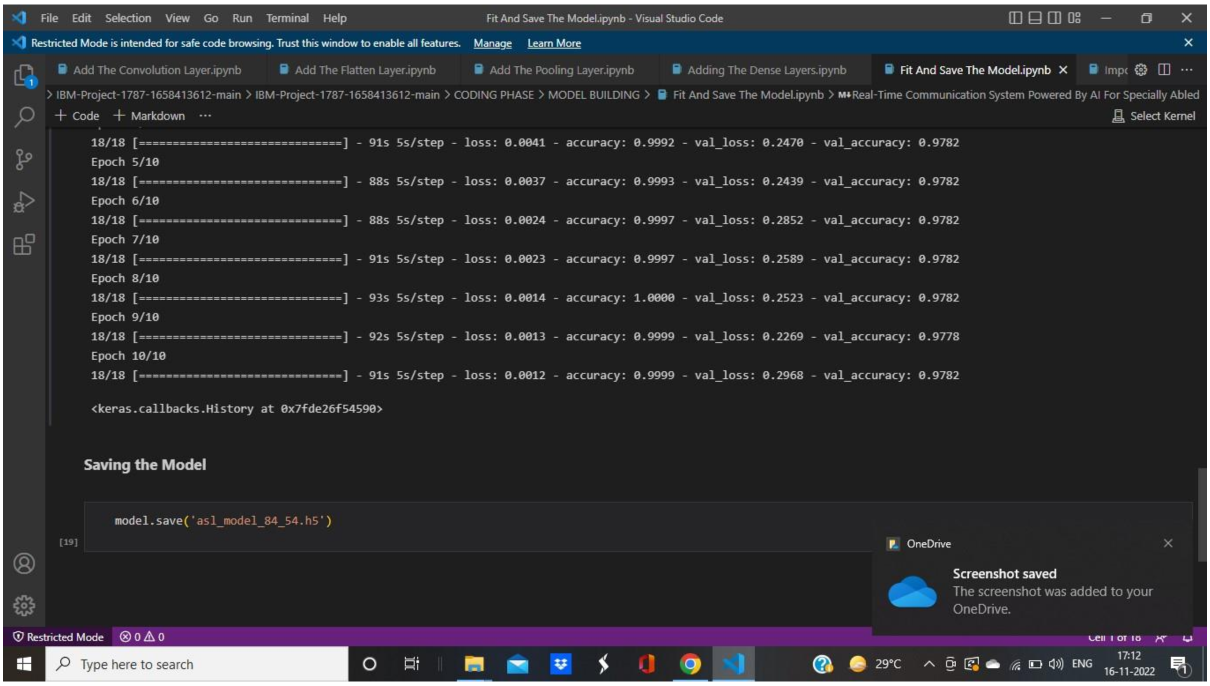
Fit and save the model :



```
# Fitting the Model Generator
model.fit_generator(x_train,steps_per_epoch=len(x_train),epochs=10,validation_data=x_test,validation_steps=len(x_test))
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:2: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please
use `Model.fit`, which supports generators.


Epoch 1/10
18/18 [==============================] - 92s 5s/step - loss: 0.0049 - accuracy: 0.9994 - val_loss: 0.2635 - val_accuracy: 0.9773
Epoch 2/10
18/18 [==============================] - 90s 5s/step - loss: 0.0040 - accuracy: 0.9995 - val_loss: 0.2074 - val_accuracy: 0.9773
Epoch 3/10
18/18 [==============================] - 87s 5s/step - loss: 0.0041 - accuracy: 0.9995 - val_loss: 0.2460 - val_accuracy: 0.9773
Epoch 4/10
18/18 [==============================] - 91s 5s/step - loss: 0.0041 - accuracy: 0.9992 - val_loss: 0.2470 - val_accuracy: 0.9782
Epoch 5/10
18/18 [==============================] - 88s 5s/step - loss: 0.0037 - accuracy: 0.9993 - val_loss: 0.2439 - val_accuracy: 0.9782
Epoch 6/10
18/18 [==============================] - 88s 5s/step - loss: 0.0024 - accuracy: 0.9997 - val_loss: 0.2852 - val_accuracy: 0.9782
Epoch 7/10
18/18 [==============================] - 91s 5s/step - loss: 0.0023 - accuracy: 0.9997 - val_loss: 0.2589 - val_accuracy: 0.9782
Epoch 8/10
18/18 [==============================] - 93s 5s/step - loss: 0.0014 - accuracy: 1.0000 - val_loss: 0.2523 - val_accuracy: 0.9782
Epoch 9/10
```



```
18/18 [============================] - 91s 5s/step - loss: 0.0041 - accuracy: 0.9992 - val_loss: 0.2470 - val_accuracy: 0.9782
Epoch 5/10
18/18 [============================] - 88s 5s/step - loss: 0.0037 - accuracy: 0.9993 - val_loss: 0.2439 - val_accuracy: 0.9782
Epoch 6/10
18/18 [============================] - 88s 5s/step - loss: 0.0024 - accuracy: 0.9997 - val_loss: 0.2852 - val_accuracy: 0.9782
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Epoch 8/10
18/18 [============================] - 93s 5s/step - loss: 0.0014 - accuracy: 1.0000 - val_loss: 0.2523 - val_accuracy: 0.9782
Epoch 9/10
18/18 [============================] - 92s 5s/step - loss: 0.0013 - accuracy: 0.9999 - val_loss: 0.2269 - val_accuracy: 0.9778
Epoch 10/10
18/18 [============================] - 91s 5s/step - loss: 0.0012 - accuracy: 0.9999 - val_loss: 0.2968 - val_accuracy: 0.9782

<keras.callbacks.History at 0x7fde26f54590>
```

Saving the Model

```
model.save('asl_model_84_54.h5')
```

Screenshot saved
The screenshot was added to your OneDrive.

Fit And Save The Model.ipynb - Visual Studio Code
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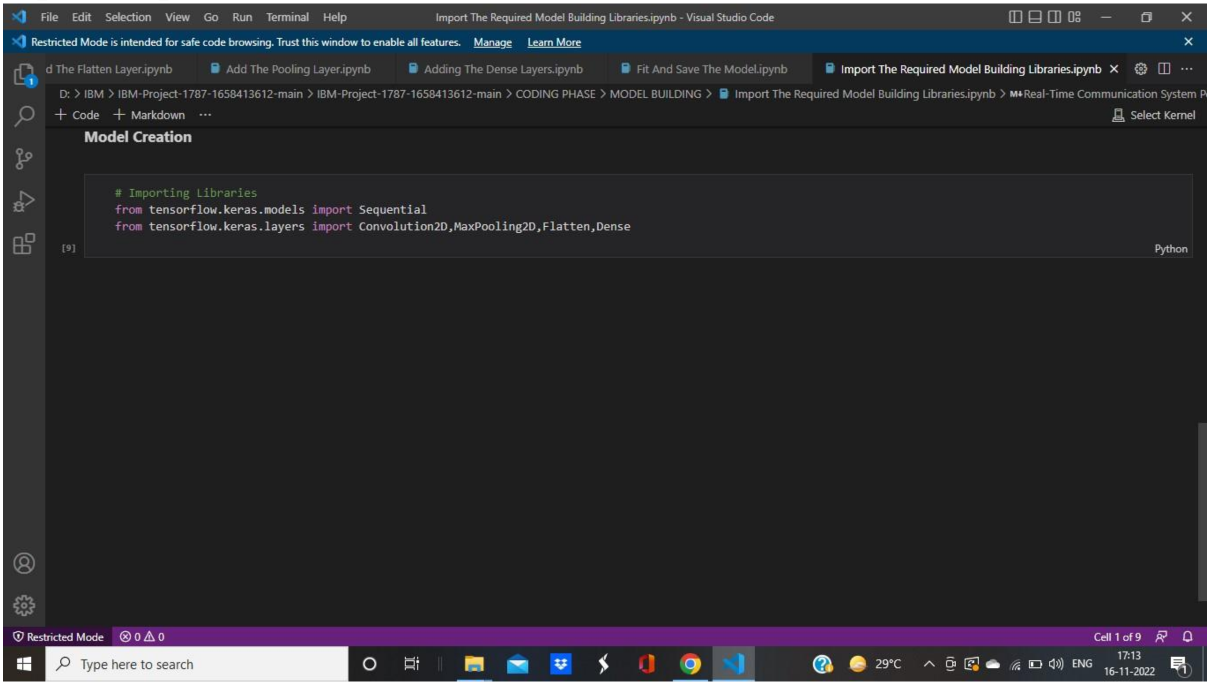
TEST THE MODEL :

Import required libraries :



Model Creation

```
# Importing Libraries
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
```

Import The Required Model Building Libraries.ipynb - Visual Studio Code
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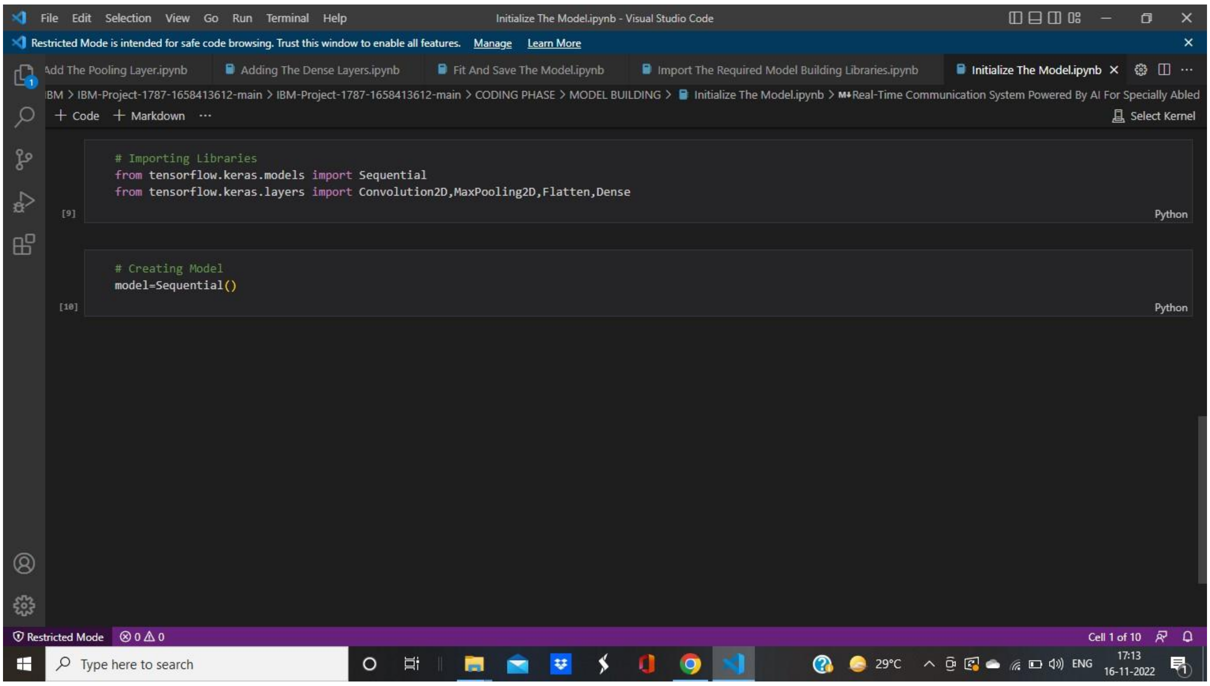
Initialize the model :



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[9]

```
# Importing Libraries
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
```

[10]

```
# Creating Model
model=Sequential()
```